

Secondary 1 Textbook Answer Key

Chapter 1 Numbers

1.1 Integers

A. Examples for positive integers, zero, and negative integers

(Page 4)

1. An example: going up 5 meters: $+5$. Going down 3 meters: -3 .

2. Positive numbers: $+6, 54, 0.001$.

Negative numbers: $-21, -3.14, -999$.

3. No. 0 is neither positive nor negative.

B. The classification of positive integers, zero, and negative integers

1. Number line

(Page 6)

1. (1) Yes. (2) No. (3) No. (4) Yes.

2. A: -5 . B: -1.5 . C: 2.5 . D: 6 .

2. Opposite numbers

(Page 7)

1. (1) -2.5 . (2) 100 . (3) 5 . (4) 1.1 . (5) -8.2 .

2. (1) False. (2) True. (3) False.

C. Comparing positive integers, zero, and negative integers

1. Comparing two numbers on a number line.

(Page 8)

1. (1) True. (2) False. (3) False. (4) True.

2. (1) $>$ (2) $<$ (3) $<$ (4) $>$ (5) $<$ (6) $<$

2. Absolute values

(Page 10)

1. The absolute values: $5, 4.5, 0.5, 1, 0$.

1.3 Operations of Integers

A. Additions of two or more integers

1. Addition rule of integers

(Page 16)

1. Answer not provided.
2. (1) 6 (2) 16 (3) -47 (4) -9 (5) 0.
3. (1) -5 (2) 11 (3) 2 (4) 3.

2. Additional operation of integers

(Page 17)

1. (1) -10 (2) 4
2. -5°C .

B. Subtractions of two or more integers

(Page 19)

1. (1) 3 (2) 4 (3) -3 (4) -39 .
2. (1) 5 (2) -3 (3) 3 (4) -4 (5) -11 .
3. (1) 11°C (2) 8°C (3) 160m (4) 72m.

C. Multiplications of two or more integers

1. Multiplication rule

(Page 22)

1. (1) -12 (2) -10 (3) -12 (4) -12
(5) 0 (6) 0 (7) -10 (8) -10 .

2. Multiplication operation of integer

(Page 23)

1. (1) -700 (2) 39 (3) 0.

Practice (Page 24)

1. (1) 42 (2) -60 (3) 26 (4) -350 .
2. (1) -24 (2) 210 (3) 300 (4) 0 (5) 195.

D. Divisions of two integers.

(Page 26)

1. (1) -12 (2) 4 (3) $-\frac{1}{6}$ (4) 0
(5) -40 (6) $\frac{7}{6}$

E. Factors

(Page 27)

1. ± 3 .
2. The factors of 18: $\pm 1, \pm 2, \pm 3, \pm 6, \pm 9, \pm 18$.
The factors of 24: $\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 8, \pm 12, \pm 24$.
3. 60.

1.4 Applications of Integers

(Page 28)

1. -5°C .
2. (1) 440 yuan.
(2) 850 meters below sea level.
(3) 2400 kg.
(4) B is at 5 km to the west of A. $81a$ Liