Think Academy

Jolly Math

Grade 3

Think Academy US ONLINE

Upper Elementary Math Program

Think Academy Elementary Math Program is designed for K to Grade 5 students, offering a professional, systematic, and comprehensive year-round curriculum based on North American learning standards. The program is divided into two main systems:**School Curriculum Track and Competition Track.**

- The School Curriculum Track is divided by students' progress and ability:
  - Core+：Aligned with school curriculum; with solid foundations and steady improvement
  - Honors：One year ahead; consistent A grades and readiness for accelerated programs
  - Challenge：1.5–2 years ahead; full mastery of AP-level math with moderate enrichment

1–2 years ahead of Common Core, aligning with both private school entrance exams (MAP, ISEE, SSAT) and public school assessments (STAR Math, i-Ready, IOWA, SBA, etc.), ensuring students maintain a strong academic edge.

- The Competition Track is divided by thinking flexibility and concept mastery:
  - ACE：Builds competition foundations, strengthens problem-solving skills, and helps Grade 5 students reach AMC 8 Honor Roll
  - ACE+：Intensive training for advanced Olympiad pathways and higher-level competitions

Covers core knowledge points from Math Kangaroo (Grades 1–4) and AMC 8 (Grades 4–8), develops both reasoning and competition skills, promoting excellence in school academics and contests for long-term growth.!

The tiered class structure ensures every student finds a fit. All cover the seven core modules of elementary mathematics—Computation, Geometry, Number Theory, Applications, Counting and Probability, Algebra, and Combinatorics—**with differences only in pace and depth.**

	Elementary School									Middle School		
Grade	G3			G4			G5			G6		
Semester	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring
Core+	Math 3			Math 4			Math 5			Math 6		
Honors	G3 Honors			G4 Honors			G5 Honors			Pre-Algebra		
Challenge	G3 Challenge			G4 Challenge			G5 Challenge			Algebra 1		Intro to Geometry
ACE	G3 ACE			G4 ACE			G5 ACE			AMC8 HR		AMC10 Intro

Think Academy US ONLINE
Middle School Competition Track Student Results

2022-2024 AMC8 Number of Students Awarded:

456
Achievement Roll
(Lower Grade Achievement Award)

397
Honor Roll
(National Top 5%)

134
DHR
(National Top 1%)

2022-2024 AMC10 Number of Students Awarded:

304
AIME Qualification
(National Top 7%)

187
Honor Roll
(National Top 5%)

45
DHR
(National Top 1%)

2024 Think Global IMO Award Winner

7 Golds 1 Silver

Ranked first globally in total gold medals.

International Mathematical Olympiad
Foundation Bronze Sponsor

Think Academy is an official partner of the International Mathematical Olympiad (IMO)

Why Think Academy Competition Courses Trained Thousands of Award-Winning Students?

1 One-Stop Professional System for Math Competitions

Think Competition follows the AMC syllabus and aligns with students' learning pace. **Grades 5–6 focus on AMC 8**, while **Grades 7–8 focus on AMC 10**. The curriculum covers the four core modules of math competitions — Algebra, Geometry, Number Theory, and Counting & Probability — enabling students to achieve one competition milestone each year and **complete AMC 10 preparation before high school, successfully qualifying for AIME**.

2 Expert Coaches. Top Results. Proven Success.

Think Competition courses are taught by **instructors with many years of competition teaching experience**, enabling students to master complex contest concepts efficiently and with ease.

James
Upenn - 5 YOE

Dennis
Duke - 4 YOE

Yichen
Columbia - 4 YOE

3 Collaborate and Excel with Outstanding Peers

Each year, the Competition Track begins with an entrance assessment to ensure students learn alongside peers of similar ability. This structure makes preparation more engaging and collaborative, as students motivate one another and grow together throughout the journey.

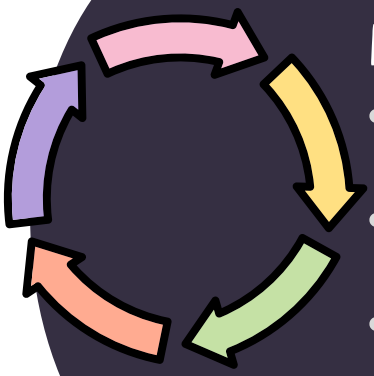
Think Academy US Online

Course Highlights

Clear Structure, Worry-Free for Parents

Personalized Learning Plans with Full Progress Tracking

- **Before Enrollment:** Teachers create **personalized study plans** based on each student' s goals and ability
- **During Learning:** Teachers give **regular feedback and targeted advice**, helping parents track progress
- **Mid-Term & Final Evaluations**: **Parent meetings** and updated study plans ensure steady improvement



Weekly Learning Cycle to Ensure Steady Progress

- **Pre-Class Preparation: 15-minute preview** to review key concepts and prepare for new lessons
- **Homework: Assigned after each class**, with teacher feedback shared with parents
- **Office Hour: Free live sessions** to review and clarify difficult problems
- **Homework Review Videos:** Each homework question includes a **detailed video explanation** for easy review

Year-Round Learning Support

- **Year-round Parent App service** providing fast responses
- Through the Parent App, parents get **direct contact with teachers** for efficient communication and real-time progress updates
- Instant online homework help for **timely learning support**

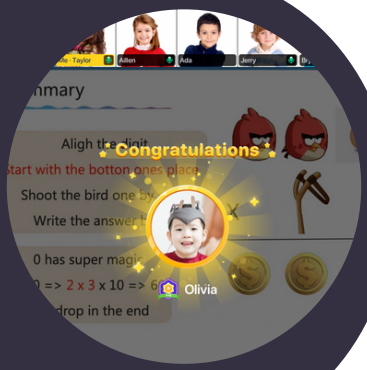
Think Academy US Online

Course Highlights

Happy Learning, Better Results

Thoughtfully Crafted Lessons Inspire a Love for Math

- **Interactive games and scenario-based teaching** make math fun and engaging
- **Gold coin reward system** lets students exchange coins for prizes, motivating them to complete learning tasks actively



Self-Developed Learning App Enhances Every Online Class

- **Think Academy learning app** enhances in-class interaction with hand-raising, polls, and group activities —**keeping students engaged every three minutes**
- Teachers **track progress in real time** for an effective learning experience

A Sense of Achievement Builds Intrinsic Motivation

- Students learn efficiently in class and get **full after-class support** with detailed homework videos and free weekly Office Hours.
- Students **gain higher grades, faster progress**. They are naturally motivated to put more effort in STEM learning and become **confident math learners**

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Basic Math

Numbers and Operations

Numbers to 100,000

1 Order the following five numbers from least to greatest.

$1,356$ $2,924$ $3,162$ $8,263$ $1,526$

_____ < _____ < _____ < _____ < _____

2 Find the missing numbers.

(1) $35,408 = 30,000 + 5,000 +$ _____ $+8$

(2) $46,294 =$ _____ ten thousands + 6 thousands + _____ hundreds + 9 tens + 4 ones

3 Write the expanded form of the following numbers.

(1) Expanded form for $7,008$: _____

(2) Expanded form for $6,060$: _____

(3) Expanded form for $5,300$: _____

(4) Expanded form for $8,190$: _____

(5) Expanded form for $3,612$: _____

4 Find the missing numbers.

(1) $80,671 =$ _____ $+600 + 70 + 1$

(2) $24,549 = 2$ ten thousands + _____ thousands + 5 hundreds + 4 tens + _____ ones

5 Order the following four numbers from least to greatest with the help of the place-value chart.

62, 152 42, 634 63, 154 22, 132

Ten Thousands	Thousands	Hundreds	Tens	Ones

_____ < _____ < _____ < _____

6 Find the missing numbers.

(1) 61, 047 = 60, 000+ _____ +40 + 7

(2) 82, 572 = 8 ten thousands + _____ thousands + 5 hundreds + _____ tens +2 ones

7 Find the missing numbers.

(1) $3,814 = 3,000 +$ _____ $+10 + 4$

(2) $5,374 =$ _____ $+ 300 + 70 + 4$

(3) $6,263 = 6,000 + 200 +$ _____ $+3$

(4) $5,723 =$ _____ thousands $+$ _____ hundreds $+2$ tens + 3 ones

(5) $6,263 = 6$ thousands + _____ hundreds + _____ tens + 3 ones

8 Write the expanded form of the following numbers.

(1)Expanded form for $4,005$: _____

(2)Expanded form for $2,040$: _____

(3)Expanded form for $3,600$: _____

(4)Expanded form for $5,380$: _____

(5)Expanded form for $1,827$: _____

9 Find the missing numbers.

(1) $51,307 = 50,000 + 1,000 + 300 +$ _____

(2) $43,372 = 4$ ten thousands + _____ thousands + 3 hundreds + _____ tens + 2 ones

10 Order the following four numbers from least to greatest with the help of the place-value chart.

$71,237$ $73,234$ $62,234$ $41,231$

Ten Thousands	Thousands	Hundreds	Tens	Ones

_____ < _____ < _____ < _____

11 Find the missing numbers.

(1) $62,023 = 60,000 +$ _____ $+20 + 3$

(2) $39,728 = 3$ ten thousands + _____ thousands + _____ hundreds + 2 tens + 8 ones

12 Order the following four numbers from least to greatest with the help of the place-value chart.

$14,475$ $14,512$ $54,511$ $26,172$

Ten Thousands	Thousands	Hundreds	Tens	Ones

_____ < _____ < _____ < _____

13 Order the following five numbers from least to greatest.

$3,274$ $6,152$ $5,475$ $5,264$ $4,641$

_____ < _____ < _____ < _____ < _____

Addition and Subtraction of Whole Numbers

1 Calculate:

(1) $6,326 + 1,439 =$ _____

(2) $5,839 + 3,279 =$ _____

(3) $2,785 + 4,779 =$ _____

(4) $5,748 + 3,367 =$ _____

2 Use column subtraction to calculate:

(1) $44,351 - 26,223 =$ _____ (2) $25,734 - 6,423 =$ _____

(3) $68,612 - 28,153 =$ _____ (4) $52,142 - 6,142 =$ _____

3 Use column subtraction to calculate:

(1) $94,462 - 79,151 =$ _____ (2) $41,212 - 6,728 =$ _____

(3) $41,125 - 27,522 =$ _____

(4) $25,162 - 7,162 =$ _____

4 Calculate:

(1) $8,421 + 7,469 =$ _____

(2) $9,063 + 3,002 =$ _____

(3) $4,204 + 5,979 =$ _____

(4) $4,200 + 2,838 =$ _____

5 Solve the following problems using column subtraction.

(1) $4,200 - 3,800 =$ _____

−				

(2) $4,320 - 1,780 =$ _____

−				

(3) $5,618 - 2,580 =$ _____

−				

6 Solve the following problems using column subtraction.

(1) $4,700 - 2,900 =$ _____

−				

(2) $5,430 - 4,320 =$ _____

−				

(3) $5,678 - 2,590 =$ _____

−				

7 Use column subtraction to calculate:

(1) $47,258 - 13,862 =$ _____

(2) $65,371 - 9,846 =$ _____

(3) $29,174 - 18,922 =$ _____

(4) $57,913 - 9,913 =$ _____

Estimation of Whole Numbers

1 Use rounding estimation to find the answers. (Round each number to the nearest thousand.)

(1) The estimated result of $7,293 - 1,947$ is _____ .

(2) The estimated result of $7,895 + 1,223$ is _____ .

(3) The estimated result of $78,831 - 8,142$ is _____ .

(4) The estimated result of $28,572 + 52,430$ is _____ .

2 Use rounding estimation to find the answers. (Round each number to the nearest thousand.)

(1) The estimated result of $6,501 - 3,123$ is _____ .

(2) The estimated result of $5,195 + 1,742$ is _____ .

(3) The estimated result of $65,294 - 4,334$ is _____ .

(4) The estimated result of $41,753 + 36,253$ is _____ .

3 Use front-end estimation to find the answers.

(1) The estimated result of $31,472 + 69,123$ is _____ .

(2) The estimated result of $82,421 - 29,520$ is _____ .

4 Use rounding estimation to find the answers. (Round the 2-digit number to the nearest ten.)

(1) The estimated result of 26×3 is _____ .

(2) The estimated result of 21×4 is _____ .

(3) The estimated result of 24×5 is _____ .

(4) The estimated result of 19×2 is _____ .

5 Use rounding estimation to find the answers. (Round the 2-digit number to the nearest ten.)

(1) The estimated result of 62×2 is _____ .

(2) The estimated result of 35×3 is _____ .

(3) The estimated result of 76×2 is _____ .

(4) The estimated result of 41×2 is _____ .

6 Use rounding estimation to find the answers. (Round each number to the nearest hundred.)

(1) The estimated result of $2,613 - 1,412$ is _____ .

(2) The estimated result of $5,962 + 2,142$ is _____ .

(3) The estimated result of $62,671 - 5,343$ is _____ .

(4) The estimated result of $73,182 + 12,662$ is _____ .

7 Use front-end estimation to find the answers.

(1) The estimated result of $52,182 + 25,142$ is _____ .

(2) The estimated result of $88,142 - 62,723$ is _____ .

8 Use front-end estimation to find the answers.

(1) The estimated result of $29,132 + 32,834$ is _____ .

(2) The estimated result of $41,512 - 38,371$ is _____ .

Multiplication and Division of Whole Numbers

1 Calculate:

(1) $125 \div 4 =$ _____ R _____

(2) $108 \div 7 =$ _____ R _____

(3) $125 \div 10 =$ _____ R _____

(4) $97 \div 3 =$ _____ R _____

2 Put some flowers into the vase. When put 6 in each vase, there will be flowers left. The possible numbers of the left flowers are _____ , the minimum number is _____ , the maximum number is _____ .

3 Calculate:

(1) $38 \div 4 =$ _____ R _____

(2) $110 \div 9 =$ _____ R _____

(3) $89 \div 5 =$ _____ R _____

(4) $123 \div 6 =$ _____ R _____

4 In a division equation, the divisor is 8, the quotient is 10, and the remainder is 7. Therefore, the dividend is _____ .

5 Calculate:

(1) $84 \div 7 =$ _____

(2) $17 \times 5 =$ _____

(3) $28 \times 7 =$ _____

(4) $64 \div 4 =$ _____

6 Calculate:

(1) $51 \div 3 =$ _____

(2) $15 \times 4 =$ _____

(3) $24 \times 9 =$ _____

(4) $56 \div 4 =$ _____

7 Put some peaches into several baskets. When put 6 peaches in each basket, there will be the peaches left. The possible numbers of the left peaches are _____ , the minimum number is _____ , and the maximum number is _____ .

Odd and Even Number

1 Without calculating, can you quickly decide if the result of each expression is an even or an odd number? Fill in each blank with "Even" or "Odd".

43 + 11	_____
666 + 888	_____
1 + 223	_____
823 – 41	_____
121 – 78	_____
876 – 19	_____

2 There are four numbers: 2000, 1187, 23, and 2235. Find the even number(s).

3 Without calculating, can you quickly decide if the result of each expression is an even or an odd number? Fill in each blank with "Even" or "Odd".

200 + 11	_____
555 + 555	_____
23 + 233	_____
800 – 798	_____
655 – 65	_____
777 – 269	_____

4 There are four numbers: 15, 27, 36, and 40. Which ones are even numbers?

5 Without calculating, can you quickly decide if the result of each expression is an even number or an odd number?

(1) The result of $883 - 178$ is an _____ number.

A. Odd B. Even

(2) The result of $985 - 379$ is an _____ number.

A. Odd B. Even

(3) The result of $21 + 42 + 83 + 94 + 25 + 86$ is an _____ number.

A. Odd B. Even

(4) The result of $78 + 90 + 133 + 84 + 95$ is an _____ number.

A. Odd B. Even

Factors and Multiples

1 Find the least common multiple of each pair of numbers.

(1) 4 and 10

(2) 3 and 5

(3) 4 and 8

2 Find the common factors and the greatest common factor of each pair of numbers below.

(1) 12 and 18

(2) 20 and 24

3 Find the common factors and the greatest common factor of each pair of numbers below.

(1) 18 and 24

(2) 13 and 26

4 Find the common factors and the greatest common factor of each pair of numbers below.

(1) 12 and 16

(2) 10 and 20

5 Find the first two common multiples of each pair of numbers. (Do not include 0 in the answer.)

(1) The first two common multiples of 3 and 4 are _____ and _____ .

(2) The first two common multiples of 2 and 10 are _____ and _____ .

6 Find all the factors of each number below.

(1) 27

(2) 26

7 Find the least common multiple of each pair of numbers.

(1) 5 and 6

(2) 4 and 5

(3) 2 and 8

8 Find the correct multiples.

(1) Starting from 1 time of 5, the third multiple of 5 is _____ .

(2) Starting from 1 time of 6, the eighth multiple of 6 is _____ .

(3) Starting from 1 time of 7, the third multiple of 7 is _____ .

9 Find the least common multiple of each pair of numbers.

(1) 5 and 8

(2) 4 and 6

(3) 2 and 6

10 Find all the factors of each number below.

(1) 19

(2) 14

11 How many factors does each of the following numbers have?

(1) 16

A. 2 B. 3 C. 4 D. 5

(2) 21

A. 1 B. 2 C. 4 D. 6

12 How many factors does each of the following numbers have?

(1) 13

A. 1 B. 2 C. 3 D. 4

(2) 24

A. 2 B. 4 C. 6 D. 8

13 Find the first two common multiples of each pair of numbers. (Do not include 0 in the answer.)

(1) The first two common multiples of 6 and 8 are _____ and _____ .

(2) The first two common multiples of 4 and 12 are _____ and _____ .

14 Find the correct multiples.

(1) Starting from 1 time of 8, the second multiple of 8 is _____ .

(2) Starting from 1 time of 6, the fifth multiple of 6 is _____ .

(3) Starting from 1 time of 9, the seventh multiple of 9 is _____ .

15 Find the first two common multiples of each pair of numbers. (Do not include 0 in the answer.)

(1) The first two common multiples of 2 and 6 are _____ and _____ .

(2) The first two common multiples of 4 and 8 are _____ and _____ .

16 Find the correct multiples.

(1) Starting from 1 time of 3, the fifth multiple of 3 is _____ .

(2) Starting from 1 time of 3, the ninth multiple of 3 is _____ .

(3) Starting from 1 time of 10, the seventh multiple of 10 is _____ .

17 How many factors does each of the following numbers have?

(1) 22

A. 1 B. 2 C. 3 D. 4

(2) 25

A. 1 B. 2 C. 3 D. 4

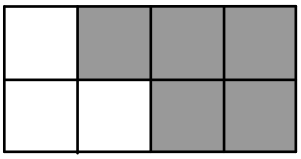
18 Find all the factors of each number below.

(1) 21

(2) 17

Knowing Fraction and Comparing Fraction

1 Lisa divided a rectangle into 8 identical small squares as shown below.



(1) The shaded small squares are _____ of the whole rectangle. The denominator is _____ , and the numerator is _____ .

(2) The white small squares are _____ of the whole rectangle. The denominator is _____ , and the numerator is _____ .

2 Compare the following fractions:

(1) $\frac{1}{5}$ ( ) $\frac{1}{7}$

(2) $\frac{6}{23}$ ( ) $\frac{7}{23}$

(3) $\frac{34}{5}$ ( ) $\frac{34}{7}$

(4) $\frac{9}{7}$ ( ) $\frac{11}{7}$

3 Compare the following fractions:

(1) $\frac{1}{17}$ ( ) $\frac{1}{15}$

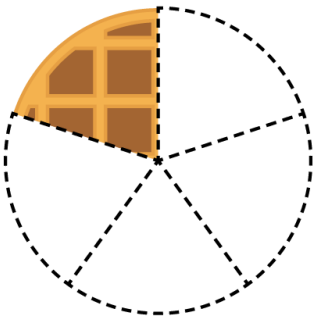
(2) $\frac{7}{20}$ ( ) $\frac{3}{20}$

(3) $\frac{35}{4}$ ( ) $\frac{35}{9}$

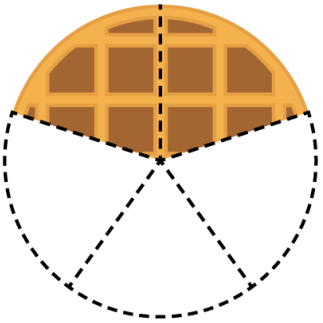
(4) $\frac{11}{12}$ ( ) $\frac{11}{5}$

4 Justin divides a waffle into 5 equal pieces.

(1) Justin eats 1 piece, which is _____ of the whole waffle.



(2) Justin gives 2 pieces to Vivian, which is _____ of the whole waffle.



5 Compare the following fractions:

(1) $\frac{3}{4}$ ( ) $\frac{7}{4}$

(2) $\frac{3}{14}$ ( ) $\frac{3}{11}$

(3) $\frac{13}{16}$ ( ) $\frac{11}{16}$

(4) $\frac{14}{3}$ ( ) $\frac{14}{5}$

6 Compare the following fractions:

(1) $\frac{3}{2}$ ( ) $\frac{9}{2}$

(2) $\frac{4}{11}$ ( ) $\frac{4}{15}$

(3) $\frac{7}{12}$ ( ) $\frac{11}{12}$

(4) $\frac{17}{6}$ ( ) $\frac{17}{5}$

Addition and Subtraction of Like Fractions

1 Calculate:

(1) $\frac{2}{9} + \frac{5}{9} =$ _____

(2) $\frac{1}{5} + \frac{3}{5} =$ _____

(3) $\frac{2}{10} + \frac{7}{10} =$ _____

(4) $\frac{6}{17} + \frac{8}{17} =$ _____

2 Calculate:

(1) $\frac{2}{7} + \frac{3}{7} =$ _____

(2) $\frac{6}{9} + \frac{1}{9} =$ _____

(3) $\frac{4}{13} + \frac{9}{13} =$ _____

(4) $\frac{4}{19} + \frac{6}{19} =$ _____

3 Calculate:

(1) $\frac{3}{10} + \frac{4}{10} =$ _____

(2) $\frac{3}{8} + \frac{5}{8} =$ _____

(3) $\frac{4}{7} - \frac{2}{7} =$ _____

(4) $\frac{9}{12} - \frac{4}{12} =$ _____

4 Calculate:

(1) $\frac{1}{7} + \frac{3}{7} =$ _____

(2) $\frac{2}{9} + \frac{3}{9} =$ _____

(3) $\frac{2}{8} + \frac{5}{8} =$ _____

(4) $\frac{2}{13} + \frac{4}{13} =$ _____

5 Calculate: (write the answer in the simplest form.)

(1) $\frac{5}{24} + \frac{7}{24} =$ _____ .

(2) $\frac{7}{27} + \frac{2}{27} =$ _____ .

(3) $\frac{17}{25} - \frac{7}{25} =$ _____ .

(4) $\frac{17}{32} - \frac{9}{32} =$ _____ .

(5) $1 - \frac{12}{34} =$ _____ .

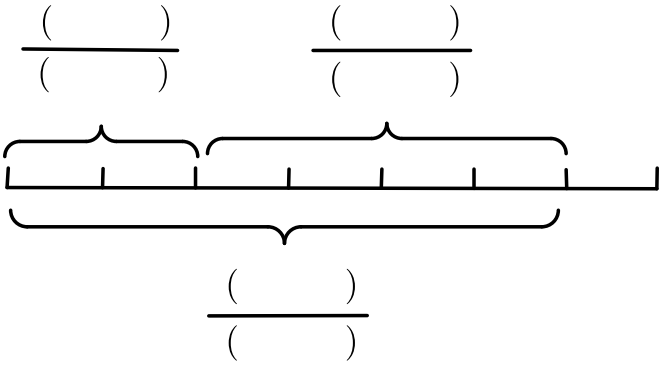
6 Calculate:

(1) $\frac{8}{11} - \frac{4}{11} + \frac{3}{11} =$ _____

(2) $\frac{2}{5} + \frac{3}{5} - \frac{3}{5} =$ _____

(3) $\frac{9}{23} + \frac{14}{23} - \frac{7}{23} =$ _____

7 Write the equation according to the picture below.



( ) + ( ) = ( )

8 Calculate: (write the answer in the simplest form.)

(1) $\frac{3}{17} + \frac{9}{17} =$ _____ .

(2) $\frac{14}{24} + \frac{2}{24} =$ _____ .

(3) $\frac{18}{30} - \frac{3}{30} =$ _____ .

(4) $\frac{25}{35} - \frac{18}{35} =$ _____ .

(5) $1 - \frac{11}{27} =$ _____ .

9 Calculate:

(1) $\frac{5}{9} - \frac{2}{9} + \frac{4}{9} =$ _____

(2) $\frac{3}{7} + \frac{4}{7} - \frac{4}{7} =$ _____

(3) $\frac{3}{19} + \frac{15}{19} - \frac{11}{19} =$ _____

10 Calculate: (write the answer in the simplest form.)

(1) $\frac{7}{18} + \frac{5}{18} =$ _____ .

(2) $\frac{11}{20} + \frac{5}{20} =$ _____ .

(3) $\frac{15}{28} - \frac{7}{28} =$ _____ .

(4) $\frac{15}{26} - \frac{5}{26} =$ _____ .

(5) $1 - \frac{20}{36} =$ _____ .

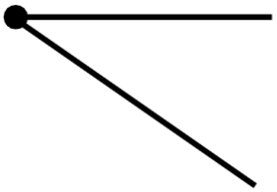
NOTE

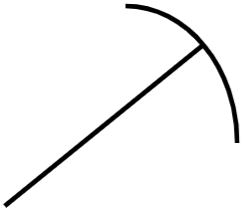
NOTE

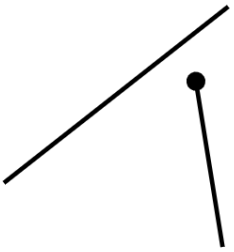
Geometry

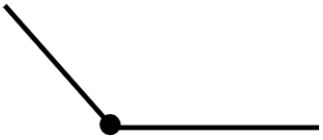
Identify Angles

1 Are the following 4 figures angles? If yes, put a ✓ in the parentheses; if no, put a ×.

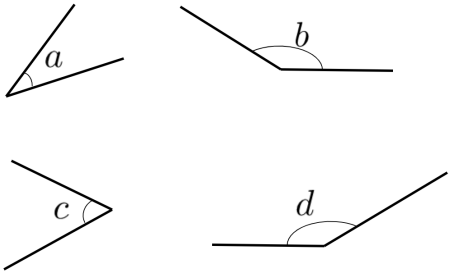
1.  ( ) .

2.  ( ) .

3.  ( ) .

4.  ( ) .

2 Look at the given angles and answer the following questions.



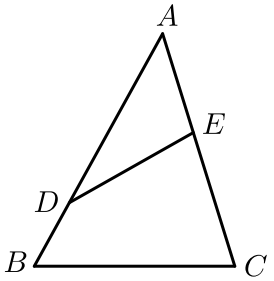
(1) Which angles are acute?

∠ _____ , ∠ _____ .

(1) Which angles are obtuse?

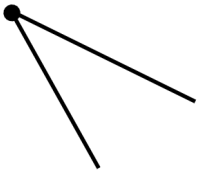
∠ _____ , ∠ _____ .

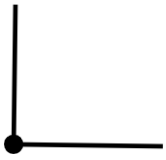
3 Which of the angles below is the angle with E as the vertex?

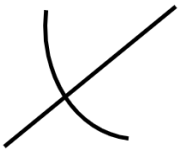


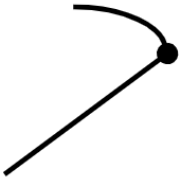
A. $\angle DAE$ B. $\angle ADE$ C. $\angle DEA$ D. $\angle BDE$

4 Are the following 4 figures angles? If yes, put a ✓ in the parentheses; if no, put a ×.

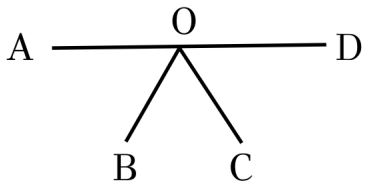
1.  ( ) .

2.  ( ) .

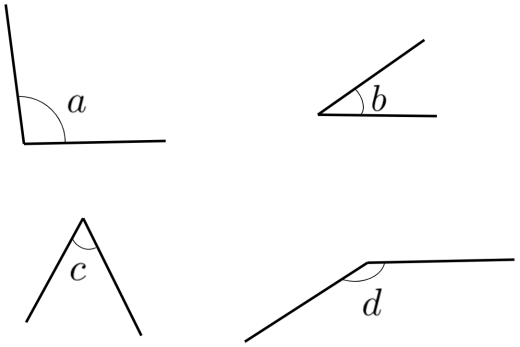
3.  ( ) .

4.  ( ) .

5 Find and list all the angles in the figure below (only consider those less than 180 degrees).



6 Look at the given angles and answer the following questions.



(1) Which angles are acute?

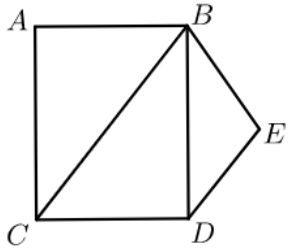
∠ _____ , ∠ _____ .

(2) Which angles are obtuse?

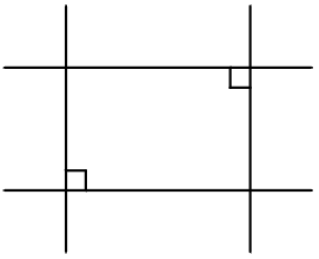
∠ _____ , ∠ _____ .

Parallel and Perpendicular

1. Line BC is parallel to line _____ , and line BD is perpendicular to line _____ and _____ .



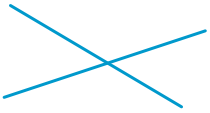
2. How many pairs of perpendicular lines are there in the figure? _____ pairs

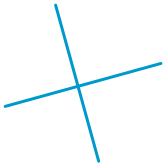


3 Put the ✓ in the ( ) if two lines are perpendicular to each other in each figure. If not, put a × in the ( ).

1. ( ) .

2. ( ) .

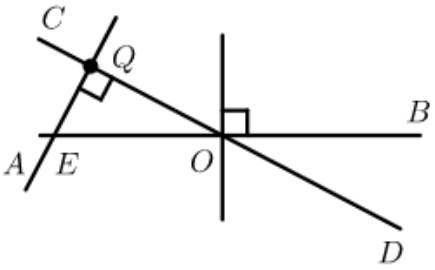
3.  ( ) .

4.  ( ) .

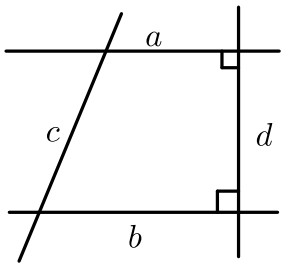
5. ( ) .

6. ( ) .

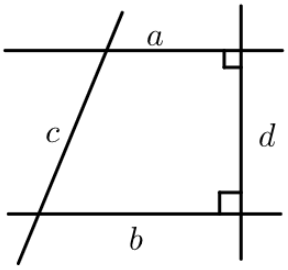
4 How many pairs of perpendicular lines are there in the figure? _____ pairs



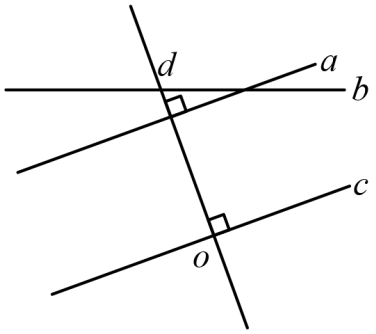
5 How many pairs of perpendicular lines are there in the following figure?



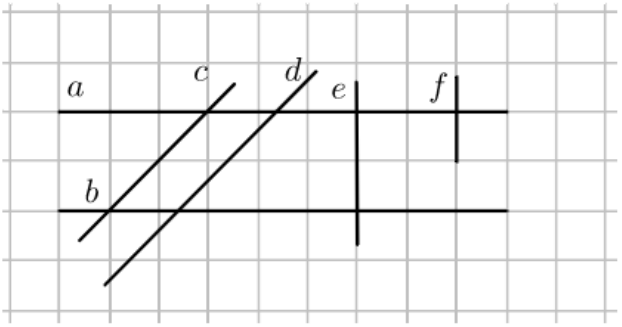
6 How many pairs of parallel lines are there in the figure below? _____



7 How many pairs of perpendicular lines are there in the figure? _____ pairs

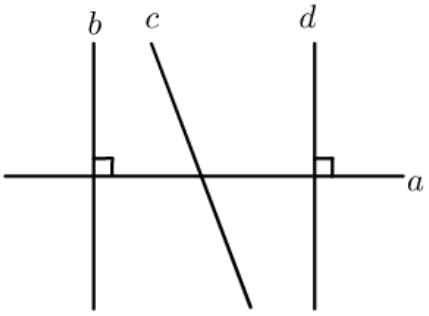


8 Which following statements are false?

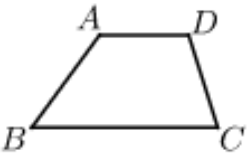


A. $a//b, a\perp e$ B. $c//d, f\perp b$ C. $d//e, b\perp e$ D. $a//b, a\perp f$

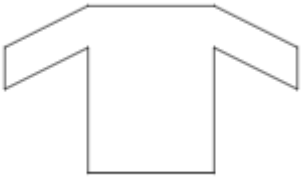
9 Line b is parallel to line _____ , and line d is perpendicular to line _____ .



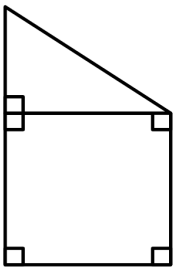
10 How many pairs of parallel lines are there in figure $ABCD$? _____ pair



11 How many pairs of perpendicular lines are there in the figure? _____ pairs

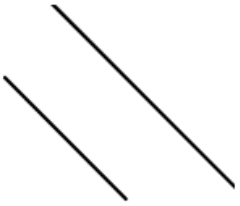


12 The figure below is made up of a right triangle and a square. How many pairs of perpendicular line segments are there in the figure? _____



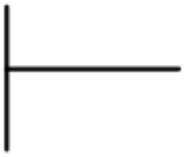
13 Put the ✓ in the ( ) if two lines are perpendicular to each other in each figure. If not, put a × in the ( ).

1. ( ) .

2.  ( ) .

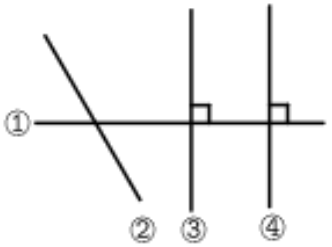
3. ( ) .

4. ( ) .

5.  ( ) .

6. ( ) .

14 Which lines are perpendicular to ①?

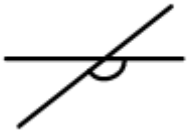


A. ②④ B. ③④ C. ②③

15 Put the ✓ in the ( ) if two lines are perpendicular to each other in each figure. If not, put a × in the ( ).

1.

( ) .

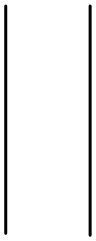
2. 

( ) .

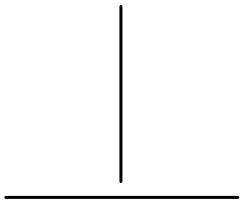
3.

( ) .

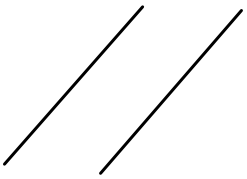
16 Put the ✓ in the ( ) if two lines are parallel to each other in each figure. If not, put a × in the ( ).

1. 

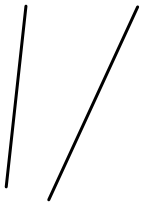
( )

2. 

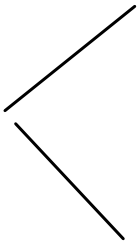
( )

3. 

( )

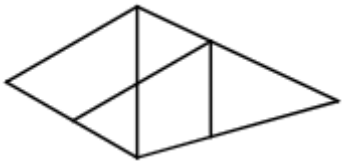
4. 

( )

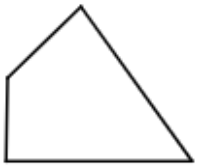
5. 

( )

17 How many pairs of parallel lines are there in the figure shown below? _____ pairs



18 How many pairs of parallel lines are there in the figure shown below? _____ pairs

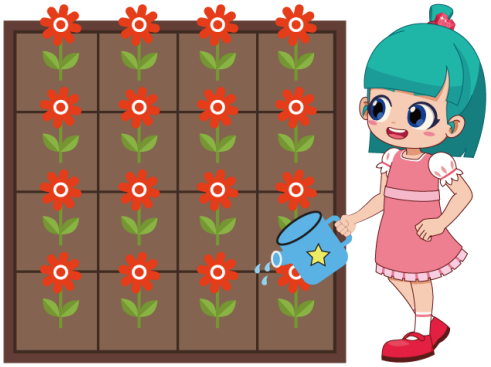


Area of Rectangle and Square

1. Dennis has a rectangular garden with an area of 48 m^2. The length of the garden is 8 m. The width of the garden is _____ m.

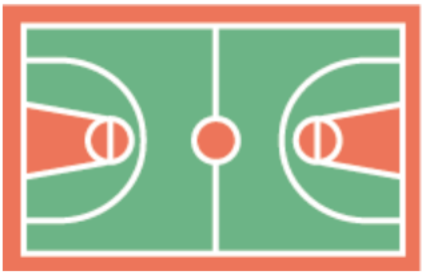
2. A rectangular garden has a length of 65 m and a width of 30 m. The area of the garden is _____ m^2.

3 Vivian's flowerbed is a square with an area of 64 m^2. The side length of the flowerbed is _____ m.



4 The workers are going to plant some flowers in the rectangular garden, which is 20 meters long and 5 meters wide. They grow some roses in the entire garden with 3 roses per square meter. They grow _____ roses in total.

5 A rectangular playground has a length of 18 meters and a width of 8 meters.The perimeter of the playground is _____ m, and the area of the playground is _____ m^2.



6 A square pizza has an area of 144 cm^2. The side length of the pizza is _____ cm, and the perimeter of the pizza is _____ cm.

7 A rectangular pencil case has a length of 19 cm and a width of 16 cm. The area of the pencil case is _____ cm^2.

8 Tom has a rectangular farm with a length of 20 m. Its width is 10 m less than its length. He keeps some chickens in the entire garden with 4 chickens per square meter. Tom keeps _____ chickens in total.

9 Linda has a square vegetable garden with a side length of 14 m. She grows some cabbages in the entire vegetable garden with 3 cabbages per square meter. Linda grows _____ cabbages in total.

10 A square pizza has a perimeter of 60 cm. The side length of the pizza is _____ cm, and the area of the pizza is _____ cm^2.

11 A desk with a rectangular top has a length of 13 cm and a width of 9 cm. The perimeter of the desk top is _____ cm, and the area of the desk top is _____ cm^2.

12 Faye has a rectangular garden with an area of 45 m^2. The length of the garden is 9 m. The width of the garden is _____ m.

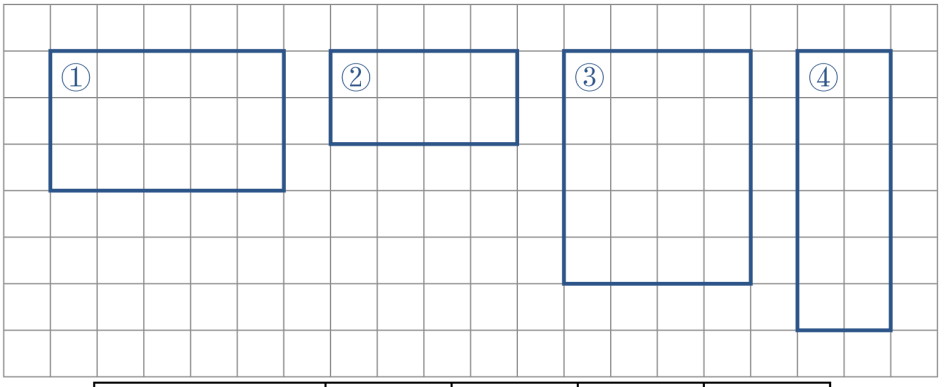
13 Mary has a rectangular envelop. Its length is 14 cm and its width is 10 cm. The area of the envelop is _____ cm^2.

14 A square window frame has a side length of 8 ft. The perimeter of the window frame is _____ ft, and the area of the window is _____ ft^2.

15 A rectangular tile has a length of 16 cm and a width of 12 cm. The area of the tile is _____ cm^2.

16 The grid below is consisted of identical squares with a side length of 1 cm and area of 1 cm^2.

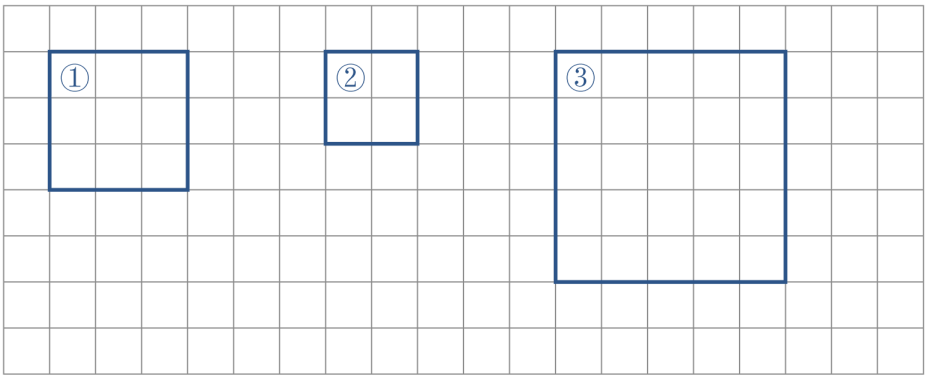
(1) Complete the table and fill in the blanks.



	①	②	③	④
Length (cm)				
Width (cm)				
Area (cm^2)				

By observing the table above, we find: area of a rectangle = _____ × _____

(2) Complete the table and fill in the blanks.

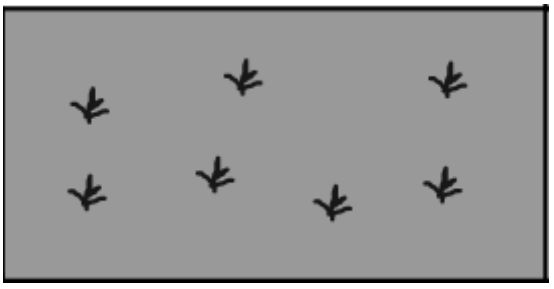


	①	②	③
Side length (cm)			
Area (cm^2)			

By observing the table above, we find: area of a square = _____ × _____ .

17 A square meadow has a side length of 20 m. The perimeter of the meadow is _____ m, and the area of the meadow is _____ m^2.

18 A rectangular lawn has a length of 30 meters and a width of 20 meters. The perimeter of the lawn is _____ m, and the area of the lawn is _____ m^2.

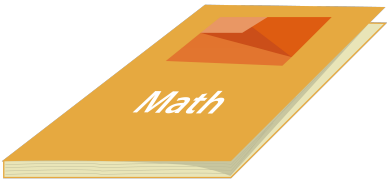


19 A square has an area of 289 cm^2. The side length of the square is _____ cm, and the perimeter of the square is _____ cm.

20 Yuki has a square garden with a side length of 10 m. She grows some roses in the entire garden with 5 roses per square meter. Yuki grows _____ roses in total.

21 James is going to plant flowers in the rectangular garden with a length of 15 m. Its width is 5 m less than its length. He grows some roses in the entire garden with 3 roses per square meter. James grows _____ roses in total.

22 The math textbook has a length of 23 cm and a width of 15 cm. The perimeter of the math textbook is _____ cm, and the area of the math textbook is _____ cm^2.



23 A square bed has a side length of 2 m. The perimeter of the bed is _____ m, and the area of the bed is _____ m^2.

24 A square garden has a side length of 13 m. The perimeter of the garden is _____ m, and the area of the garden is _____ m^2.

25 David is going to plant fruit in the square orchard with a side length of 10 m. He grows some apples in the entire orchard with 3 apples per square meter. David grows _____ apples in total.

NOTE

NOTE

Word Problems

Addition and Subtraction within 100,000

1. The book store sold $13,421$ books in the first month and $21,812$ books in the second month. How many books did the book store sell in these two months?

2. Mike ran $42,412$ meters in the first week and $53,855$ meters in the second week. How many meters did he run in these two weeks?

3 The sales of the store this month was $31,941$ dollars, and the sales of the last month was $9,149$ dollars. How much more was the sales of the store this month than the last month?

4 Mike saved $34,461$ dollars this year. Last year, he saved $5,124$ less dollars than this year. How much money did he save last year?

5 Mary wrote $34,123$ words in June. In May, she wrote $6,142$ less words than in June. How many words did Mary write in May?

6 There are $24,672$ boys and $21,421$ girls in this school. How many boys and girls are there in this school in total?

Time Calculation

1. Tom and Bob join in the mountain climbing competition together. It takes Tom 3 hours and 20 minutes to reach the top. It takes Bob 2 hours and 55 minutes to reach the top. How many less minutes does Bob finish the competition than Tom?

Bob finishes the competition _____ min faster than Tom.

2. The truck travels 3 hours and 27 minutes in the morning. The truck travels 2 hours and 48 minutes in the afternoon. How many more minutes does the truck travel in the morning than in the afternoon?

The truck travels _____ minutes more in the morning than in the afternoon.

3 Ronaldo played football for 3 hours and 43 minutes yesterday, and 4 hours and 15 minutes today. How many more minutes did he play football today than yesterday?

He played football _____ minutes longer today than yesterday.

4 Lily plays the piano for 3 h 20 min in the morning. She plays the piano for 2 h 15 min in the afternoon. How long does she plays the piano in total?

She plays the piano for _____ h _____ min in total.

5 Justin hikes for 2 h 15 min before the break. After the break, he hikes for 1 h 50 min. How long does Justin hike in total?

Justin hikes for _____ h _____ min in total.

6 In a marathon race, James completes the marathon in 5 h 16 min and Michael completes the marathon in 4 h 35 min. How many less minutes does Michael finish the race than James?

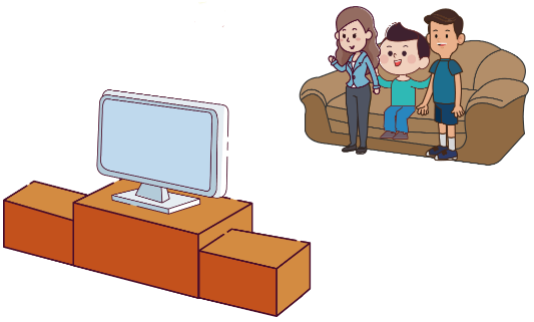
Michael finishes the marathon _____ min faster than James.

7 The driver drives the bus from A to B. It takes him 1 h 50 min to the gas station. Then, he drives for 1 h 15 min from the gas station to B. How long does he drive in total?

The driver drives for _____ h _____ min in total.

8 The Wilsons watch TV together. They watch TV for 2 hours and 45 minutes in the morning. They watch TV for 1 hour and 30 minutes in the afternoon. How many more minutes do they watch TV in the morning than in the afternoon?

They watch _____ min more television in the morning than in the afternoon.



Money Calculation

1 Laura has 12 dollars and 32 cents. She buys a book for 3 dollars and 73 cents. Now, she has _____ dollars and _____ cents left.

2 Ben buys a notebook for 13 dollars and 95 cents. He also buys a pen for 3 dollars and 16 cents. In total, Ben spends _____ dollars and _____ cents.

3 Tom buys a ball for 24 dollars and 35 cents. He also buys a pen for 5 dollars and 22 cents. In total, Tom spends _____ dollars and _____ cents.

4 Linda has 24 dollars and 66 cents. She buys a pen for 16 dollars and 22 cents. Now, Linda has _____ dollars and _____ cents left.

5 Ruth has 15 dollars and 25 cents. She puts 8 dollars and 73 cents in a piggy bank. Now, Ruth has _____ dollars and _____ cents left.

6 The Smiths go out for a picnic and buy two bottles of Coke and a box of cookies. A bottle of Coke is 3 dollars and 56 cents, and a box of cookies is 13 dollars and 23 cents. In total, The Smiths spend _____ dollars and _____ cents.

7 David buys 1 hamburger for 6 dollars and 32 cents. He also buys 2 bottles of Coke for 3 dollars and 14 cents each. In total, he spends _____ dollars and _____ cents.

8 The teacher has 32 dollars and 80 cents. He buys a football for his students as a gift for 15 dollars and 60 cents. Now, he has _____ dollars and _____ cents left.

9 Eric has 24 dollars and 27 cents. He buys a bag for 15 dollars and 22 cents. Now, he has _____ dollars and _____ cents left.

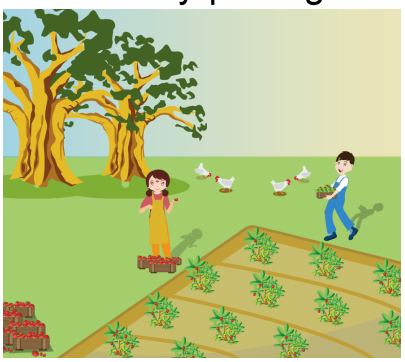
10 David buys 10 pieces of candy for 15 dollars and 60 cents. He also buys 5 apples for 11 dollars and 20 cents. In total, David spends _____ dollars and _____ cents.

Mean, Median, and Mode

1. Lily likes reading books. She read 22 pages every day for the first 2 days. She read 13 pages every day for the next 4 days and then finished the whole book. The average number of pages she read every day was _____ .

2. There are 2 students in Mr. Li's class. He assigns a total of 46 math problems. How many math problems does one student do on average?

3 Mike and his friends went strawberry-picking on Sunday.



(1) Mike picked 38 strawberries, Tim picked 26 strawberries, and Lisa picked 32 strawberries. The average number of strawberries each person picked was _____ .

(2) If 25 people took part in the strawberry-picking and the average number of strawberries each person picked was 24, they would pick _____ strawberries in total.

(3) If they picked 150 strawberries in total and the average number of strawberries each person picked was 15, there were _____ people in total.

4 4 students pick 25, 35, 45, and 55 oranges, respectively. How many oranges does each of them pick on average?

5 There are three people in Ding Ding's family, and each person eats 5 eggs on average each week. How many eggs does the family eat in a week?

6 Alice is 152 cm tall, Bob is 158 cm, and Charles is 164 cm. What is the average height of these three students?

7 The average weekly water bill for Emily's family is 4 dollars, so how much is her family's monthly water bill? (Assume each month has 4 weeks.)

8 In a science quiz, four students get 86, 90, 92, and 96 points, respectively. What is the average score of these four students?

9 On Christmas, 6 classes are wrapping some presents together and they wrap 20, 22, 31, 35, 38, and 40 presents, respectively. How many presents does each of the classes wrap on average?

10 Ten kids are comparing ages, and their ages are listed below:

10 9 8 9 10 9 10 10 8 10

(1) The **mode** of the 10 kids' ages is _____ .

(2) Two 9-year-old boys join. Now, the **mode** are _____ .

(3) Another ten kids' ages are added to the survey and their ages are listed below:

9 10 10 9 8 8 9 9 8 8

The **mode** of 22 kids' ages is _____ .

11 Mason spent an average of 450 dollars per month from January to March, 350 dollars per month from April to July, 1,250 dollars in total from August to October, and 400 dollars per month from November to December. How much did he spend on average per month from January to December?

12 Two dice were rolled 12 times. Here are the scores, respectively.

3 12 10 4 6 9 11 9 9 11 4 8

(1) What is the **median**? _____ .

(2) What is the **range**? _____ .

13 There is a group of cards: 2 2 0 3 3 8 8 8

(1) What is the median? _____ .

(2) What is the range? _____ .

14 Justin spent an average of 500 dollars per month from January to April, 300 dollars per month from May to July, 400 dollars in total from August to September, and 300 dollars per month from October to December. How much did he spent in average per month from January to December?

15 The teacher bought 6 identical small toys for the children. It cost a total of 36 dollars. How much is each small toy?

16 Tom has 54 pieces of candy. Lily has 60 pieces of candy. Betty has 62 pieces of candy and Elena has 68 pieces of candy. How many pieces of candy does each of them have on average?

Basic Age Problems

1 John is 15 years old this year and Mary is 12 years old. What is the age difference between John and Mary?

A. 3 B. 5 C. 9 D. 12

2 Ada is 40 years old now, and Ben is 32 years old now. How many years older is Ada than Ben?

3 Lucy is 2 years older than Ashley. If Lucy is 20 years old this year, how old is Ashley this year?

A. 16 B. 18 C. 20 D. 22

4 Adam is 7 years old this year, and his grandpa is 63 years old this year. How many times is grandpa's age than Adam's age?

5 Linna is 38 years old now, and Coral is 21 years old now. How old is Coral younger than Linna?

6 Alex is 28 years old this year and David is 21 years old. What is the age difference between Alex and David?

A. 5 B. 6 C. 7 D. 8

7 Betty is 21 years old this year and Gary is 9 years old. What is the age difference between Betty and Gary?

A. 9 B. 10 C. 12 D. 11

NOTE

Advanced Math

Numbers and Operations

Whole Number Mixed Operation

1 Calculate:

(1) $22 \times 5 + 28 \times 5 =$ _____

(2) $38 \times 65 + 62 \times 65 =$ _____

(3) $37 \times 19 - 17 \times 19 =$ _____

(4) $127 \times 18 + 91 \times 18 + 82 \times 18 =$ _____

2 Calculate:

(1) $138 \times 4 - 96 \div 6 =$ _____

(2) $84 \times 7 + 91 \div 7 =$ _____

3 Calculate:

(1) $360 \div 6 + 195 =$ _____

(2) $326 - 267 + 737 =$ _____

(3) $369 \div (39 - 36) =$ _____

4 Calculate:

(1) $84 \div 7 \times 4 + 352 =$ _____ (2) $302 - 231 + 87 \div 3 =$ _____

5 Calculate:

(1) $112 \times 4 - 36 \div 6 =$ _____ (2) $29 \times 7 + 144 \div 9 =$ _____

6 Calculate:

(1) $67 \times 5 + 15 \times 6 =$ _____ (2) $(235 + 465) \times 6 =$ _____

(3) $823 + 125 \times 4 =$ _____

7 Let's see who can find the correct answer first!

(1) $1300 \times 17 \div 13 =$ _____ (2) $1000 \times 200 \div 25 =$ _____

8 Brainstorm ways to make the following expressions easier to calculate!

(1) $4300 \div (43 \times 25) =$ _____ (2) $3200 \div 25 \div 4 =$ _____

(3) $480 \div (60 \div 125) =$ _____

9 Calculate:

(1) $420 \div 7 + 159 =$ _____

(2) $623 - 167 + 377 =$ _____

(3) $642 \div (42 - 36) =$ _____

10 Calculate:

(1) $25 \times 404 = 25\times$ _____ $+ 25\times$ _____ $=$ _____ $+$ _____ $=$ _____

(2) $125 \times 108 =$ _____

(3) $(100 - 2) \times 56 =$ _____

11 Calculate:

(1) $26 \times 57 + 26 \times 43 =$ _____

(2) $269 - 182 + 52 \div 4 =$ _____

12 Calculate:

(1) $12 \times 12 \div 4 + 164 =$ _____ (2) $259 - 130 + 355 \div 5 =$ _____

13 Calculate:

(1) $25 \times 296 = 25\times$ _____ $-25\times$ _____ $=$ _____ $-$ _____ $=$ _____

(2) $125 \times (88 + 8) =$ _____ (3) $(100 - 5) \times 17 =$ _____

14 Brainstorm ways to make the following expressions easier to calculate!

(1) $3000 \div (750 \times 2) =$ _____

(2) $200 \div (5 \div 25) =$ _____

(3) $640 \div (80 \div 125) =$ _____

15 Calculate:

(1) $98 \times 4 + 26 \times 5 =$ _____

(2) $(125 + 175) \times 6 =$ _____

(3) $382 + 125 \times 4 =$ _____

16 Calculate:

(1) $25 \times 12 \times 3 =$ _____

(2) $125 \times 72 \times 3 =$ _____

17 Let's see who can find the correct answer first!

(1) $1200 \times 24 \div 12 =$ _____

(2) $1000 \times 200 \div 125 =$ _____

18 Calculate:

(1) $28 \times 25 =$ _____

(2) $125 \times 32 \times 25 =$ _____

19 Brainstorm ways to make the following expressions easier to calculate!

(1) $2900 \div (29 \times 50) =$ _____

(2) $2000 \div (125 \div 5) =$ _____

(3) $560 \div (70 \div 125) =$ _____

Long Multiplication and Long Division

1 Calculate:

(1) $240 \times 22 =$ _____

(2) $405 \times 15 =$ _____

(3) $690 \times 50 =$ _____

(4) $408 \times 50 =$ _____

2 Calculate:

(1) $220 \times 40 =$ _____

(2) $27 \times 360 =$ _____

3 Calculate with long division. Don't be afraid of trying!

(1) $360 \div 53 =$ _____ R _____ (2) $612 \div 28 =$ _____ R _____

4 Calculate using long multiplication:

(1) $470 \times 2 =$ _____ (2) $189 \times 3 =$ _____

(3) $145 \times 4 =$ _____

5 Calculate with long multiplication:

(1) $603 \times 34 =$ _____

(2) $180 \times 23 =$ _____

(3) $780 \times 50 =$ _____

6 Calculate:

$121 \times 32 =$ _____

$981 \div 28 =$ _____ R _____

7 Use long division to calculate:

(1) $77 \div 18 =$ _____ R _____

(2) $128 \div 72 =$ _____ R _____

(3) $332 \div 12 =$ _____ R _____

(4) $561 \div 32 =$ _____ R _____

8 Use column multiplication to calculate:

(1) $134 \times 22 =$ _____

(2) $198 \times 56 =$ _____

(3) $312 \times 42 =$ _____

9 Calculate:
$612 \div 34 \times 25 =$ _____

10 Calculate with long division:
(1) $621 \div 23 =$ _____ (2) $781 \div 40 =$ _____ R _____

(3) $551 \div 20 =$ _____ R _____

11 Use long multiplication to calculate:

(1) $203 \times 40 =$ _____ (2) $315 \times 84 =$ _____

12 Use long multiplication to calculate:

(1) $1,413 \times 25 =$ _____ (2) $2,649 \times 57 =$ _____

13 Use long multiplication to calculate:

(1) $1,379 \times 56 =$ _____

(2) $5,003 \times 18 =$ _____

(3) $1,244 \times 25 =$ _____

(4) $4,823 \times 36 =$ _____

(5) $3,082 \times 13 =$ _____

(6) $4,793 \times 49 =$ _____

14 Use long multiplication to calculate:

(1) $203 \times 40 =$ _____

(2) $560 \times 20 =$ _____

(3) $870 \times 30 =$ _____

15 Use long division to calculate:

(1) $316 \div 45 =$ _____

(2) $936 \div 18 =$ _____

16 Use column multiplication to calculate.

(1) $49 \times 23 =$ _____ (2) $19 \times 53 =$ _____

17 Fill in the boxes.

$$\begin{array}{r} 6\ \ 5 \\ \times\ \ 3\ \ 1 \\ \hline \square\ \square \\ \square\ \square\ \square\ \ \\ \hline \square\ \square\ \square\ \square \end{array}$$

18 Calculate using long multiplication:

(1) $98 \times 5 =$ _____ (2) $83 \times 7 =$ _____

19 Calculate with long division:

(1) $520 \div 40 =$ _____

(2) $148 \div 30 =$ _____

20 Calculate:

(1) $210 \div 34 =$ _____ R _____

(2) $520 \div 67 =$ _____ R _____

Improper Fractions and Mixed Numbers

1 Rewrite the improper fractions as mixed numbers.

(1) $\frac{5}{3}$ = _____ .

(2) $\frac{7}{2}$ = _____ .

(3) $\frac{14}{3}$ = _____ .

(4) $\frac{27}{5}$ = _____ .

2 Fill in the blanks:

(1) Convert the following improper fractions into mixed numbers:

$\frac{5}{2}$ = _____ .

$\frac{13}{5}$ = _____ .

$\frac{26}{7}$ = _____ .

(2) Convert the following mixed numbers into improper fractions:

$4\frac{1}{3}$ = _____ .

$2\frac{4}{5}$ = _____ .

$9\frac{8}{9}$ = _____ .

3 Rewrite the mixed numbers as improper fractions.

(1) $4\frac{4}{5}$ = _____ .

(2) $2\frac{7}{8}$ = _____ .

(3) $7\frac{3}{10}$ = _____ .

(4) $13\frac{1}{4}$ = _____ .

4 Rewrite the improper fractions as mixed numbers. Rewrite the mixed numbers as improper fractions.

(1) $\frac{12}{7}$ = _____ .

(2) $\frac{16}{3}$ = _____ .

(3) $2\frac{2}{9}$ = _____ .

(4) $8\frac{2}{3}$ = _____ .

5 Write the following expressions as mixed numbers.

(1) $3 + \frac{11}{28} =$ _____

(2) $9 + \frac{7}{15} =$ _____

(3) $\frac{39}{71} + 10 =$ _____

(4) $\frac{28}{99} + 1 =$ _____

6 Rewrite the mixed numbers as improper fractions.

(1) $4\frac{3}{8} =$ _____ .

(2) $5\frac{2}{3} =$ _____ .

(3) $3\frac{2}{5}$ = _____ .

(4) $7\frac{5}{6}$ = _____ .

(5) $4\frac{1}{7}$ = _____ .

(6) $2\frac{8}{13}$ = _____ .

(7) $12\frac{6}{7}$ = _____ .

(8) $4\frac{6}{11}$ = _____ .

(9) $4\frac{1}{14}$ = _____ .

(10) $4\frac{2}{3}$ = _____ .

7 Rewrite the improper fractions as mixed numbers. Rewrite the mixed numbers as improper fractions.

(1) $\frac{36}{5}$ = _____ .

(2) $\frac{22}{9}$ = _____ .

(3) $7\frac{5}{8}$ = _____ .

(4) $3\frac{6}{7}$ = _____ .

8 Rewrite the improper fraction as a mixed number or rewrite the mixed number as an improper fraction.

(1) $\frac{43}{7}$ = _____ .

(2) $\frac{59}{8}$ = _____ .

(3) $4\frac{1}{6}$ = _____ .

(4) $3\frac{5}{9}$ = _____ .

9 Rewrite the mixed numbers as improper fractions.

(1) $2\frac{3}{4}$ = _____ .

(2) $3\frac{5}{7}$ = _____ .

(3) $4\frac{1}{2}$ = _____ .

(4) $2\frac{2}{5}$ = _____ .

10 $\frac{3}{10}$ $\frac{23}{11}$ $3\frac{3}{5}$ $\frac{10}{11}$ $\frac{23}{14}$ $10\frac{1}{2}$ $\frac{13}{29}$ $\frac{7}{20}$

(1) How many proper fractions are there among the fractions above?

A. 1 B. 2 C. 3 D. 4

(2) How many improper fractions are there among the fractions above?

A. 1 B. 2 C. 3 D. 4

(3) How many mixed numbers are there among the fractions above?

A. 1 B. 2 C. 3 D. 4

11 Rewrite the improper fractions as mixed numbers. Rewrite the mixed numbers as improper fractions.

(1) $\frac{37}{9}$ = _____ .

(2) $\frac{35}{4}$ = _____ .

(3) $3\frac{5}{7}$ = _____ .

(4) $7\frac{3}{11}$ = _____ .

12 Write the following expressions as mixed numbers.

(1) $3 + \frac{4}{11}$ = _____

(2) $12 + \frac{6}{7}$ = _____

(3) $\frac{28}{47} + 5$ = _____

(4) $\frac{7}{31} + 10$ = _____

13 Rewrite the improper fractions as mixed numbers.

(1) $\frac{17}{9}$ = _____ .

(2) $\frac{34}{5}$ = _____ .

14 $\frac{33}{7}$ $3\frac{8}{9}$ $12\frac{7}{10}$ $\frac{9}{17}$ $\frac{1}{6}$ $1\frac{98}{99}$ $\frac{13}{21}$ $\frac{19}{8}$

(1) How many proper fractions are there among the fractions above?

A. 1 B. 2 C. 3 D. 4

(2) How many improper fractions are there among the fractions above?

A. 1 B. 2 C. 3 D. 4

(3) How many mixed numbers are there among the fractions above?

A. 1 B. 2 C. 3 D. 4

15 Rewrite the improper fractions as mixed numbers.

(1) $\frac{7}{4}$ = _____ .

(2) $\frac{13}{6}$ = _____ .

(3) $\frac{18}{5}$ = _____ .

(4) $\frac{70}{9}$ = _____ .

Equivalent Fractions and Simplest Form

1 Simplify each proper fraction.

(1) $\frac{8}{22}$ = _____

(2) $\frac{10}{45}$ = _____

(3) $\frac{30}{48}$ = _____

(4) $\frac{18}{27}$ = _____

2 Find the simplest form of each fraction below.

(1) $\frac{5}{15}$ = _____ .

(2) $\frac{8}{12}$ = _____ .

(3) $\frac{12}{16}$ = _____ .

(4) $\frac{9}{15}$ = _____ .

(5) $\frac{5}{25}$ = _____ .

3 Fill in the blanks!

(1) $\frac{3}{7} = \frac{3 \times (\quad)}{7 \times 2} = \frac{(\quad)}{(\quad)}$

(2) $\frac{16}{18} = \frac{16 \div 2}{18 \div (\quad)} = \frac{8}{(\quad)}$

(3) $\frac{3}{4} = \frac{3 \times (\quad)}{4 \times (\quad)} = \frac{15}{(\quad)}$

(4) $\frac{1}{3} = \frac{3}{(\quad)}$

(5) $\frac{7}{8} = \frac{(\quad)}{16}$

(6) $\frac{9}{21} = \frac{3}{(\quad)}$

4 Fill in the blanks!

(1) $\frac{3}{5} = \frac{3 \times (\quad)}{5 \times 4} = \frac{(\quad)}{(\quad)}$

(2) $\frac{15}{18} = \frac{15 \div 3}{18 \div (\quad)} = \frac{5}{(\quad)}$

(3) $\frac{6}{10} = \frac{6 \times (\quad)}{10 \times (\quad)} = \frac{18}{(\quad)}$

(4) $\frac{3}{7} = \frac{9}{(\quad)}$

(5) $\frac{12}{22} = \frac{(\quad)}{11}$

(6) $\frac{6}{24} = \frac{1}{(\quad)}$

5 Fill in the blanks!

(1) $\frac{3}{4} = \frac{3 \times (\quad)}{4 \times 5} = \frac{(\quad)}{(\quad)}$

(2) $\frac{10}{12} = \frac{10 \div 2}{12 \div (\quad)} = \frac{5}{(\quad)}$

(3) $\frac{2}{5} = \frac{2 \times (\quad)}{5 \times (\quad)} = \frac{10}{(\quad)}$

(4) $\frac{4}{7} = \frac{12}{(\quad)}$

(5) $\frac{16}{20} = \frac{(\quad)}{10}$

(6) $\frac{2}{24} = \frac{1}{(\quad)}$

6 Find the simplest form of each fraction below.

(1) $\frac{7}{21}$ = _____ .

(2) $\frac{12}{26}$ = _____ .

(3) $\frac{15}{20}$ = _____ .

(4) $\frac{9}{21}$ = _____ .

(5) $\frac{10}{18}$ = _____ .

7 Find the simplest form of each fraction below.

(1) $\frac{6}{32} = \frac{(\quad)}{(\quad)}$

(2) $\frac{12}{20} = \frac{(\quad)}{(\quad)}$

(3) $\frac{15}{45} = \frac{(\quad)}{(\quad)}$

(4) $\frac{21}{49} = \frac{(\quad)}{(\quad)}$

(5) $\frac{20}{56} = \frac{(\quad)}{(\quad)}$

(6) $\frac{30}{66} = \frac{(\quad)}{(\quad)}$

8 Rewrite the following fractions in the simplest form.

(1) $\frac{6}{48}$ = _____

(2) $\frac{12}{100}$ = _____

(3) $\frac{14}{50}$ = _____

(4) $\frac{18}{54}$ = _____

9 Find the simplest form of each fraction below.

(1) $\frac{8}{16}$ = _____ .

(2) $\frac{3}{24}$ = _____ .

(3) $\frac{10}{25}$ = _____ .

(4) $\frac{6}{18}$ = _____ .

(5) $\frac{9}{24}$ = _____ .

10 Order $\frac{3}{8}$, $\frac{3}{4}$, $\frac{11}{12}$, and $\frac{19}{24}$ from largest to least.

_____ > _____ > _____ > _____

Letters Representing Numbers

1 Simplify the following expressions:

$3e + (4f - 2e) =$ _____ ;

$9q - (5e - 3q) =$ _____ ;

$4m - (d^3 + 2 - 3a) =$ _____ ;

$(5ef + 2f + 3e) - (2ef - 4f - 6e) =$ _____ .

2 Simplify the following expressions:

(1) $3a - (6c + a) =$ _____

(2) $4c + 2b - (2c + b) =$ _____

(3) $3c + 24 - (c + 2d + 4) =$ _____

(4) $6 + 5a - (3b + 2a + 3) =$ _____

(5) $63 + 7c - 2d - (d + 3c - 3) =$ _____

3 Simplify the following expressions.

$5m - (2n - 2m) =$ _____ .

$5g - (3g - 3a) =$ _____ .

$32 - (6 + 4a - 2c^3) =$ _____ .

$(6a + 5 - 5ab) - (3 + 2ab + 5b) =$ _____ .

4 Simplify the following expressions.

$7 \times x =$ _____ .

$r \times n =$ _____ .

$7a - 3c - 2c =$ _____ .

$r \times r \times r \times r =$ _____ .

$4 \times m =$ _____ .

$6b - 2a + 3a =$ _____ .

$e \times e \times e =$ _____ .

$r \times q =$ _____ .

$6y - 3x - y =$ _____ .

$q \times q \times q \times q =$ _____ .

5 Simplify the following expressions:

(1) $2 \times (5a - 2) =$ _____

(2) $(3a + 2b) \times 2 =$ _____

(3) $5 \times (2a - 2c + 4b) =$ _____

(4) $8 \times w \times (2a + b) =$ _____

(5) $(2c + 4d) \times 3a =$ _____

6 Simplify the following expressions:

(1) $3c - 6d + 4c =$ _____ .

(2) $w \times 3 + 1 \times v =$ _____ .

(3) $2 \times a \times b \times 2 =$ _____ .

(4) $5 \times e + 2 \times c =$ _____ .

(5) $2 \times a - 3 \times b \times a =$ _____ .

(6) $2 \times h \times h + 1 \times g =$ _____ .

8 Simplify the following expressions:

(1) $7ab - (6 + 3ab - 3c) =$ _____

(2) $(3xy - 8) - (3 + xy) =$ _____

(3) $8t + 27 - (3e + 5t) =$ _____

(4) $(9ab + 18 + 4c) - (8 + 3ab - 6c) =$ _____

(5) $2 - (7 + 2a - 3b) =$ _____

9 Simplify the following expressions:

$9c + (4d - 2c) =$ _____ ; $5a - (2b - 3a) =$ _____ ;

$21 - (a^2 - 5 + 2c) =$ _____ ;

$(2xy + 13y + 3) - (2y - 4xy - 6) =$ _____ .

10 Simplify the following expressions:

(1) $7a + 5a + 4b =$ _____ . (2) $w \times 1 + e \times 2 =$ _____ .

(3) $h \times g =$ _____ . (4) $1 \times b \times g \times 19 =$ _____ .

(5) $a \times b - c =$ _____ .

(6) $2a \times a \times 3b =$ _____ .

(7) $28 \times h \times h + k \times 9k =$ _____ .

11 Simplify the following expressions:

(1) $(2a + 4) \times 3 =$ _____

(2) $3 \times (a + b) =$ _____

(3) $(3c - 4) \times 2 =$ _____

(4) $2g \times (a + b) =$ _____

(5) $(3a + 5b) \times h =$ _____

12 Simplify the following expressions:

(1) $7ab - (6 + 3ab - 3c) =$ _____

(2) $(3xy - 8) - (3 + xy) =$ _____

(3) $8t + 27 - (3e + 5t) =$ _____

(4) $(9ab + 18 + 4c) - (8 + 3ab - 6c) =$ _____

(5) $2 - (7 + 2a - 3b) =$ _____

13 Simplify the following expressions:

$a \times 4 =$ _____ .

$b \times 3 =$ _____ .

$3a + 2a - 4b =$ _____ .

$a \times a \times a =$ _____ .

$2 \times x =$ _____ .

$3b - 2d + 2b =$ _____ .

$c \times c \times 5c =$ _____ .

$5x \times b =$ _____ .

$3a - a + 2c =$ _____ .

$5d \times d \times d =$ _____ .

14 Simplify the following expressions:

(1) $5a - 2(a - 5b) =$ _____ .

(2) $8 - 4a(2a - 3b) =$ _____ .

(3) $(4m + 8n) - 7(n - m) =$ _____ .

(4) $8(2xy - 3x + 2y) - (6xy + x) =$ _____ .

15 Simplify the following expressions:

(1) $4a + 3b - a - 2b =$ _____ .

(2) $h \times g \times 3 =$ _____ .

(3) $6 \times a + 2 \times b =$ _____ .

(4) $2 \times c - d \times 4 =$ _____ .

(5) $2 \times a - 3 \times b + 2 \times c \times d =$ _____ .

(6) $6 \times a \times a - 5 \times b =$ _____ .

16 Simplify the following expressions.

(1) $a \times 5 + b \times 5 =$ _____ .

(2) $4 \times w \times n \times 4 =$ _____ .

(3) $4 + 2 \times v - 3b =$ _____ .

(4) $3a \times 4a \times 2b =$ _____ .

17 Simplify the following expressions:

(1) $(2a + 4) \times 3 =$ _____

(2) $3 \times (a + b) =$ _____

(3) $(3c - 4) \times 2 =$ _____

(4) $2g \times (a + b) =$ _____

(5) $(3a + 5b) \times h =$ _____

18 Simplify the following expressions:

(1) $3a + 5b + 6a =$ _____ .

(2) $c \times 3 + d \times 2 =$ _____ .

(3) $h \times 1 + 4 \times g =$ _____ .

(4) $1 \times b \times 2 \times w =$ _____ .

(5) $3 \times a \times b - 2 \times c =$ _____ .

(6) $3 \times a \times a =$ _____ .

19 Simplify the following expressions:

(1) $5 \times (3a + 4b - 2c) =$ _____

(2) $(8c - 2d) \times 4a =$ _____

(3) $3a \times (3 - 2a + 4b) =$ _____

(4) $(2c - d) \times 8 =$ _____

(5) $34 - 2a \times (2 + 2b) =$ _____

20 Simplify the following expressions:

(1) $8x + 2(x + 3y) =$ _____ .

(2) $8a - 4(a + 2b) =$ _____ .

(3) $3(2t - a - 5b) + (2b + 4a - 2t) =$ _____ .

(4) $7(2x + x^2y) - (x^2y - 5x + 3y) =$ _____ .

21 Simplify the following expressions:

(1) $2 \times (5a - 2) =$ _____

(2) $(3a + 2b) \times 2 =$ _____

(3) $5 \times (2a - 2c + 4b) =$ _____

(4) $8 \times w \times (2a + b) =$ _____

(5) $(2c + 4d) \times 3a =$ _____

22 Simplify the following expressions:

$5a + (2b - 2a) =$ _____ ; $7b - (2c - b) =$ _____ ;

$15 - (a^2 - 5 + c) =$ _____ ; $(2ab + 7a + 3) - (2b - 3ab - 4) =$ _____ .

23 Simplify the following expressions:

(1) $2a + (3b - a) =$ _____ (2) $6c - (3d - 2c) =$ _____

(3) $32 + (3a - 2 + b) =$ _____ (4) $7c - (2a + 2c) =$ _____

(5) $(3ab + 5a + 1) - (2a - ab - 4) =$ _____

24 Simplify the following expressions:

$(4m + 3n) \times 5 =$ _____ ; $7 \times (3m + n) =$ _____ ;

$(3a + 6b) \times 2a =$ _____ ; $(m + n) \times 2m =$ _____ .

25 Simplify the following expressions:

$(3 + 2b) \times 3a =$ _____ ; $2x \times (7a + 2b) =$ _____ ;

$(2q + 2p) \times 3m =$ _____ ; $(4m + 5n) \times 2m =$ _____ .

26 Simplify the following expressions:

$2a - (3b - 4a) =$ _____ .

$6a - (2a + 4b) =$ _____ .

$18 - (m^2 + 7 + 2n) =$ _____ .

$(3mn + 4m + 3n) + (2m + 2mn - 6n) =$ _____ .

27 Simplify the following expressions:

(1) $3a - (6c + a) =$ _____

(2) $4c + 2b - (2c + b) =$ _____

(3) $3c + 24 - (c + 2d + 4) =$ _____

(4) $6 + 5a - (3b + 2a + 3) =$ _____

(5) $63 + 7c - 2d - (d + 3c - 3) =$ _____

28 Simplify the following expressions.

$8a - (2d - 2a) =$ _____ .

$4m - (3a + 3a) =$ _____ .

$18 - (m^2 + 4 - 2c) =$ _____ .

$(4ab + 4a + 3) - (3b - 2ab + 5) =$ _____ .

29 Simplify the following expressions:

(1) $a \times 3 + 3 \times b =$ _____ .

(2) $2 \times b \times x \times a =$ _____ .

(3) $2 + 4 \times x =$ _____ .

(4) $x \times 2b \times c =$ _____ .

30 Simplify the following expressions:

$3 \times c =$ _____ , $2 \times a =$ _____ , $a + 2b + 3c =$ _____ ,

$c \times c \times c \times c =$ _____ , $5 \times k =$ _____ , $2m - 4a + 2c =$ _____ ,

$a \times c =$ _____ , $7 \times b =$ _____ , $2x - 6a =$ _____ , $n \times n =$ _____ .

31 Simplify the following expressions:

$(4 + 5s) \times 4a =$ _____ ; $2n \times (3a + ab) =$ _____ ;

$(4x + 2y) \times 2x =$ _____ ; $(3x + 5y) \times 3x =$ _____ .

32 Simplify the following expressions:

(1) $5 \times (3a + 4b - 2c) =$ _____

(2) $(8c - 2d) \times 4a =$ _____

(3) $3a \times (3 - 2a + 4b) =$ _____

(4) $(2c - d) \times 8 =$ _____

(5) $34 - 2a \times (2 + 2b) =$ _____

33 Simplify the following expressions:

(1) $8t - 2\,(3t + 1) =$ _____ .

(2) $3\,(x - 1) - 2x =$ _____ .

(3) $(1 - t) - 5(r - t) =$ _____ .

(4) $4\left(1 + x^2y\right) - 2\left(x^2y - 2\right) =$ _____ .

34 Simplify the following expressions:

(1) $m \times 4 + 3 \times b =$ _____ .

(2) $a \times b \times 3 \times 4 =$ _____ .

(3) $2 + 5 \times a =$ _____ .

(4) $2e \times 3f \times 2f =$ _____ .

35 Simplify the following expressions:

$(3b + 2a) \times 3 =$ _____ ; $4 \times (m + 2n) =$ _____ ;

$(x + y) \times 2b =$ _____ ; $(4m + 2n) \times 3a =$ _____ .

36 Simplify the following expressions:

$2a \times 4 =$ _____ , $e \times 3 =$ _____ , $3e + 2e - 4f =$ _____ ,

$x \times x \times x =$ _____ , $5 \times g =$ _____ , $3g - 2d + 5g =$ _____ ,

$v \times v \times 2v =$ _____ , $3a \times b =$ _____ , $3d - 5a + 2a =$ _____ ,

$2d \times d \times d =$ _____ .

37 Simplify the following expressions:

(1) $s \times 2 + r \times 1 =$ _____ .

(2) $3 \times a \times b \times 3 =$ _____ .

(3) $5 \times a - 3 =$ _____ .

(4) $3s \times n \times 2s =$ _____ .

38 Simplify the following expressions:

(1) $5a + 2\,(2a - 3) =$ _____ .

(2) $6\,(x - 2) - 3x =$ _____ .

(3) $2(3 - m) - (n - m) =$ _____ .

(4) $3\left(1 + a^2\right) - \left(a^2 - 5\right) =$ _____ .

39 Simplify the following expressions:

$3 \times b =$ _____ , $5 \times s =$ _____ , $5x + 3y - 4x =$ _____ ,

$b \times b \times b \times b =$ _____ , $3 \times n =$ _____ , $8m + 6b - 4b + 2m =$ _____ ,

$a \times a =$ _____ , $7 \times r =$ _____ , $2x - 6a + 3x =$ _____ , $n \times n \times n =$ _____ .

40 Simplify the following expressions:

(1) $3 \times m + 2 \times a =$ _____ .

(2) $4 \times s \times 2 \times a =$ _____ .

(3) $4 \times m + n =$ _____ .

(4) $2a \times 3b \times 7a =$ _____ .

41 Simplify the following expressions:

(1) $2a + (3b - a) =$ _____

(2) $6c - (3d - 2c) =$ _____

(3) $32 + (3a - 2 + b) =$ _____

(4) $7c - (2a + 2c) =$ _____

(5) $(3ab + 5a + 1) - (2a - ab - 4) =$ _____

42 Simplify the following expressions:

$(2m + 1) \times 2 =$ _____ .

$3 \times (a - b) =$ _____ .

$4x \times (2m - n) =$ _____ .

$(a + b) \times y =$ _____ .

43 Simplify the following expressions:

(1) $5a - 2(a - 5b) =$ _____ .

(2) $8 - 4a(2a - 3b) =$ _____ .

(3) $(4m + 8n) - 7(n - m) =$ _____ .

(4) $8(2xy - 3x + 2y) - (6xy + x) =$ _____ .

44 Simplify the following expressions:

(1) $3c - 6d + 4c =$ _____ .

(2) $w \times 3 + 1 \times v =$ _____ .

(3) $2 \times a \times b \times 2 =$ _____ .

(4) $5 \times e + 2 \times c =$ _____ .

(5) $2 \times a - 3 \times b \times a =$ _____ .

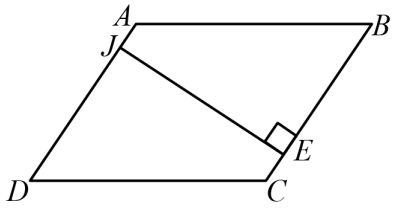
(6) $2 \times h \times h + 1 \times g =$ _____ .

NOTE

Geometry

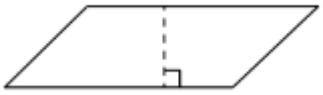
Parallelogram

1 In parallelogram $ABCD$, JE is perpendicular to BC. If BC is 6 cm and JE is 4 cm, what is the area of parallelogram $ABCD$?

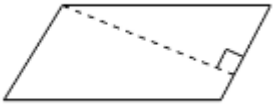


2 Which of the following parallelograms has the wrong height with the corresponding base?

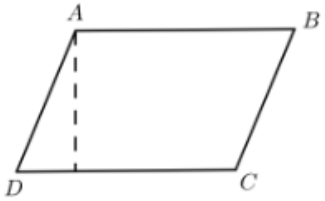
A.



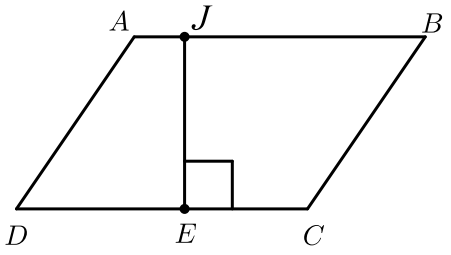
B.



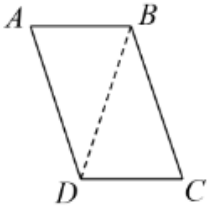
C.

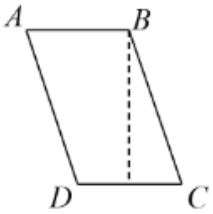


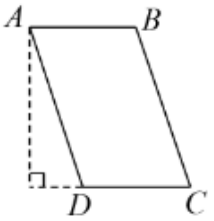
3 In parallelogram $ABCD$, JE is one of the base of the parallelogram $ABCD$. If the area of parallelogram $ABCD$ is 35 cm^2, and DC is 7 cm, what is the length of JE?



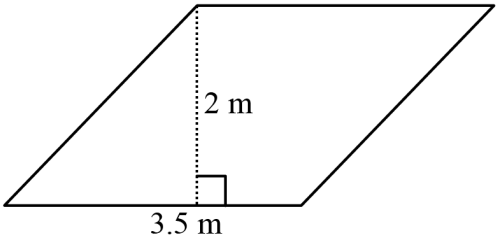
4 Which of the following parallelograms has the correct height with the corresponding base?

A.


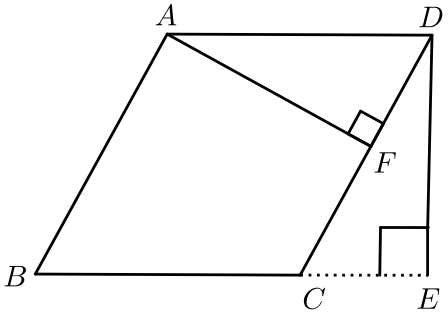
B.


C.


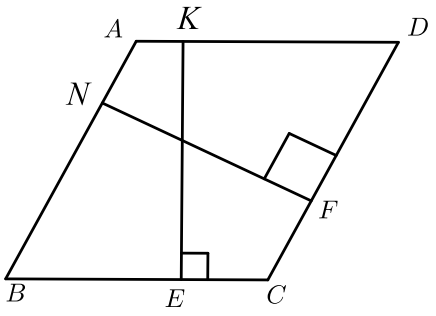
5 What is the area of the parallelogram?



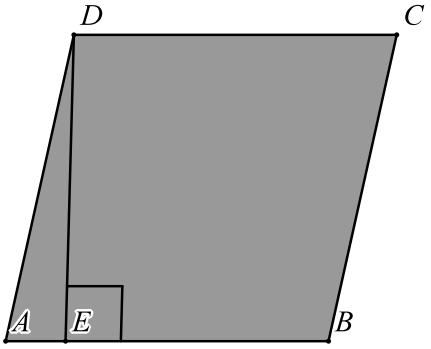
6 In parallelogram $ABCD$, DE and AF are two of the heights of the parallelogram $ABCD$. If DE is 14 cm, BC is 12 cm, and CD is 21 cm, the area of the parallelogram $ABCD$ is _____ cm^2 and the length of AF is _____ cm.



7 In parallelogram $ABCD$, KE is perpendicular to BC, and NF is perpendicular to CD. If BC is 8 cm, CD is 12 cm, and the area of the parallelogram $ABCD$ is 120 cm^2. The length of NF is _____ cm, and the length of KE is _____ cm.

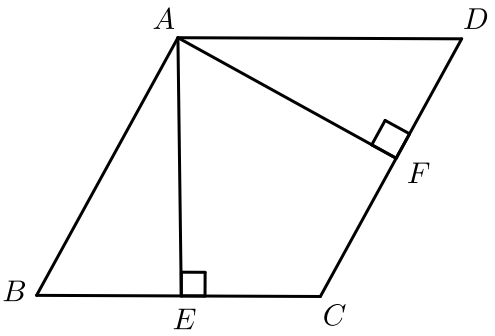


8 In parallelogram $ABCD$, DE is perpendicular to AB. If the area of parallelogram $ABCD$ is 40 cm^2, and AB is 10 cm, what is the length of DE?



A. 4 B. 5 C. 6 D. 7

9 In parallelogram $ABCD$, AE is perpendicular to BC, and AF is perpendicular to CD. If BC is 10 cm, AE is 12 cm, and CD is 15 cm, the length of AF is _____ cm.



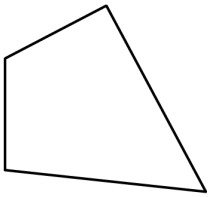
10 Which of the following figures is a parallelogram?

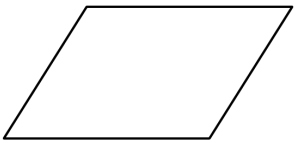
A.

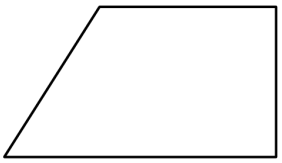
B.

C.

11 Which of the following figures is a parallelogram?

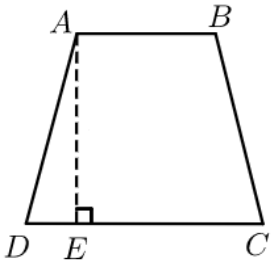
A. 

B. 

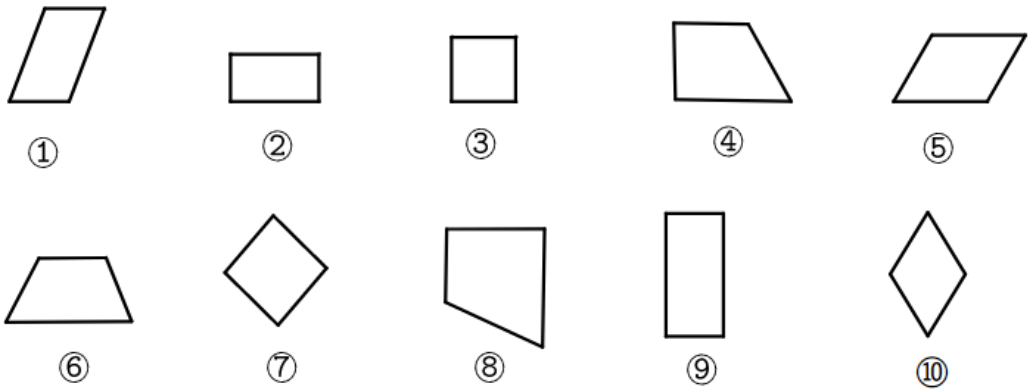
C. 

Trapezoid

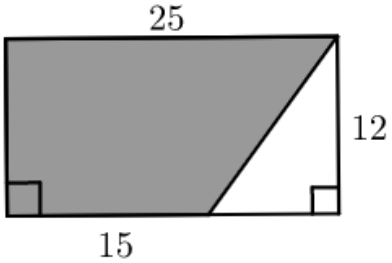
1 As shown in the figure below, the area of a trapezoid $ABCD$ is 16 m^2. If the top base AB is 3 m and the bottom base CD is 5 m, then the height AE is _____ m.



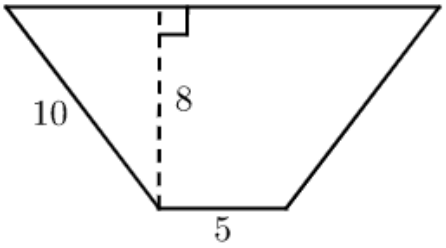
2 In the quadrilaterals below, there are _____ trapezoids. Among these trapezoids, there is/are _____ isosceles trapezoid(s), and _____ right trapezoid(s).



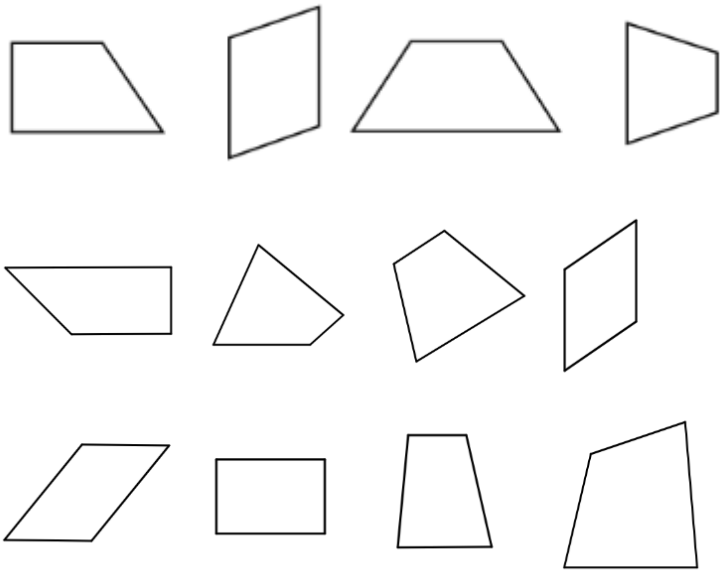
3 The area of this shaded trapezoid is _____ . (units: cm)



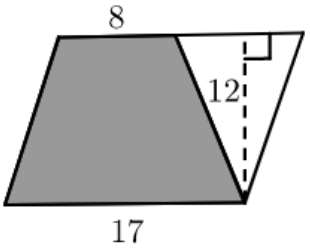
4 The area of the whole figure is 80 m^2. If the height is 8 m and the bottom base is 5 m, then the top base is _____ m.



5 In the quadrilaterals below, there are _____ trapezoids. Among these trapezoids, there is/are _____ isosceles trapezoid(s), and _____ right trapezoid(s).

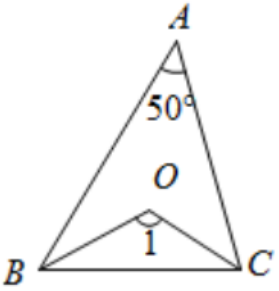


6 The area of this shaded trapezoid is _____ .(units: cm)



Triangle

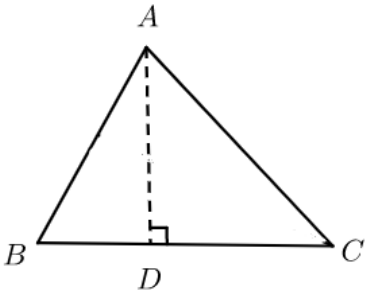
1 In $\triangle ABC$, $\angle A = 50^\circ$, OB and OC divide the remaining two angles equally, then $\angle 1 =$ _____ $^\circ$.



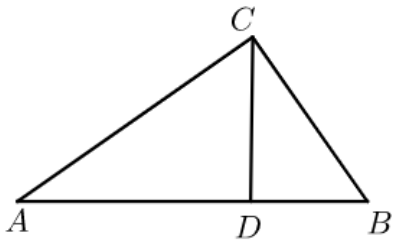
2 In a triangle, the lengths of two of the sides are 5 cm and 9 cm. Thus, the length of the third side may be _____ .

A. 3 cm B. 4 cm C. 5 cm D. 14 cm

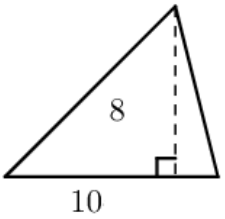
3 As shown in the figure below, $BC = 15$ cm, and the area of triangle ABC is 60 cm^2. What is the length of AD?

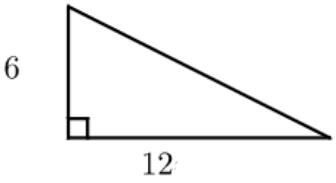


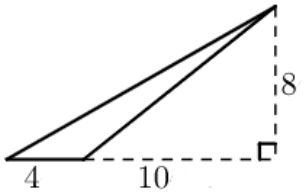
4 As shown in the figure below, in right triangle ABC, $\angle ACB = 90^\circ$, CD is perpendicular to AB, $AB = 14$ cm, and the area of triangle ABC is 35 cm^2. What is the length of CD?



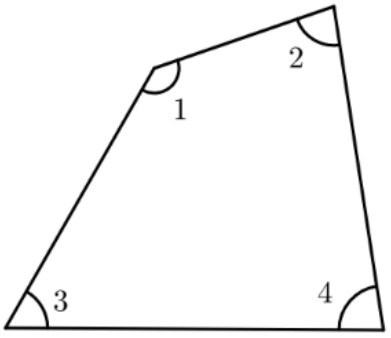
5 Find the area of each triangle below. (Unit in cm)



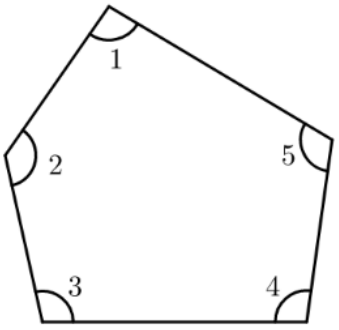




6 In the figure below, the sum of the degrees of all the angles: $\angle 1 + \angle 2 + \angle 3 + \angle 4 =$ _____ °.



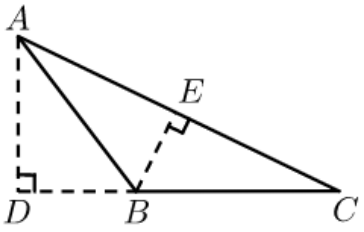
7 In the figure below, the sum of the degrees of all the angles: $\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 =$ _____ °.



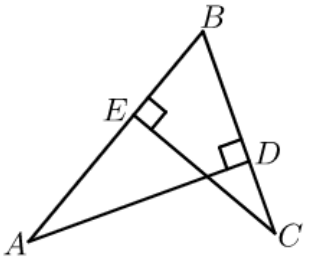
8 Which group of line segments below can form a triangle?

A. 9 cm, 3 cm, 5 cm B. 5 cm, 4 cm, 4 cm C. 2 cm, 6 cm, 4 cm

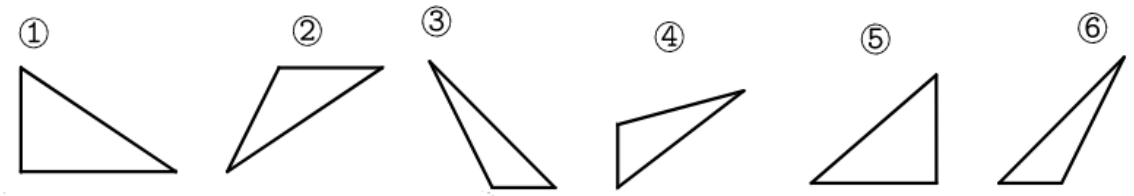
9 In triangle ABC, $BC = 6$ cm, $AC = 10$ cm, and $BE = 3$ cm, the length of AD is _____ cm.



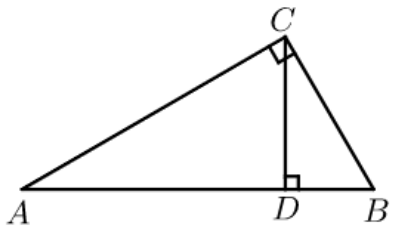
10 In $\triangle ABD$ and $\triangle BCE$, AD is perpendicular to BC, CE is perpendicular to AB, and $\angle A = 30^\circ$. Then $\angle C =$ _____ $^\circ$.



11 As shown in the figure below, the right triangles are _____ , and the obtuse triangles are _____ .

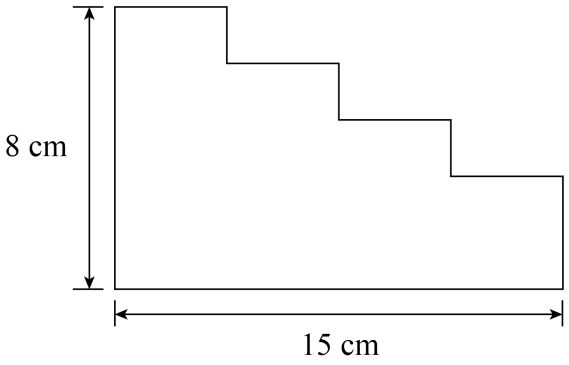


12 In triangle ABC, $BC = 4$ cm, $AC = 12$ cm, and $AB = 16$ cm, the length of CD is _____ cm.

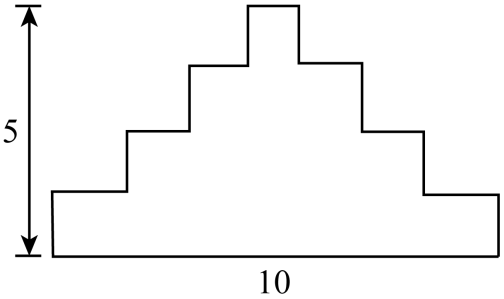


Strategy to Find the Perimeter

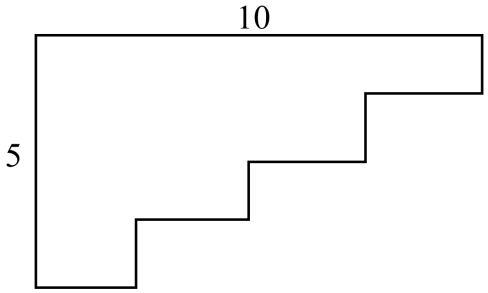
1 Find the perimeter of the figure below.

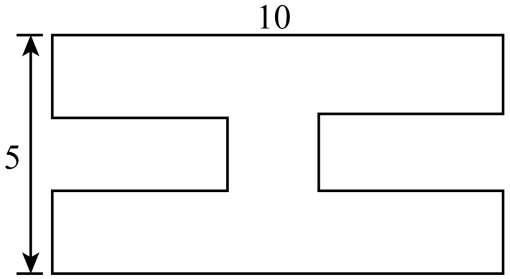


2 Which of the following figures has the longest perimeter?

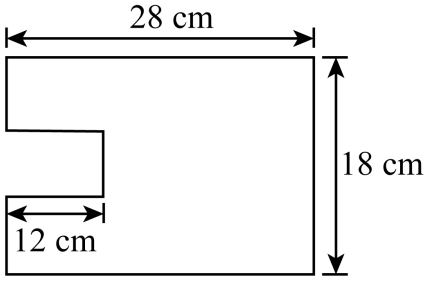
A.


B.

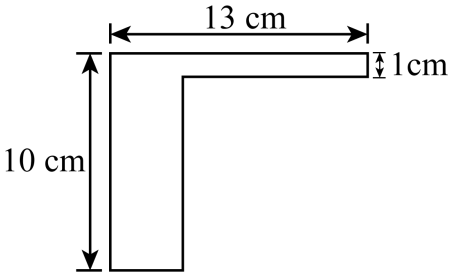
C.


D.


3 Find the perimeters of the figures below, respectively.

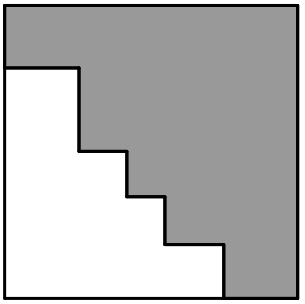


(1)



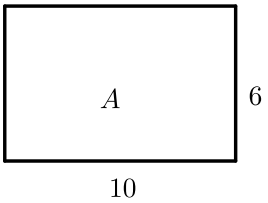
(2)

4 The side length of the large square is 4 m. Find the perimeter of the shaded figure.

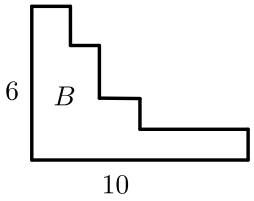


5 Which figure has the longest perimeter?

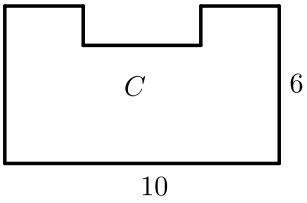
A.



B.

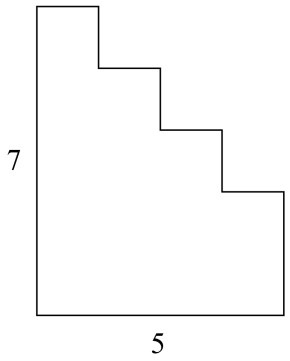


C.

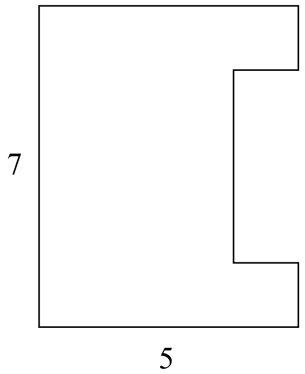


6 Which one of the following figures has the largest perimeter?

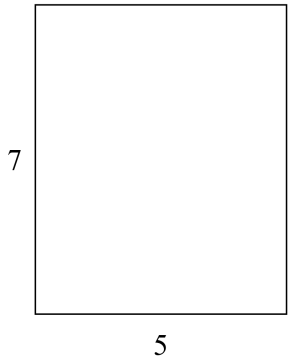
A.



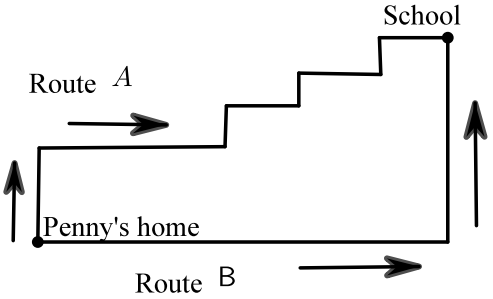
B.



C.



7 Penny has two ways to reach school from home, which way is shorter?

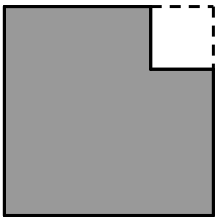


A. Route *A*

B. Route *B*

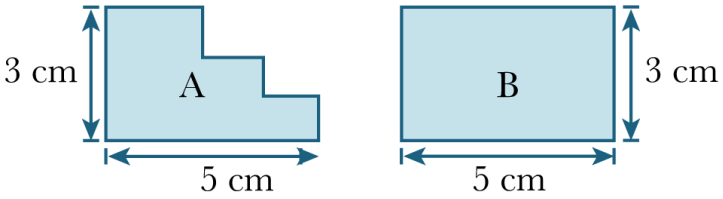
C. Same

8 Cut a small square out of a square card. Which statement is right?



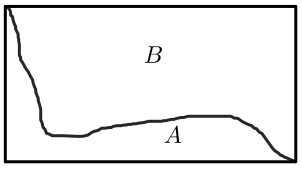
A. The perimeter of the big square doesn't change.
B. The perimeter of the big square becomes smaller than before.
C. The perimeter of the big square becomes larger than before.

9 Which figure has a longer perimeter?



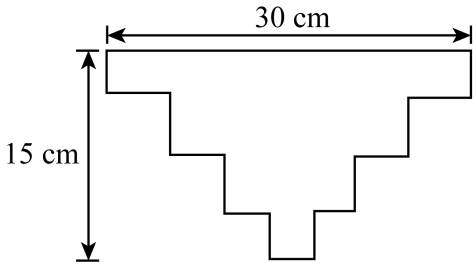
A. *A*
B. *B*
C. They have the same perimeter.

10 Which statement below is right?

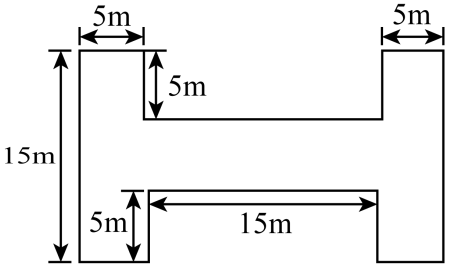


A. Figure A and figure B has the same perimeter.
B. Figure A's perimeter is bigger.
C. Figure B's perimeter is bigger.

11 Find the perimeters of the figures below, respectively.

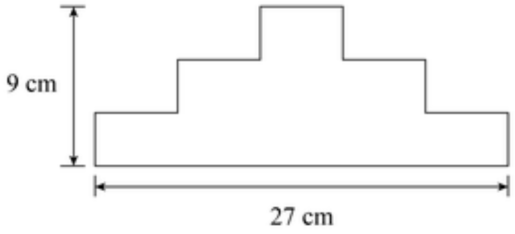


(1)

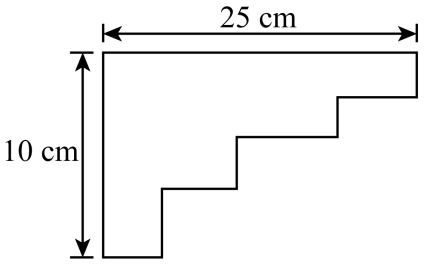


(2)

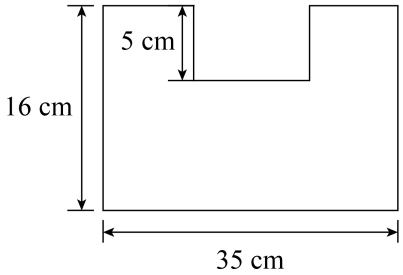
12 Find the perimeter of the figure below.



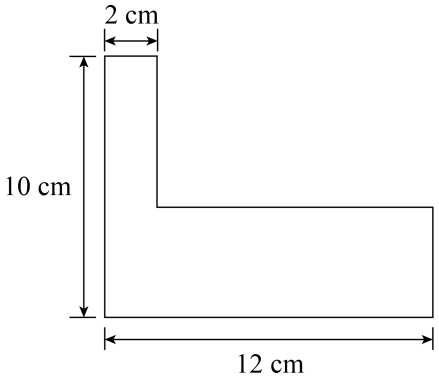
13 Find the perimeter of the figure below.



14 Find the perimeters of the figures below, respectively.



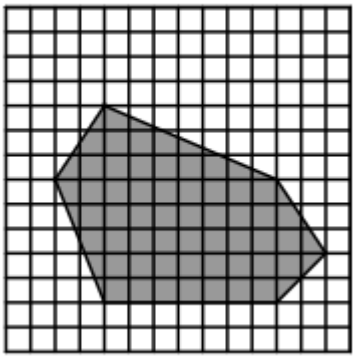
(1)



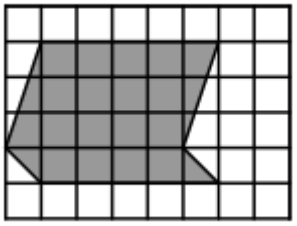
(2)

Strategy to Solve the Area

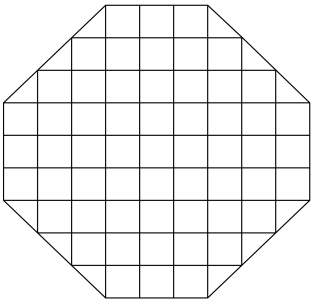
1. The area of each square is 1 m^2. Find the shaded area of the figure as shown below.



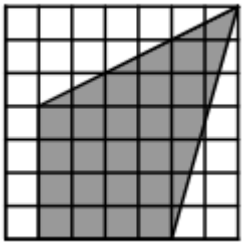
2. The area of each square is 1 cm^2. Find the shaded area of the figure as shown below.



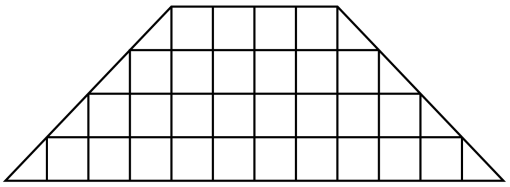
3 The side length of each square is 1 m. Find the area of the figure as shown below.



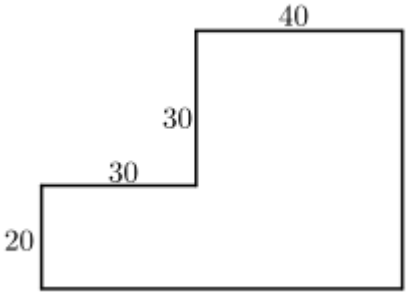
4 The side length of each small square is 1 cm. Find the area of the figure as shown below.



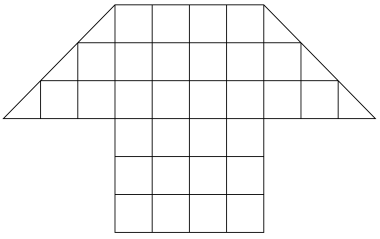
5 The side length of each square is 1 m. Find the area of the figure as shown below.



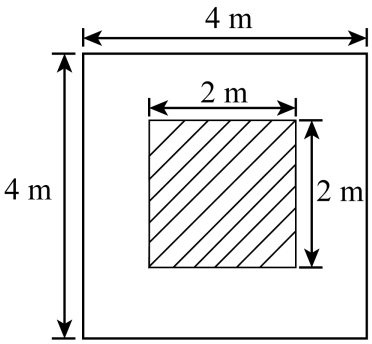
6 Find the area of the figure below. (Unit: cm)



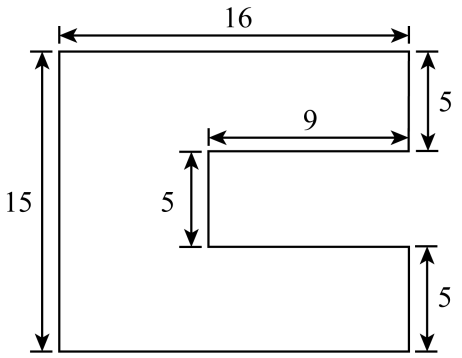
7 The area of each square is 1 cm^2. Find the area of the house as shown below.



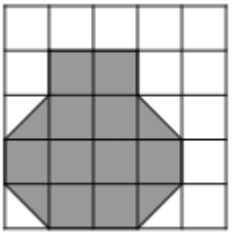
8 Find the area of the blank region below.



9 Find the area of the figure below. (Unit: cm)



10 The side length of each small square is 1 m. Find the area of the figure as shown below.



NOTE

Word Problems

Sum and Difference

1. To celebrate Tom's birthday, Tom's brother bought some pens and erasers for Tom. On that day, Tom's brother bought 36 pens and erasers in total and the number of pens was 6 more than that of erasers. How many erasers did Tom's brother buy? What about pens?

2. To help some children in need, Betty and Elena decided to donate some money towards a charitable organization. They totally donated 70 dollars and Betty donated 10 more dollars than Elena. How many dollars did Elena donate? What about Betty?

3 Jack and Dennis make 63 cupcakes in total. Jack makes 5 more cupcakes than Dennis, how many cupcakes does Jacks make? How about Dennis?

4 Justin and Hailey buy 27 peaches in total. Justin buys 3 more than Hailey, how many peaches does Justin buy? How about Hailey?

5 Cathie and Dannie have 24 stickers in total. Cathie has 2 more stickers than Dannie, how many stickers does Cathie have? How about Dannie?

6 Mike and Nancy bought 62 apples in total. Nancy bought 4 fewer apples than Mike, how many apples did Mike buy? How about Nancy?

7 Cindy and Lisa planted 44 roses in total. Cindy planted 4 fewer roses than Lisa, how many roses did Cindy plant? How about Lisa?

8 During the holiday, Think Academy bought some toys for students, including remote-controlled cars and remote-controlled planes. Totally, Think Academy bought 49 toys and the amount of remote-controlled cars is 5 less than that of remote-controlled planes. How many remote-controlled cars did Think Academy buy? How about remote-controlled planes?

9 Kate and Lucy buy 39 boxes of pears in total. Kate buys 3 more boxes than Lucy, how many boxes of pears does Kate buy? How about Lucy?

10 Selina and Iris bought 53 sweets in total. Selina bought 7 fewer than Iris, how many sweets did Selina buy? How about Iris?

11 To help some children in need, Tina and Ben decided to donate some money towards a charitable institution. They totally donated 140 dollars and Tina donated 20 more dollars than Ben. How many dollars did Ben donate? How about Tina?

12 Kevin and Mira buy 28 boxes in total. Kevin buys 6 more boxes than Mira, how many boxes does Kevin buy? How about Mira?

13 Jenny and Rose planted 35 trees in total. Jenny planted 9 fewer trees than Rose, how many trees did Jenny plant? How about Rose?

14 On Christmas Day, Think Academy delivered presents to children. Both Linna and Tina received presents. On that day, Tina and Linna received 31 presents in total. Also, Linna received 5 fewer presents than Tina. How many presents did Linna receive on that day? What about Tina?

15 Candice and Ellie have 29 apples in total. Candice has 5 more apples than Ellie, how many apples does Candice have? How about Ellie?

16 During the summer vacation, Think Academy bought some toys for students, including remote-controlled cars and dolls. Totally, Think Academy bought 42 toys and the amount of remote-controlled cars is 6 less than that of dolls. How many remote-controlled cars did Think Academy buy? What about dolls?

17 To celebrate Simon's birthday, his father bought some pens and erasers for Simon. On that day, Simon's father bought 98 pens and erasers in total and the number of pens is 8 more than that of erasers. How many erasers did Simon's father buy? What about pens?

18 James and Lily make 87 donuts in total. James makes 5 more donuts than Lily, how many donuts does James make? How about Lily?

19 On Easter Day, Think Academy delivered eggs to children. Both Linna and Tina received eggs. On that day, Tina and Linna received 47 eggs in total. Also, Linna received 5 fewer eggs than Tina. How many eggs did Linna receive on that day? What about Tina?

20 On Halloween day, Think Academy distributed toys to children. Both Lucy and Neo got toys. On that day, Lucy and Neo got 108 toys in total. Also, Neo got 12 less toys than Lucy. How many toys did Neo receive on that day? How about Lucy?

21 Mia and Carl make 57 biscuits in total. Mia makes 5 more than Carl, how many biscuits does Mia make? How about Carl?

22 Nancy and Lucy planted 39 trees in total. Nancy planted 7 fewer than Lucy, so how many trees did Nancy plant? How about Lucy?

Sum and Multiple

1. To encourage Jahn and Tim to study harder, the teacher gives them some cookies. There are 96 cookies which are either Jahn's or Tim's. The number of cookies Jahn has is 11 times that of Tim's. Therefore, Tim has _____ cookies and Jahn has _____ cookies.

2. There are 192 balls which are either yellow balls or blue balls. The number of yellow balls is 7 times that of blue balls. There are _____ yellow balls.

3 In the classroom, there are totally 400 books which are either the teacher's or the student's. The number of teacher's books is 9 times that of student's books . Therefore, the teacher has _____ books and the student has _____ books.

4 Sammy loves reading books. He read 36 books in this summer vacation, and those books are either history books or novels. The number of the history books he read is 5 times that of the novels he read. He read _____ history books and _____ novels in this summer vacation.

5 There are 90 cats which are either white or black. The number of white cats is 5 times that of black cats. There are _____ black cats and _____ white cats.

6 In the classroom, there are totally 200 books which are either teacher's books or student's books. The number of teacher's books is 9 times that of student's books. Therefore, the teacher has _____ books and the student has _____ books.

7 There are 90 dogs which are either with a long tail or a short tail. The number of long-tail dogs is 5 times that of short-tail dogs. There are _____ short-tail dogs and _____ long-tail dogs.

8 There are 36 trees along the road. These trees are either maple trees or ginkgo trees. The number of maple trees is 8 times that of ginkgo trees. There are _____ maple trees along the road.

9 There are 100 toys in the store's warehouse, and the toys are either dolls or teddy bears. The number of dolls is 9 times that of teddy bears. There are _____ dolls and _____ teddy bears.

10 There are 128 balls which are either yellow or blue. The number of blue balls is 7 times that of yellow balls. There are _____ blue balls.

Difference and Multiple

1. Cassie and April took a math quiz. Cassie got 24 more points than April and her score is 7 times that of April. How many points did Cassie get? How about April?

2. Mark is three times as old as his youngr sister this year. Mark is 6 years older than his younger sister. Therefore, Mark's younger sister is _____ years old and Mark is _____ years old this year.

3 The number of apples is 180 more than that of bananas in the market, and the number of apples is 7 times that of bananas. There are _____ bananas and _____ apples in the market.

4 The number of science-fiction books is 300 more than that of comic books in the school library, and the number of science-fiction books is 6 times that of comic books. There are _____ science-fiction books in the library.

5 Nina is in her aunt's house now. Her aunt is 25 years older than Nina. And the age of Nina's aunt is 6 times that of Nina. How old is Nina and how old is Nina's aunt?

6 Carrots and cabbage are grown on the farm. The number of carrots is 6 times that of cabbage, and there are 10 more carrots than cabbage. How many carrots are there?

7 The number of apples is 360 more than that of bananas in the market, and the number of apples is 7 times that of bananas. There are _____ apples in the market.

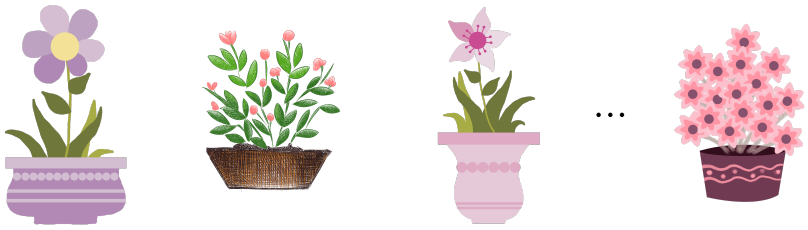
8 The number of red balls is 180 more than that of yellow balls in the box, and the number of red balls is 7 times that of yellow balls. There are _____ yellow balls in the box.

9 Suzy is four times as old as her son this year. Her son is 36 years younger than Suzy. Therefore, Suzy's son is _____ years old and Suzy is _____ years old this year.

10 The number of science-fiction books is 250 more than that of comic books in the school library, and the number of science-fiction books is 6 times that of comic books. There are _____ comic books in the library.

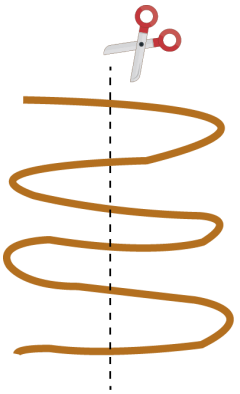
Interval

1 Mira puts 52 pots of flowers every 2 meters on one side of a road. The width of the pot is negligible. It is _____ meters long from the 1st pot of flowers to the 52nd pot of flowers.



2 Workers put some benches on one side of a road. They put one pot of flowers between every two benches, and put 35 pots of flowers in total. They put _____ benches.

3 Cut along the dotted line and the rope is cut into _____ segments.

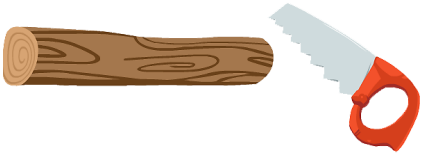


4 A ribbon was cut 8 times. (The ribbon cannot be folded or twisted.) Each section was 3 meters long. This ribbon was _____ meters long originally.

5 Candice plants 42 flowers on one side of the road. The road is divided into _____ segments.

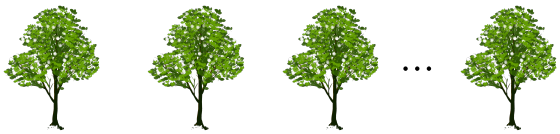
6 A string was cut 13 times. (The string cannot be twisted.) Each section was 2 meters long. This string was _____ meters long.

7 How many times do you need to cut this wood into 5 parts? (Cut in the same direction each time)

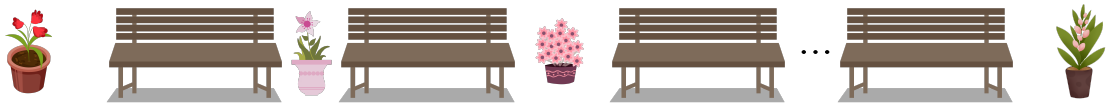


8 A ribbon was cut six times. (The ribbon cannot be twisted.) Each section was 3 meters long. This ribbon was _____ meters long.

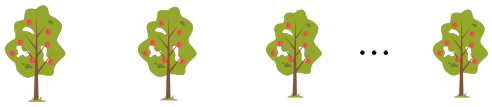
9 If workers plant 34 trees on one side of the road as shown below. The road is divided into _____ segments.



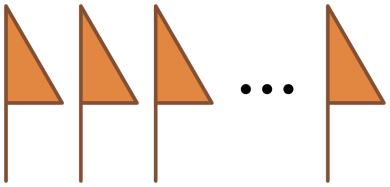
10 Workers put some benches on one side of a road. They put one bench between every two pots of flowers, and put 43 benches in total. They put _____ pots of flowers.



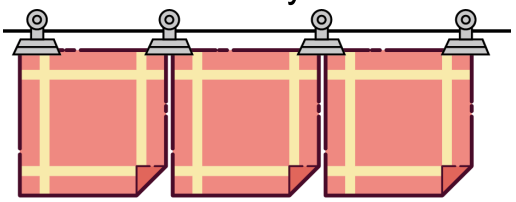
11 There is a road in a park. If workers plant 17 trees on one side of the road as shown below. The road is divided into _____ segments from the first tree to the last one.



12 Candy puts 41 flags on one side of the road. The road is divided into _____ segments.



13 How many clothes-pins do I need to dry 6 handkerchiefs?



A. 5 B. 6 C. 7

Chicken and Rabbit Problem & Find the Unit

1 A spider has eight legs. 2 spiders have a total of _____ legs. A tiger has four legs. 3 tigers have a total of _____ legs. 5 spiders and 4 tigers have a total of _____ heads and _____ legs.

2 A pigeon has two legs. 2 pigeons have a total of _____ legs. A dog has four legs. 6 dogs have a total of _____ legs. 5 pigeons and 5 dogs have a total of _____ heads and _____ legs.

3 A total of 8 chickens and rabbits are caged together. If there are 22 legs in total, how many chickens and rabbits are in the cage, respectively?

4 A total of 16 chickens and rabbits are caged together. If there are 50 legs in total, how many chickens and rabbits are there, respectively?

5 Mandy is shopping with her friends in a gift shop. They spend 30 dollars on 3 cups. Each cup costs the same. How much will they cost if Mandy wants to buy 5 of the same cups?

6 Lily divides 50 postcards into 5 envelopes. One week after Lily has already divided the postcards, her friends give her some other postcards, and then Lily divides those new postcards into another 2 envelopes. Each envelope has the same number of postcards. How many postcards in total are there?

7 Penny is making cupcakes for her birthday party. It takes her 36 minutes to make 6 cakes and the amount of time she spend on each cake is the same. If Penny wants to make 10 cupcakes, how many minutes will she spend?

8 Nina is buying clothes with her friends in a shopping mall. They buy 5 tops and spend 25 dollars. Each top costs the same. How much will they cost if Nina wants to buy 8 of the same tops?

9 Nancy divides 24 roses into 3 vases. After Nancy has already divided, her mother brings back some other roses and Nancy divides them into another four vases. Each vase has the same amount of roses. How many roses in total are there?

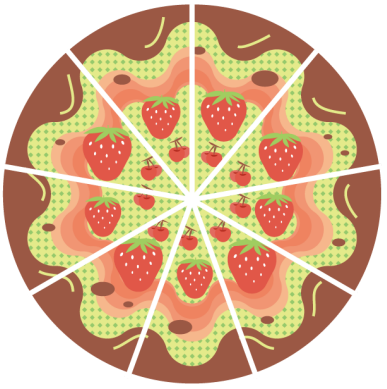
Word Problems of Addition and Subtraction of Fractions

1. Alicia and her roommate, Tina, bought a bottle of shampoo. Alicia used $\frac{2}{9}$ bottle of the shampoo, and Tina used $\frac{3}{9}$ bottle of the shampoo. What fraction of the shampoo did they use in total?

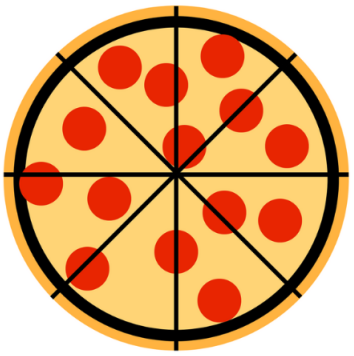
2. Lily and her friend, Megan, bought a cake. Lily ate $\frac{3}{10}$ of the cake, and Megan ate $\frac{4}{10}$ of the cake. What fraction of the cake did they eat in total?

3 Helen peels an orange into 8 equal slices. She keeps 2 slices for herself and gives the rest to Sophia. How many more slices of the orange does Sophia have comparing to Helen? What is the fraction of the orange that Sophia has more than Helen?

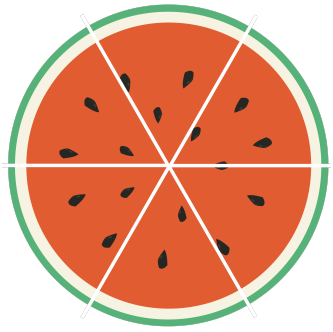
4 Jennifer cuts a cake into 9 equal pieces and she gives 2 pieces to her brother. How many pieces does Jennifer have now? What fraction of cake does she have?



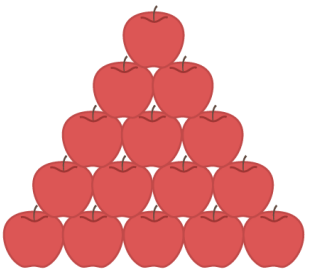
5 Sara cuts a pizza into 8 equal pieces and she gives 5 pieces to her brother. How many pieces does Sara have now? What fraction of pizza does she have?



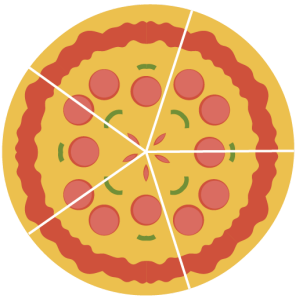
6 Elena cuts a watermelon into 6 equal pieces and she gives 3 pieces to her brother. How many pieces does Elena have now? What fraction of watermelon does Elena have?



7 Sam is distributing 50 apples among his friends. He gives 10 apples to Bob and gives 23 apples to John. How many more apples does John get comparing to Bob? What is the fraction of the total amount of apples that John gets more than Bob?



8 Lauren cuts a pie into 5 equal pieces. She saves 1 piece for herself and gives 4 pieces to Hannah. How many more pieces of pie does Hannah gets comparing to Lauren? What is the fraction of the pie that Hannah gets more than Lauren?



9 Neo and his brother, Mark, bought a bottle of juice. Noe drank $\frac{4}{11}$ of the whole bottle of juice, and Mark drank $\frac{5}{11}$ of the whole bottle of juice. What fraction of the juice did they drink in total?

10 Tom is distributing 30 tennis balls to his classmates. He gives 7 balls to Simon and gives 18 balls to Elena. How many more tennis balls does Elena get comparing to Simon? What is the fraction of the total amount of tennis balls that Elena gets more than Simon?

Combinatorics

Operation without Numbers

1 Find the number each shape represents below!
(The same shapes represent the same numbers, and different shapes represent different numbers.)

+ =30	= _____
+ =56	= _____
-7=43	= _____

2 Fill in the blanks. (The same shape represents the same number, and different shapes represent different numbers.)

+ + = 18

(1) + + + = 28

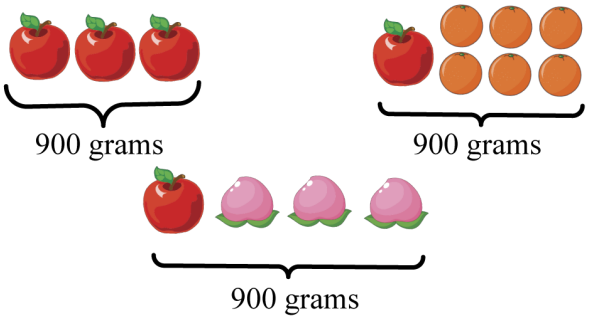
= _____. = _____.

+ + + + + = 28

(2) + + = 20

= _____. = _____.

3 Each pile of fruit below weighs 900 grams. Can you work out the weight of an apple, a peach, and an orange, respectively?



= _____ grams

= _____ grams

= _____ grams

4 Find the number each animals represents below. (The same animal represents the same number, and different animals represent different numbers.)

= _____

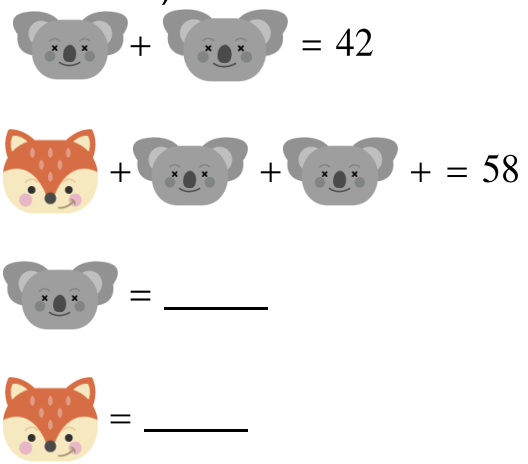
= _____

= _____

= _____

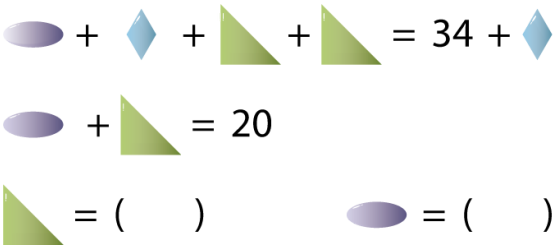
= _____

5 Find the number each shape represents below! (The same shapes represent the same numbers, and different shapes represent different numbers.)

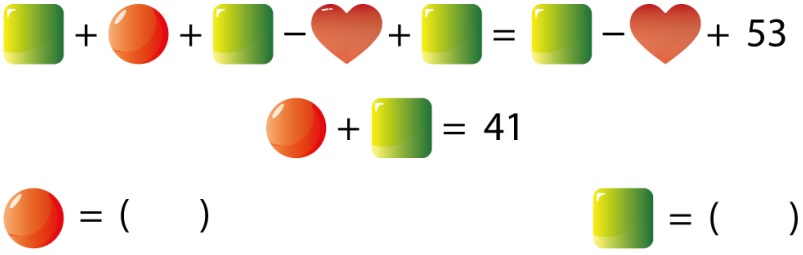


6 Fill in the blanks. (The same shape represents the same number, and different shapes represent different numbers.)

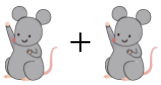
(1)



(2)



7 Find the number each shape represents below! (The same shapes represent the same numbers, and different shapes represent different numbers.)

 + = 26

+ + = 43

= _____

= _____

8 Fill in the blanks. (The same shape represents the same number, and different shapes represent different numbers.)

− = 24

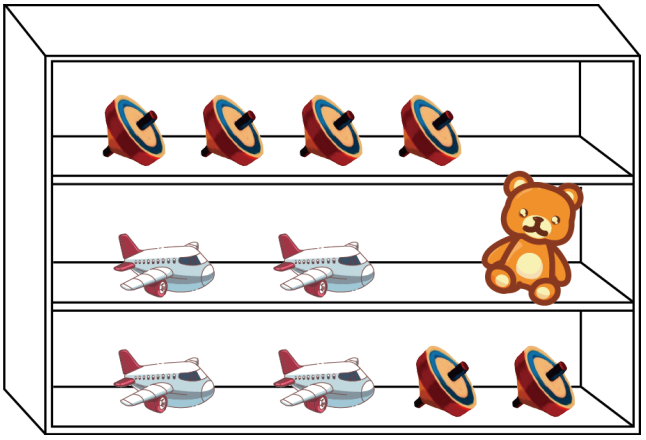
+ + =

= ( ) = ( )

9 Find the number each shape represents below! (The same shapes represent the same numbers, and different shapes represent different numbers.)

+ = 35	= _____
+ = 65	= _____
− 7 = 43	= _____

10 All items on each level of the shelf cost 20 dollars.

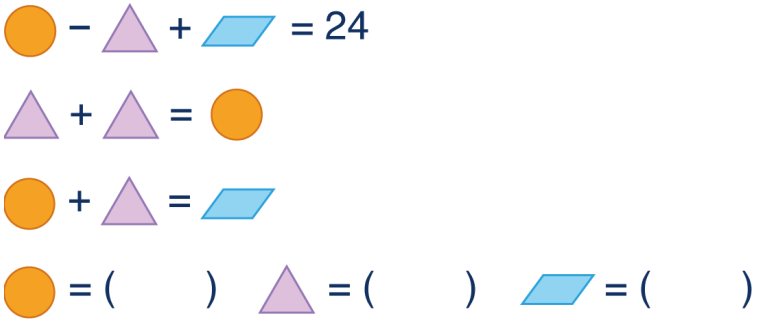


= _____ dollars

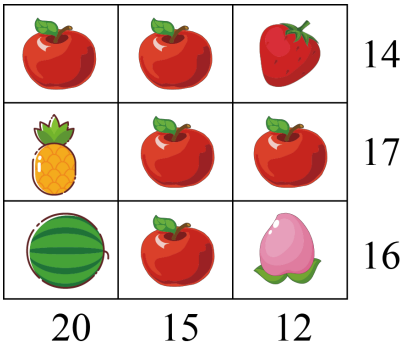
= _____ dollars

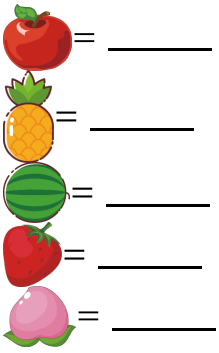
= _____ dollars

11 Fill in the blanks. (The same shape represents the same number, and different shapes represent different numbers.)

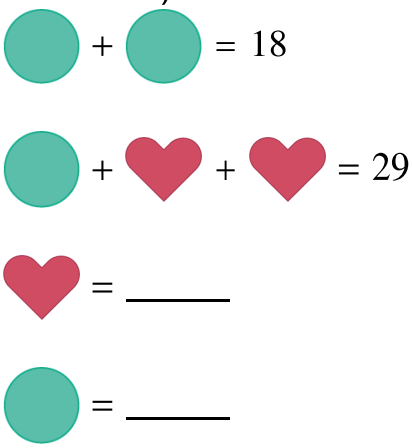


12 Find the number each fruit represents below. (The same fruit represents the same number, and different fruits represent different fruits.)





13 Find the number each shape represents below! (The same shapes represent the same numbers, and different shapes represent different numbers.)



Sudoku

1 Fill the numbers 1 to 6 exactly once in every row,column, and block.

		2	4	6	
1		4	2		
5	2			1	4
4	1			2	6
		1	6		5
	4	5	1		

2 Fill the numbers 1 to 4 exactly once in every row, column, and block.

		3	1
3	1		
			2
1	2		

3 Fill the numbers 1 to 4 exactly once in every row, column, and block.

1		4	
2		1	3
4	2		1
	1		4

4 Fill the numbers 1 to 6 exactly once in every row,column, and block.

2	6	5	1	3	
4		3	6	5	2
1	4		3	6	5
	5	6		2	1
5	3	1	2		6
	2		5	1	3

5 Fill the numbers 1 to 6 exactly once in every row,column, and block.

4	2	3		6	
6			4	3	2
5		2		4	
	4		6		5
1	3	6			4
	5		3	1	6

6 Fill the numbers 1 to 6 exactly once in every row,column, and block.

2		1		3	
		6	4	1	2
4	6		3	2	
	1	2		5	4
1	5	4	2		
	2		1		5

7 Fill the numbers 1 to 6 exactly once in every row,column, and block.

	2		6	4	3
3	6	4			1
	3		1		6
2		6		3	
1			3	6	5
6	5	3		1	

8 Fill the numbers 1 to 6 exactly once in every row,column, and block.

6	3	4	1	5	2
	5	1	4	6	
3		2	5		6
4		5	2		1
5	2			1	4
1	4	6	3	2	5

9 Fill the numbers 1 to 6 exactly once in every row,column, and block.

2			6	3	
		6	4		5
	1		2	5	4
4	2	5		1	
5		2	1		
	6	1			2

10 Fill the numbers 1 to 6 exactly once in every row,column, and block.

1		5	6	3	
	6		5		1
2		1		4	6
6	4		1		2
4		6		1	
	1	2	4		3

11 Fill the numbers 1 to 6 exactly once in every row,column, and block.

6		1	5	2	
	3			4	6
5		4	2		1
1		3	4		5
3	1			5	
	5	6	3		2

12 Fill the numbers 1 to 6 exactly once in every row,column, and block.

	6	4	2	5	
1	2		3	6	4
5	3	1	4		6
2		6	1	3	5
4	5	3		1	2
	1	2	5	4	

13 Fill the numbers 1 to 6 exactly once in every row,column, and block.

	4		3	2	5
2	3	5			6
	1		5		2
6		2		1	
4			2	5	1
5	2	1		3	

14 Fill the numbers 1 to 6 exactly once in every row,column, and block.

5	6	4	2	3	
2		1	6	4	5
3	1		4	5	6
4	5	6		2	3
1	2	3	5		4
	4	5	3	1	2

15 Fill the numbers 1 to 6 exactly once in every row,column, and block.

5	1	6		3	4
2	4		6	1	5
3		5	4	6	1
1		4	5	2	3
4	3		1	5	6
6	5	1		4	2

NOTE

Crazy Math

MK Level 3–4

1. Emily took part in the math competition. There were 20 questions in total. If she did a question right, she would get 5 points; if she did a question wrong or did not answer a question, 3 points would be deducted. Finally, her score was 60 points. How many questions did Emily do right?

A. 16 B. 17 C. 15 D. 14 E. 13

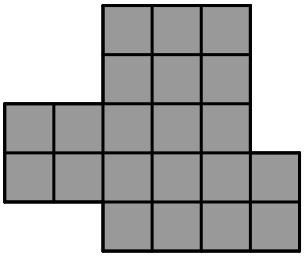
2. To defeat a monster with several heads, Ema has to cut off all the heads of the monster. If she can cut off 4 of the monster's heads, one new head immediately grows. Ema defeats the monster by cutting off 14 heads in total. How many heads did the monster have at the beginning?

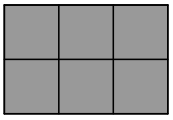
A. 11 B. 16 C. 14 D. 13 E. 15

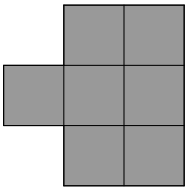
3 Cathy, Katy, and Iris are weighing. Cathy and Iris weigh 52 kilograms together, Katy and Cathy weigh 51 kilograms together, and three people weigh 81 kilograms in total. What is the weight of Cathy in kilograms?

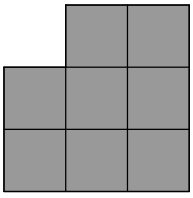
A. 22 B. 24 C. 27 D. 29 E. 30

4 The figure below is divided into three identical pieces. What does each of the pieces look like?

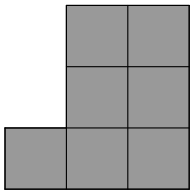


A. 

B. 

C. 

D.

E. 

5 Lily and her friend plan to watch a movie. The movie is 90 minutes long. It will start at 10 : 10 AM. During the movie, there will be two commercial breaks, one lasting 6 minutes and the other lasting 7 minutes. At what time will the movie finish?

A. At 11 : 13 AM
B. At 11 : 27 AM
C. At 11 : 47 AM
D. At 11 : 53 AM
E. At 12 : 13 AM

6 James and Mike have 19 stickers in total, and the stickers James has is 5 more than the stickers Mike has. How many stickers does James have?

A. 12 B. 7 C. 15 D. 14 E. 8

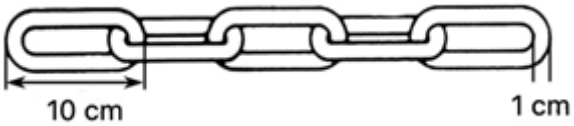
7 Andy has more stamps than Cathie. If Andy gives 23 stamps to Cathie, Andy still has 4 more stamps than Cathie. The number of Andy's stamps is 6 times that of Cathie's stamps. How many stamps does Cathie have?

A. 9 B. 10 C. 15 D. 12 E. 18

8 There are some trees on a road as shown below. Jessy notices that some of the trees are very special that all the trees to the left of it are shorter than it and all the trees to the right of it are taller than it. How many special tree(s) is/are there?

A. 0 B. 1 C. 2 D. 3 E. 4

9 Betty makes a chain using identical links as shown in the picture. What is the length of a chain made out of five links?



A. 46 cm
B. 42 cm
C. 50 cm
D. 47 cm
E. There is no right answer.

10 4 digits are removed from the ten-digit number 1634972098 to form a new six-digit number without changing the position of each digit. What is the least six-digit number that can be formed?

A. 165349 B. 102334 C. 163098 D. 132098 E. 012334

11 ◆ + ◆ + ◆ + ◆ + ◆ + ★ + ★ = 36,

◆ + ◆ + ★ = 16,

so, ◆ = ( ), ★ = ( ).

A. ◆ = 1, ★ = 14

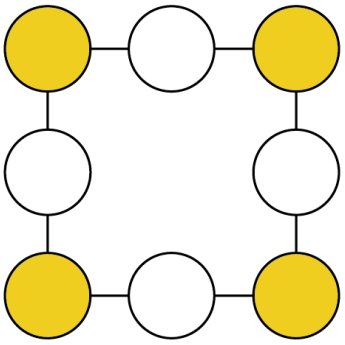
B. ◆ = 2, ★ = 12

C. ◆ = 3, ★ = 10

D. ◆ = 4, ★ = 8

E. There is no right answer.

12 Fill the eight numbers 1, 4, 6, 7, 8, 9, 13, and 16 in the circles so that the sum of the numbers on each side of the square is equal to 21. What will be the sum of the numbers in the yellow circles?



A. 18

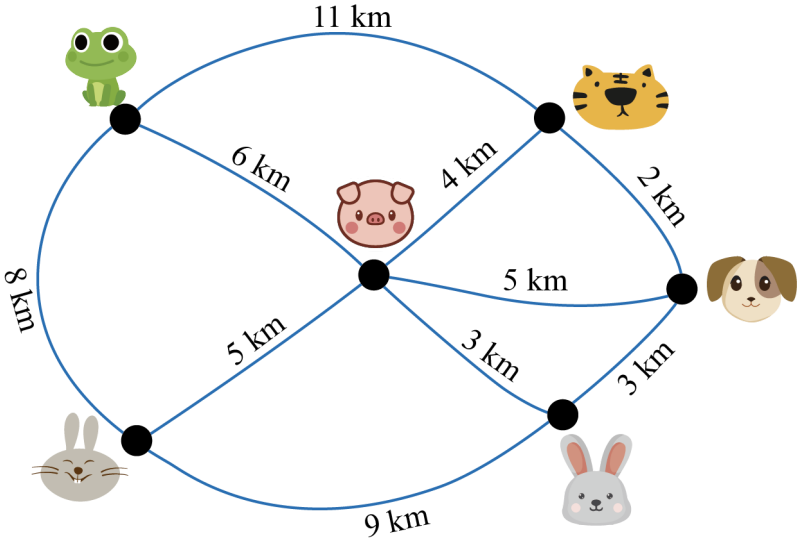
B. 19

C. 23

D. 20

E. 21

13 Here is a map of an animal village. Starting from its house, the frog wants to visit all the 5 friends' houses, and it stays with the friend it visits last. What is the length of the shortest route that the frog can choose?

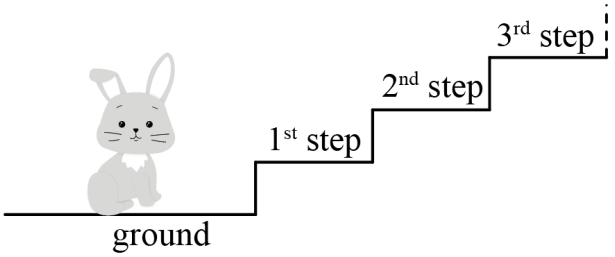


A. 32 km B. 24 km C. 21 km D. 19 km E. 28 km

14 There is a container for culturing microbes. If we put some microbes in the container and seal it, the number of microbes doubles overnight. If we open the container, the number of microbes decreases by 16 immediately. Kiala put some microbes in the container on the first day, and opened it once on each of the second, third, and fourth days. Each time she opened it, and then she sealed it right after. On the fifth day, Kiala surprisely found there was nothing in the container when she opened it. How many microbes did Kiala put in the container on the first day?

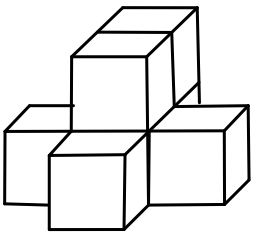
A. 10 B. 14 C. 15 D. 24 E. 28

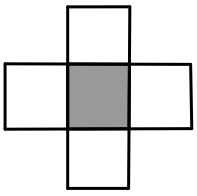
15 A rabbit wants to climb a staircase with many steps. The rabbit can make one of the two kinds of jumps each time: 3 steps up or 5 steps up. Beginning at the ground step, at least how many jumps will the rabbit make in order to rest on the 48th step?

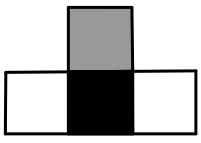


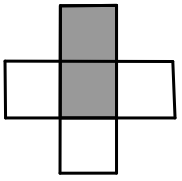
A. 10 B. 9 C. 6 D. 8 E. 5

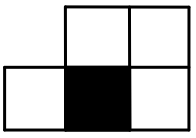
16 Use □ to represent 1 cube, ▩ to represent 2 cubes, and ■ to represent 3 cubes. The figure below is built with 7 cubes. Observing the figure from the front, what will be the shape look like?

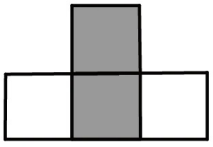


A. 

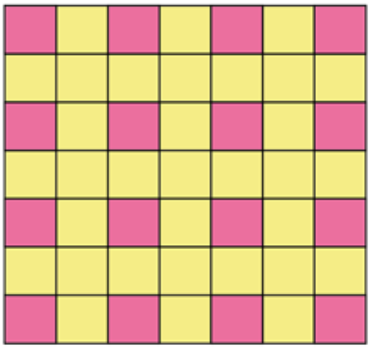
B. 

C. 

D. 

E. 

17 As the figure shows below, there are _____ . (can be rotated.)

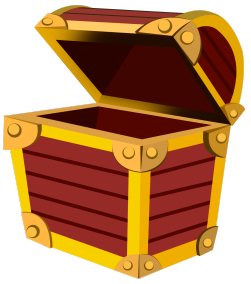


A. 16 B. 24 C. 32 D. 49 E. 28

18 Nancy ate some strawberries from 3 bags. Each bag has 30 strawberries. She ate a few strawberries from the first bag and then ate as many strawberries from the second bag as were left in the first bag. Then, she ate 8 strawberries from the third bag. How many strawberries in total were left in all the 3 bags?

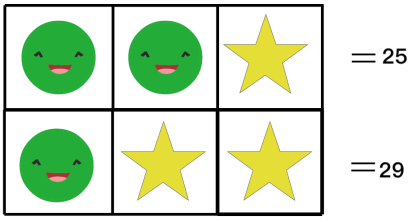
A. 52 B. 60 C. 64 D. 57 E. 48

19 Hilla, Stephin, Jen, Karl, and Echy are playing a treasure hunting game. They number five boxes from 1 to 5, and put a pearl in one of them.
Hilla says: "The pearl is not in Box 3."
Stephin says: "Hilla is telling the truth."
Jen says: "The pearl is either in Box 2 or 5."
Karl says: "Stephin is lying."
Echy says: "The pearl is in Box 4."
Only one of them is telling the truth. Which box did they put the pearl in?



A. Box 1 B. Box 2 C. Box 3 D. Box 4 E. Box 5

20 Each shape represents a different number. The sum of the three numbers in each row is shown to the right of the row. Which number does the ★ stand for?



A. 9 B. 11 C. 12 D. 13 E. 15

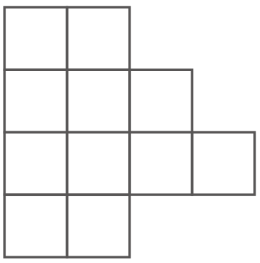
21 Monica wrote numbers from 1 to 50 in order, and then erased every "1" she had written. How many digits did Monica erase?

A. 5 B. 10 C. 13 D. 14 E. 15

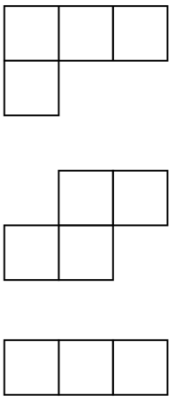
22 Rose plants some red and yellow flowers in her garden. She plants twice as many red flowers as yellow flowers. Which of the following numbers can be the number of flowers she plants in total?

A. 25 B. 26 C. 27 D. 28 E. 29

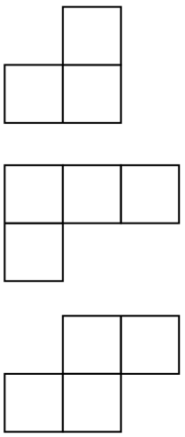
23 Which group of shapes cannot be put together to form the picture below? (The shapes can be flipped.)



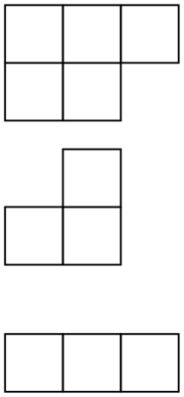
A.



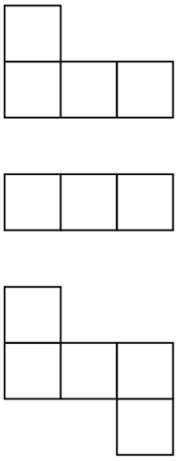
B.



C.



D.

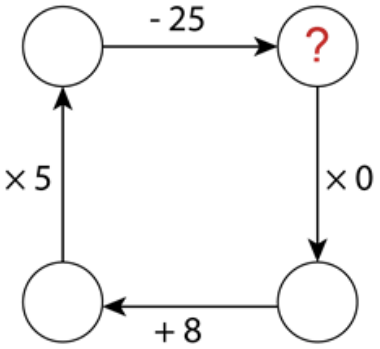


E. There is no right answer.

24 Sara adds six numbers and gets 2021. One of the numbers she adds is 305. She replaces the number 305 with 503. What sum does she get? (Adapted from 2016 Math Kangaroo Problem, level 3-4, Question #22)

A. 1823 B. 1924 C. 1917 D. 2219 E. 2218

25 Which number should be written in the circle with the question mark?



A. 50 B. 78 C. 39 D. 15 E. 28

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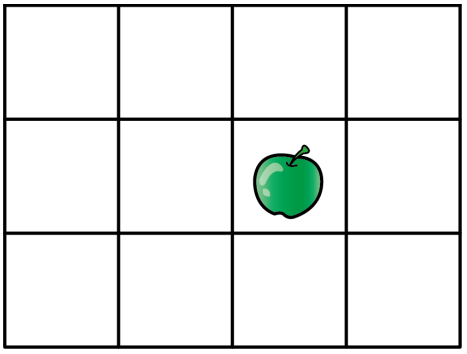
26 There are 172 Grade 2 students and two clubs. All students join at least one club. 96 of them join the piano club, and 98 of them join the basketball club. How many students join both the piano club and the basketball club?

A. 76 B. 74 C. 22 D. 25 E. 10

27 How many squares are there that contain the apple in the picture?



A. 4 B. 5 C. 6 D. 7 E. 8

28 The number 22 has the property that it is divisible by the digit in the ones place, because 22 divided by 2 is 11. The number 34 does not have this property. How many numbers greater than 52 and smaller than 63 have this property?

A. 5 B. 6 C. 4 D. 3 E. 2

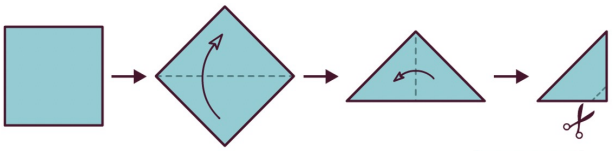
29 In a large number $\underbrace{12345678901234567890\cdots1234567890}_{2020\ digits}$, what is the 207th digit?

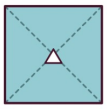
A. 1 B. 3 C. 5 D. 7 E. 9

30 Alice adds nine numbers and gets 2022. One of the numbers she adds is 405. If she replaces the number 405 with 504, what sum will she get?

A. 2427 B. 2526 C. 1617 D. 1923 E. 2121

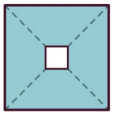
31 Kim folds a square paper and cuts a triangle out as shown below. What shape will Kim get when he unfolds the paper?



A. 

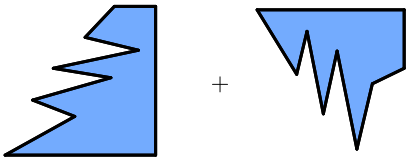
B.

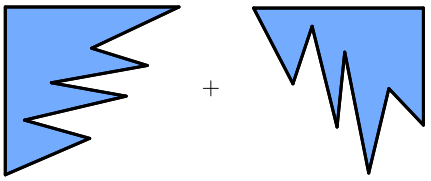
C.

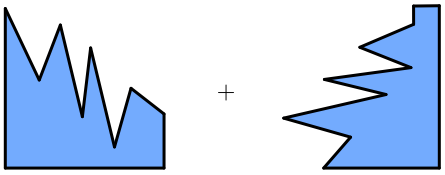
D. 

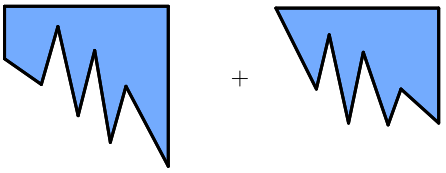
E.

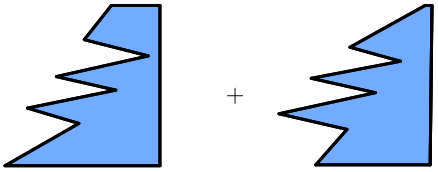
32 Which of the following groups of pieces can make up a square?

A. 

B. 

C. 

D. 

E. 

33 There are some fish in a basket. After David adds 20 kg of fish to the basket, the weight of the fish at this time is 3 times that of the fish originally. How many kilograms of fish were there in the basket originally?

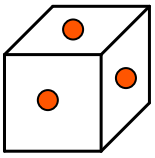
A. 60 kg B. 30 kg C. 25 kg D. 10 kg E. 15 kg

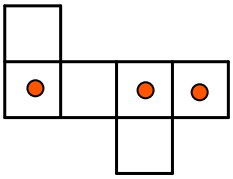
34 This year, March 28th falls on a Tuesday. What day of the week is May 3rd this year?

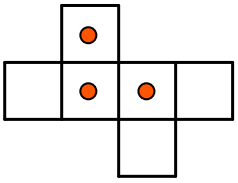
A. Tuesday B. Wednesday C. Monday D. Thursday

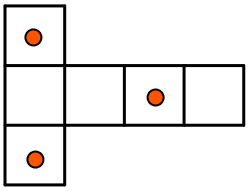
E. Sunday

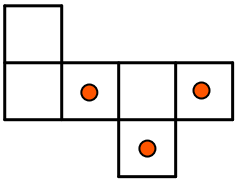
35 Which of the following can be the net of the cube below?



A. 

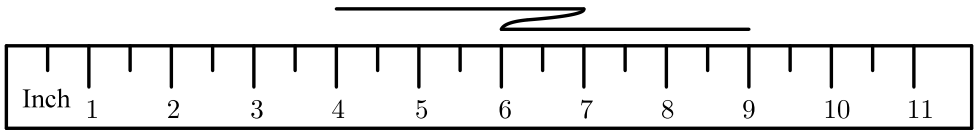
B. 

C. 

D. 

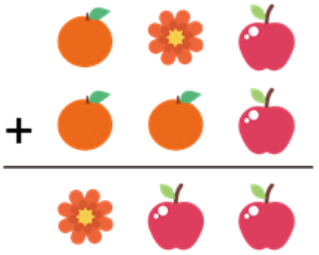
E. Cannot be determined.

36 Straighten the rope below. What is its approximate length in inches?



A. 9 B. 7 C. 5 D. 11 E. 15

37 In a column addition, the same figure represents the same number, and the different figures represent the different numbers. What does the flower represent?

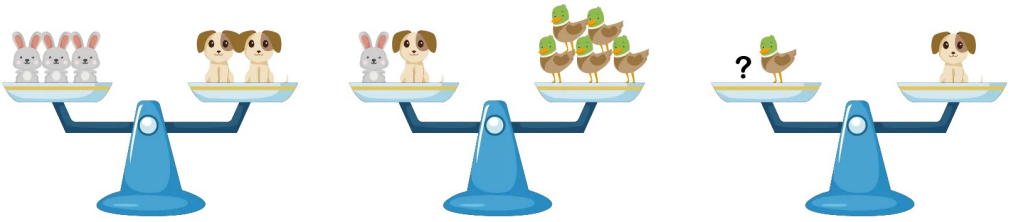


A. 0 B. 7 C. 3 D. 6 E. 10

38 There is a 360-meter road. Workers plant palm trees every 10 meters for two sides of the road and there are palm trees on both ends on each side. Then, workers plant 3 coconut trees between every two adjacent palm trees. How many coconut trees do the workers plant in total?

A. 72 B. 74 C. 108 D. 222 E. 216

39 How many birds weigh the same as a dog?

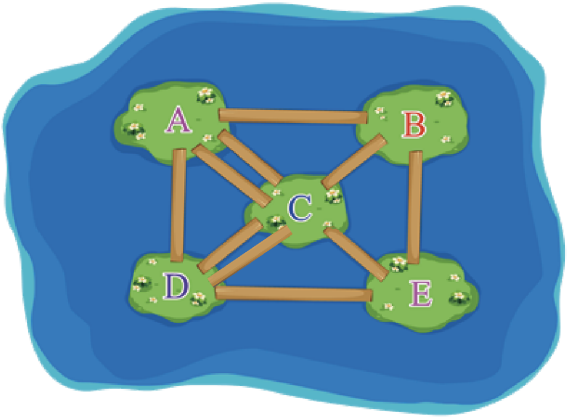


A. 2 B. 3 C. 4 D. 5 E. 6

40 Eddie bought some books. He spent half of his money on a dictionary, and he spent half of the remaining money on some storybooks. After spending 6 dollars for lunch, he was left with 10 dollars. How much did Eddie have at the beginning?

A. 64 B. 32 C. 16 D. 10 E. 34

41 There are five small islands in the sea, and the islands are conected by bridges as shown below. Peter starts from one of the islands, and wants to walk all the bridges without repeating. Which island should he start from?

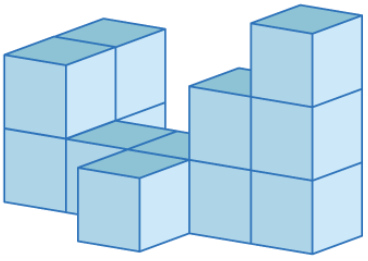


A. A
B. B
C. C
D. D
E. It is impossible.

42 Four pirates, Jack, Jimmy, Jason, and Jacob, are dividing 280 coins. Jack says: "The coins I get are 11 fewer than Jimmy, 15 more than Jason, and 20 fewer than Jacob. How many coins does Jacob get?

A. 66 B. 51 C. 56 D. 77 E. 86

43 Jane built a model using 12 identical cube blocks. Here is the model shown below, and which of the following shows the plan of the model? (The number in each square indicates the number of blocks are placed one on top of another in that place.)



A.

	2			
1	1	1	1	3
				1

B.

2				
2	1	1	2	3
		1		

C.

	1			
3	1	1	1	2
				2

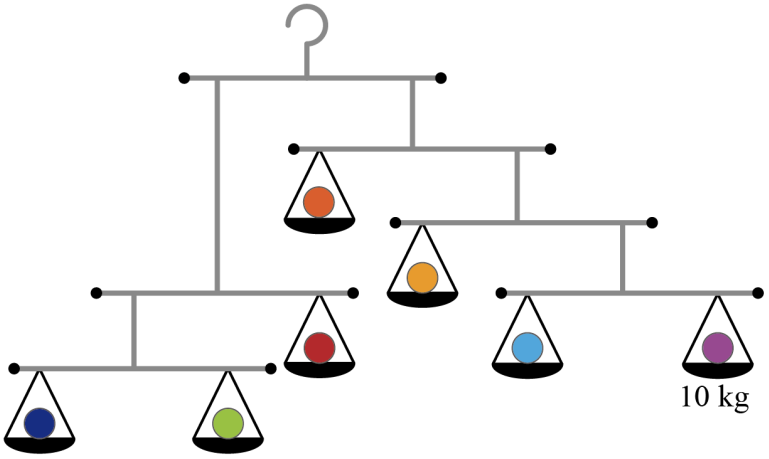
D.

2				
3	2	1	1	2
		1		

E.

	1			
3	2	1	1	2
				2

44 There is a special balance as shown below. The purple ball weighs 10 kilograms. What is the total weight of all the 7 balls?



A. 40 B. 80 C. 120 D. 160 E. 200

45 Ada forms two three-digit numbers with the digits 3, 4, 5, 6, 7, and 8, and each digit can be used only once. She subtracts these two numbers. What is the greatest difference Ada can get?

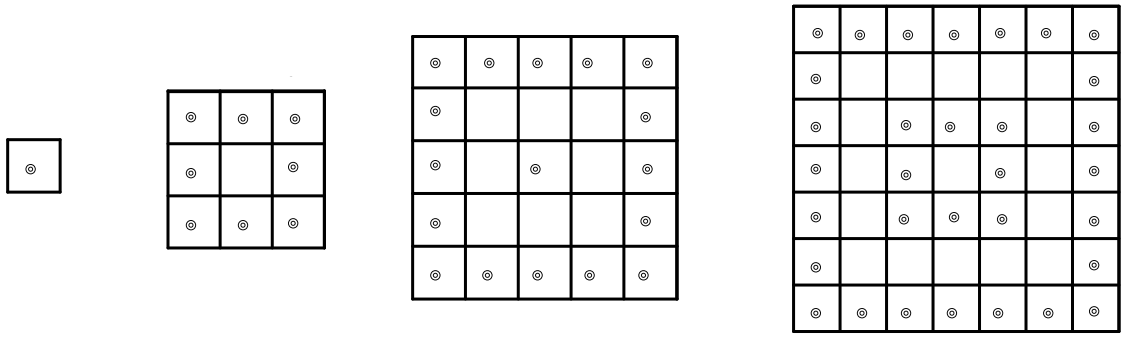
A. 531 B. 513 C. 219 D. 333 E. 876

46 Fill +, −, ×, or ÷ in the blanks to find the largest result of the following expression. What is the largest result?

11 _____ 9 − (21 _____ 7) = _____

A. 48 B. 72 C. 84 D. 96 E. 102

47 Observe the figures below. How many ◎s are there in the 6th Figure?



1st Figure 2nd Figure 3rd Figure 4th Figure

A. 49 B. 50 C. 64 D. 72 E. 74

48 A 3-digit code is needed to open a safe. The code is made of only three digits $2, 4$, and 5, and each digit is used only once. How many possible codes are there?

A. 2 B. 3 C. 4 D. 5 E. 6

49 A lazy squirrel collected some nuts for the coming winter. On Monday, it collected some nuts. On Tuesday, it was a rainy day, so the squirrel collected 4 fewer nuts than that it collected on Monday. In these two days, it collected 24 nuts in total. How many nuts did the squirrel collect on Monday?

A. 10 B. 11 C. 12 D. 13 E. 14

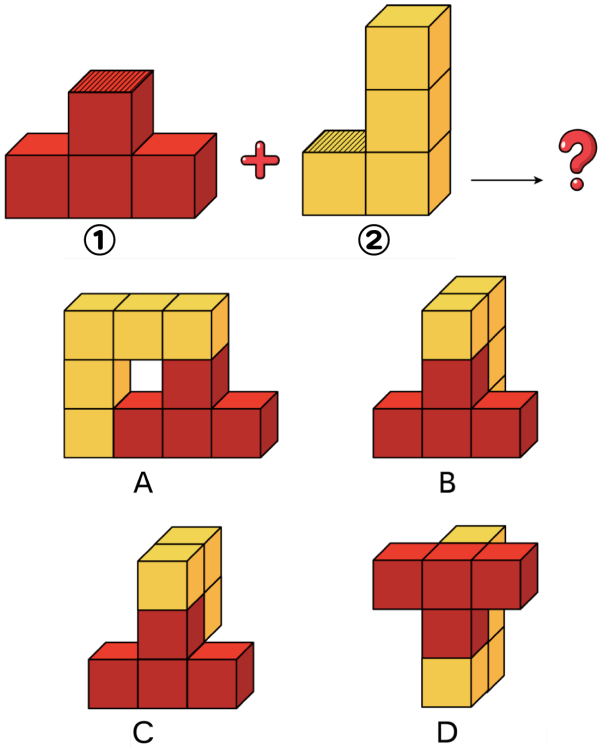
50 Lisa fell asleep at $9:27$ P.M. and woke up at $6:43$ A.M. the next day. Her older sister Lily slept 1 hour and 23 minutes longer than her. How long did Lily sleep?

A. 30 h 5 min B. 10 h 35 min C. 10 h 39 min D. 9 h 5 min
E. 8 h 35 min

51 Seven numbers add up to 2022 and one of the numbers is 522. Replace 522 with 321. What is the new sum of the seven numbers?

A. 2223 B. 2022 C. 1921 D. 1821 E. 1793

52 Lily puts two solids together by gluing the shaded parts. What shapes can she get?



A. Only B B. Only D C. C and D D. A and D E. B and D

53 Cindy has 78 stickers, and Lucy has 60 stickers. Cindy collects 7 more stickers everyday, while Lucy collects 10 more stickers everyday. After how many days will the number of Cindy's stickers be the same as that of Lucy's stickers?

A. 1 B. 2 C. 3 D. 5 E. 6

54 Bob writes the numbers from 1 to 100. How many digits does he write in total?

A. 100 B. 102 C. 192 D. 189 E. 180

55 Mike has 58 cupcakes, James has 76 cupcakes, and Bella has as many cupcakes more than Mike as she has less than James. How many cupcakes does Bella have? (Adapted from 2005 Math Kangaroo Problem, level 3-4, Question #13)

A. 74 B. 60 C. 67 D. 69 E. 72

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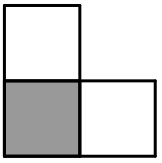
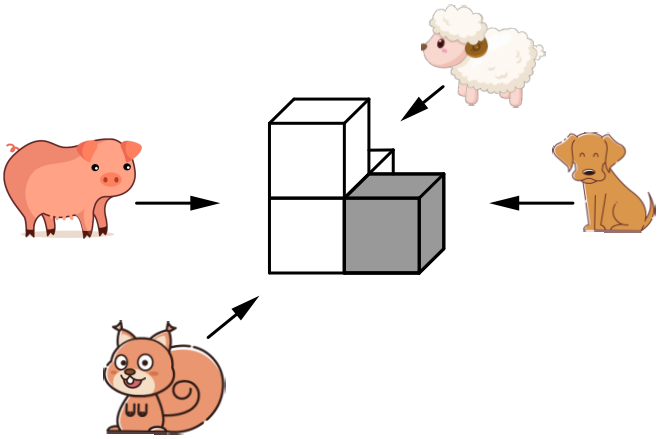
56 Which animal sees the view  ?



A.

B.

C.

D.

E. Cannot be determined.

57 Zosia prepares 11 pieces of chocolate for her students. She cuts some pieces of the chocolate into 3 pieces. Now, there are 23 pieces of chocolate in total. How many pieces of chocolate were cut?

A. 3 B. 4 C. 5 D. 6 E. 7

58 A kangaroo, a panda, a koala, and a sloth are discussing what day the February 22nd is.

The kangaroo says: "February 23rd is a Friday."

The panda says: "February 21st is a Sunday."

The koala says: "The kangaroo and the panda are both wrong."

The sloth says: "February 22nd is not a Saturday."

Only one of the animals is correct. What day is February 22nd?

A. Sunday B. Tuesday C. Thursday D. Friday E. Saturday

59 Justin and Carl have some apples. The number of apples Justin has is 21 more than that of the apples Carl has. After both of them eat the same number of the apples, the number of apples Justin has is 4 times that of apples Carl has. How many apples does Carl have now?

A. 6 B. 7 C. 24 D. 31 E. 42

60 If you flip the card in Figure 1 around its left side, which of the four cards in Figure 2 will it become?

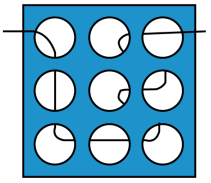
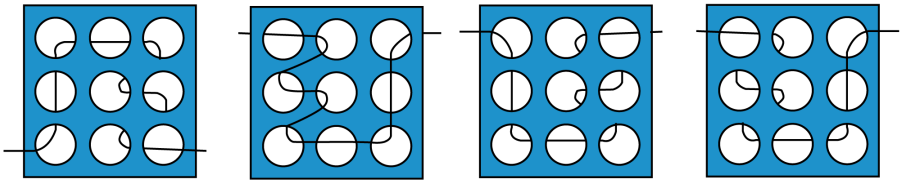


Figure 1



A *B* *C* *D*

A. A
B. B
C. C
D. D
E. There is no right answer.

61 Today, Maureen starts to make cupcakes for her son as dessert after the dinner. She can make 6 cupcakes every morning and her son will eat 4 of them every night. How many days after today there will be 36 cupcakes in the afternoon?

A. 6 B. 12 C. 15 D. 16 E. 18

62 Which of the following figures has the same number of cubes as Figure 1 below?

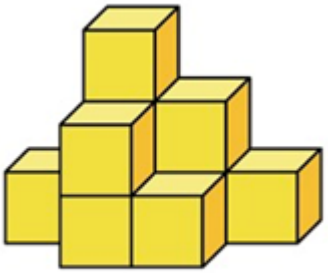
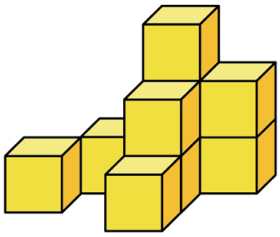
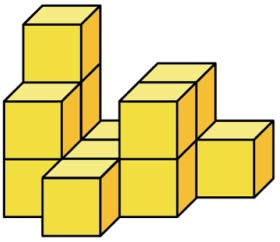
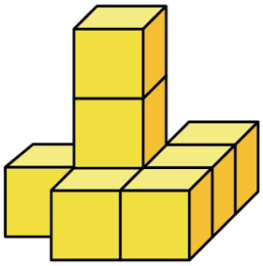
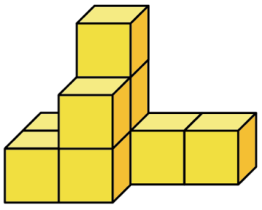


Figure 1

A. 

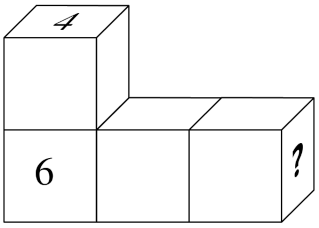
B. 

C. 

D. 

E. There is no right answer.

63 The die has a different number from 1 to 6 on each of six faces, and the sum of numbers on the each two opposite faces is 7. These four dice are sticked together, and the sum of numbers on each two sticked faces is 8. The number on the face with the question mark can be _____ .



A. 1 B. 2 C. 3 D. 1 or 2 E. 1 or 3

64 Claire wants to build a rectangular sandbox with a length of 8 m and a width of 5 m for her son. One of the longer sides of the sandbox is a wall, and she wants to build a fence around the other 3 sides that she intends to paint. Painting 3 m of the fence uses a can of paint which costs 30 dollars. How much will Claire pay for the paint she needs to paint the whole fence?

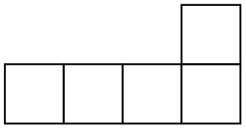
A. 120 dollars B. 180 dollars C. 240 dollars D. 200 dollars
E. 360 dollars

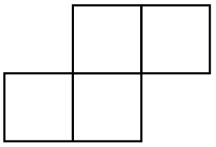
NOTE

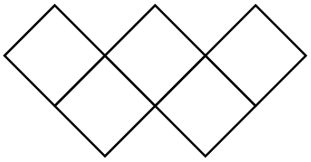
NOTE

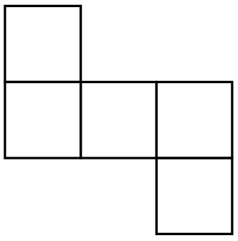
Think Cup

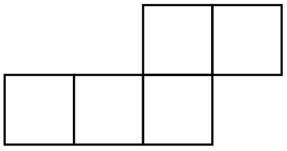
1 The following figures consist of squares with the side lengths of 1 cm. Which of the following figures has the least perimeter?

A. 

B. 

C. 

D. 

E. 

2 Liam bought a new car and had already driven for 3 days. On his car's odometer, it showed the car had driven for 5269018 meters, of which the seven digits were all different. When seven digits shown on the odometer are all different next time, it means Liam drives his car _____ more meters.

A. 3 B. 13 C. 45 D. 11 E. 356

3 Some soldiers are caught in a lonely village as they travel around the world. They are out of food for days. One of the soldiers buys some rice and cooks a pot of porridge. If each person gets 2 bowls of porridge, there will be 3 more bowls of porridge left; and if each person gets 3 bowls of porridge, there will be 3 people who get nothing. How many soldiers are there in total?

A. 8 B. 9 C. 10 D. 11 E. 12

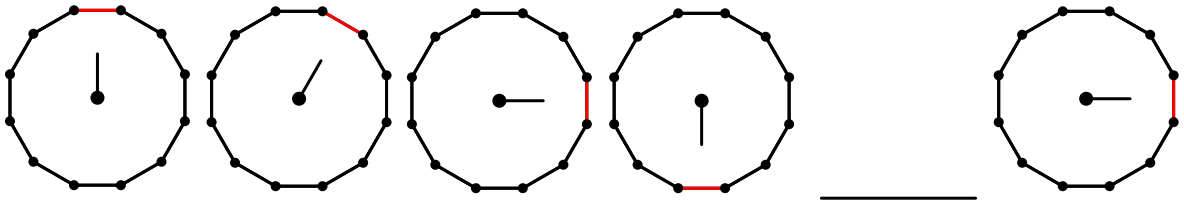
4 Rose has three types of buckets. She can fill a water tank with 10 small buckets, 5 medium buckets, and 1 large bucket. She can also fill the water tank with 6 small buckets, 3 medium buckets, and 3 large buckets. If she uses only large buckets, how many of them does she need to fill the water tank?

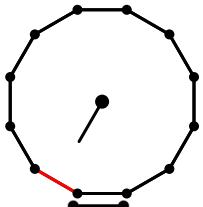
A. 5 B. 6 C. 7 D. 8 E. 9

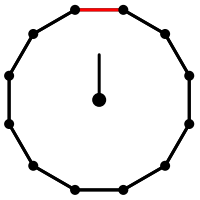
5 A shop is holding a discount activity and the activity includes two combos. Combo A has 2 bottles of milk and combo B has 3 bottles of coke. Each combo includes a free teddy bear as a gift. William buys some combos and he gets 34 bottles of milk and coke in total and he also gets 14 teddy bears. How many combo A does William buy?

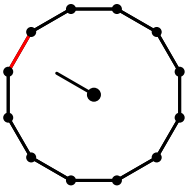
A. 4 B. 5 C. 6 D. 8 E. 10

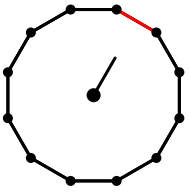
6 According to the pattern below, which figure should be put in the blank?

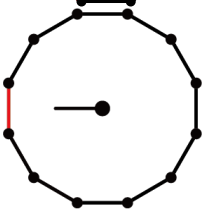


A. 

B. 

C. 

D. 

E. 

7 There is a number sequence: $1, 4, 7, 10, 13, \cdots$ In this sequence, there are 6 consecutive numbers, and the sum of these 6 numbers is 159. What is the smallest number in these 6 numbers?

A. 16 B. 19 C. 22 D. 25 E. 28

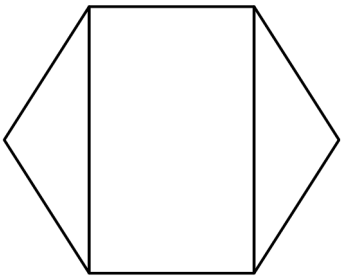
8 In 1993, an old man said, "I have already celebrated my birthday this year. More than 40 years and less than 50 years ago the date today, I was a young man in my 20s, when my age was exactly equal to the sum of the four digits of that particular year." So how old is the old man in 2022?

A. 82 B. 86 C. 91 D. 96 E. 99

9 Mary, Jane, Cathy, and Tina each brings a different book and puts it on the table. Each of them wants to choose a book on the table other than his or her own book. There are _____ different kinds of possibilities to choose books for all the people.

A. 3 B. 6 C. 9 D. 12 E. 15

10 How many pairs of perpendicular lines are there in the following regular hexagon with two line segments?



A. 1 B. 2 C. 3 D. 4 E. 5

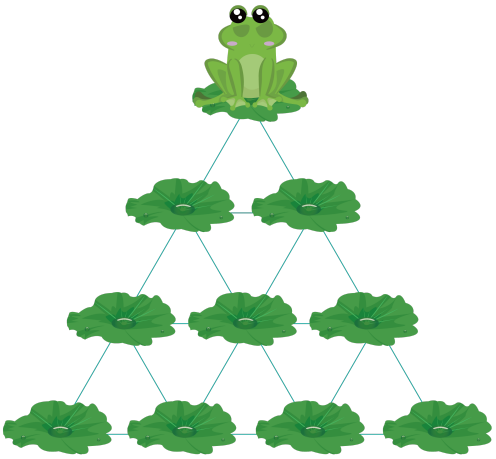
11 James is calculating his average score of all the math tests he takes this semester. If his last test score is 97, his average score is 95; if his last test score is 73, his average score is 92. How many math tests does James take this semester?

A. 5 B. 6 C. 7 D. 8 E. 9

12 Yuki travels to a small town in Japan and he discovers that the bridges in the town are made of planks. There are 6, 8, or 11 planks on each bridge. There are 16 bridges in the town, and the total number of planks on all the bridges is 130. A local elder says there is one more bridge with 6 planks than bridges with 11 planks. How many eight-plank bridges are there in this town?

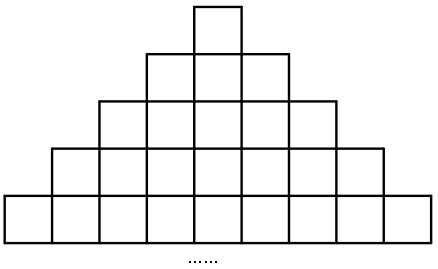
A. 4 B. 5 C. 6 D. 7 E. 8

13 There are 10 lotus leaves arranged as shown in the figure below. The distance between each of the two adjacent lotus leaves is the same. Aiden the frog is sitting on the top lotus leaf as shown below. He wants to jump around these lotus leaves. Each time he will jump one unit to one of the nearest lotus leaves. He jumps 3 times in total. How many different routes are there for Aiden to jump in total?



A. 24 B. 32 C. 48 D. 18 E. 16

14 Jackson uses some building blocks to build a model. The first floor has only 1 block, the second floor has 3 blocks, the third floor has 5 blocks, and so on. According to this pattern, if the model has 12 floors, how many building blocks does Jackson use in total?

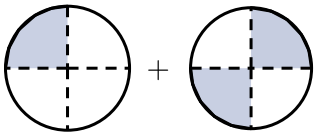


A. 121 B. 138 C. 139 D. 144 E. 156

15 In ancient times, when there was no money, people exchanged things for things. Athena, the goddess of wisdom, wanted some golden apples. Hera said she can trade golden apples for olives. 5 olives can be exchanged for 2 golden apples. As a result, the number of golden apples Athena got was 9 less than the number of olives she took out. How many golden apples did Athena get?

A. 4 B. 5 C. 6 D. 7 E. 8

16 Which of the following expressions does the figure below represent?



A. $\frac{1}{4}+\frac{3}{4}$ B. $\frac{2}{4}+\frac{2}{4}$ C. $\frac{1}{3}+\frac{2}{3}$ D. $\frac{1}{4}+\frac{2}{4}$ E. $\frac{1}{8}+\frac{2}{8}$

17 Christmas is coming. Yuki prepared a hundred cards. He numbered the cards from 1 to 80. He sent out all the cards with odd numbers to his classmates and sent out some of the even-numbered cards to his family members. Then, the numbers on the remaining cards added up to 1324. How many cards did Yuki send out at least?

A. 42 B. 43 C. 44 D. 45 E. 46

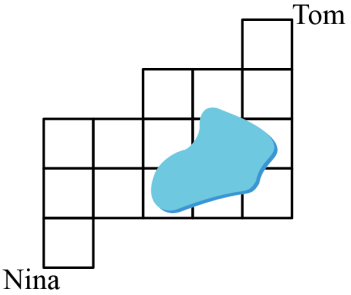
18 In a magic school, students must wear school uniforms. Students must choose either short or long sleeves for the top, and shorts or trousers for the bottom. One day, there are 150 students in the school. Among them, 90 of them are wearing trousers, 41 of them are wearing long sleeves, and 32 of them are wearing both short sleeves and shorts. Thus, there are _____ students wearing both long sleeves and trousers.

A. 17 B. 18 C. 131 D. 49 E. 13

19 Four pirates, Jack, Tommy, Wilson, and Allan, have 300 golden coins in total. Jack says, "I have 11 fewer golden coins than Tommy, 15 more than Wilson, and 20 fewer than Allan." How many golden coins does Allan have?

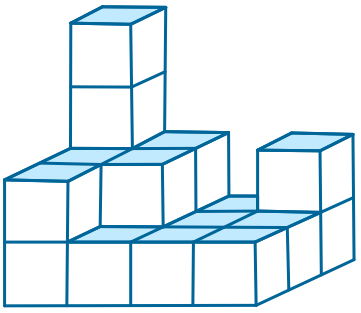
A. 69 B. 71 C. 91 D. 95 E. 99

20 A block map is shown below. The blue part is a lake that people can't cross. Nina lives in the bottom left corner of the block and Tom lives in the top right corner of the block. Today is Sunday, Nina wants to go to Tom's home and invite him to join Think Cup. To save time, Nina has to go along the shortest routes. How many ways can Nina get to Tom's home from her home?



A. 24 B. 30 C. 38 D. 45 E. 56

21 Justin uses identical cubes to build a castle. How many cubes does he use in total?



A. 15 B. 18 C. 19 D. 20 E. 21

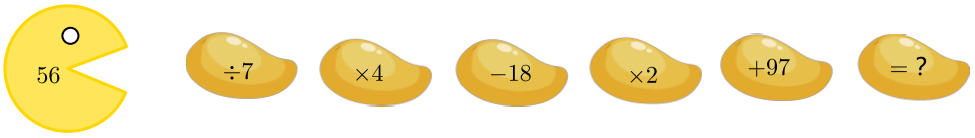
22 Peter reads a story book. He reads 20 pages for each of the first four days from the page 1. On which page will he start reading on the 5th day?

A. 81 B. 80 C. 51 D. 100 E. 111

23 5 pirates find treasure together. On the first island, they find a treasure box and everyone gets 20 coins. On the second island, they meet a magician. The magician doubles the coins they have. On the third island, they fall into a trap and each of them loses 10 coins. On the fourth island, they lose half of the coins because of the bad weather. How many coins do they have now in total?

A. 50 B. 75 C. 100 D. 125 E. 150

24 If the monster eats the beans from left to right, what will the result show on the last bean?



A. 109 B. 115 C. 119 D. 125 E. 133

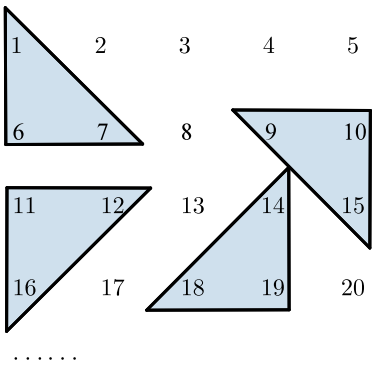
25 How many 0s are there in the result of 225×4?

A. 1 B. 2 C. 3 D. 4 E. 5

26 5 digits are removed from the ten-digit number 9178364920 to form a new five-digit number without changing the order of the remaining digits. What is the least five-digit number can be formed?

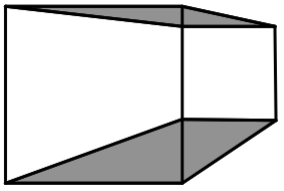
A. 10234 B. 17836 C. 14920 D. 13420 E. 01234

27 Continuous natural numbers starting from 1 to 2172 are arranged in the picture shown below. Peter wants to use an isosceles right triangle to cover 3 numbers. There are 4 different ways to cover the 3 numbers as shown in the picture below. If the sum of the three numbers that Peter covers is 2172, what is the smallest number that Peter covers?



A. 654 B. 655 C. 721 D. 722 E. 1083

28 There are two squares in the figure. The side length of the larger square is 10 and the side length of the smaller square is 6. The area of the shaded part is _____ .



A. 36 B. 64 C. 20 D. 28 E. 32

29 William arrives at a candy shop at $8:45$ A.M. How long does he have to wait for the opening of the candy shop?

Business Hour
Open
$10:30$ A.M.
Close
$18:30$ P.M.

A. 2 h 5 min B. 1 h 55 min C. 1 h 30 min D. 2 h 15 min
E. 1 h 45 min

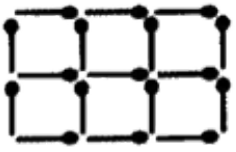
30 Class A has more than 20 students and less than 25 students. They are standing in a line and start numbering off by 3 from the left-hand side (for example, the first student calls out one, the second student calls out two, and the third student calls out three, then the fourth student calls out one again). If the last student in the line calls out the number 2, how many students are there in class A?

A. 20 B. 21 C. 22 D. 23 E. 24

31 The longest-lived mammal on Earth is the bowhead whale. There are 10 bowhead whales, and this year their ages are exactly the consecutive whole numbers from 234 to 243, respectively. When the youngest whale was _____ years old, the sum of these 10 whales' ages was 1980 less than the sum of ages in this year.

A. 36 B. 102 C. 85 D. 198 E. 45

32 There are 8 squares in the following figure. At least how many matchsticks can we add to make the total number of squares become 14? (No overlapping mathsticks.)



A. 6 B. 7 C. 9 D. 10 E. 18

33 According to the pattern in the pictures, what number should be filled in the box with the question mark?

10	8	14	19
2	0	?	11

A. 5 B. 6 C. 7 D. 8 E. 9

34 For a whole number, no matter how its digits are arranged, it is always a prime number. Such a number is called an absolute prime number. Thus, there are _____ absolute prime numbers with different digits that are smaller than 500.

A. 4 B. 8 C. 10 D. 12 E. 16

35 Which of the following pictures can be formed by sliding the unit below?

A.

B.

C.

D.

E.

36 There is a robotics team where all the robots can work forever. This team can solve 6 same missions in 3 hours of practice. At this rate, how many missions of the same kind will they solve in 8 days?

A. 5 B. 16 C. 144 D. 192 E. 384

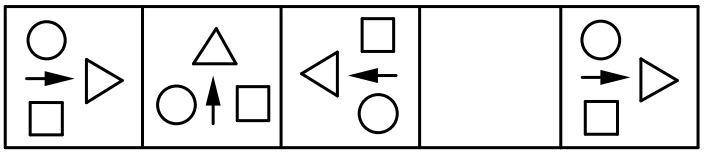
37 There is a magic city called "Impossible City". Everyone in the city needs to speak with the word "Impossible". Jason wants to enter the city but he needs to answer a question correctly before that. The question is "What is the possible sum of the measures of the two smallest angles in a triangle?" How should Jason answer the question?

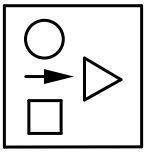
A. It is impossible to be 85°.
B. It can be 95°.
C. It is impossible to be 105°.
D. It can be 119°.
E. It is impossible to be 132°.

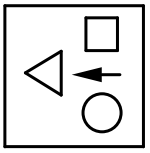
38 Mother squirrel picks 62 pine nuts. How many pine nuts at least does she need to take out so that she can distribute the rest of pine nuts equally among her 9 baby squirrels?

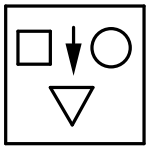
A. 8
B. 1
C. 10
D. 17
E. 6

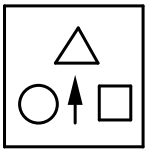
39 According to the following pattern, which figure should be filled in the empty box?



A. 

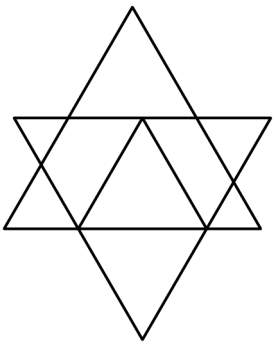
B. 

C. 

D. 

E. Cannot be determined

40 How many triangles are there in the figure below?

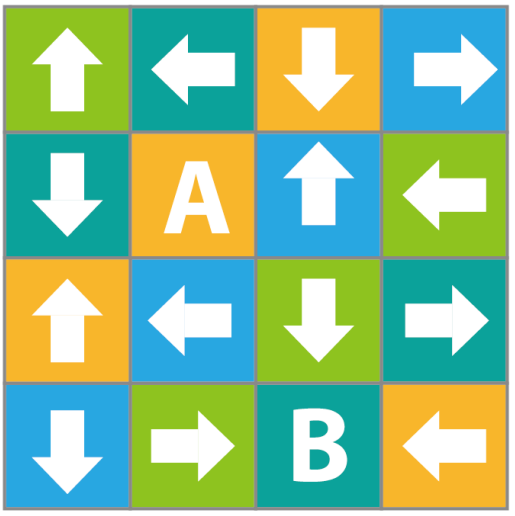


A. 10 B. 11 C. 12 D. 13 E. 14

41 How many stars are there in the following figure?

A. 15 B. 18 C. 21 D. 24 E. 27

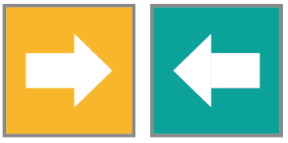
42 According to the pattern, which of the following shapes are for A and B, respectively?



A.

B.

C.

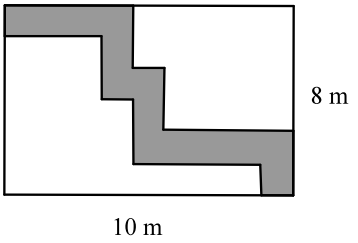
D. 

E.

43 Grandma tells stories to the princess every day. There are 117 stories in total. Each story can be told only once, and the numbers of stories can be told every day are different. How many days at most can grandma tell the stories to the princess?

A. 11 B. 12 C. 13 D. 14 E. 15

44 In Justin's rectangular garden, there is a shaded winding path of 1 meter wide, and the rest parts are the lawn. What is the area of the lawn in square meters?



A. 40 B. 52 C. 63 D. 70 E. 72

45 There are 20 students in a class. Everyone can choose either one, two, three, or four kinds of the sports from football, basketball, tennis, and volleyball to play. How many different sports combinations are there in total for a student to choose?

A. 4 B. 6 C. 12 D. 15 E. 300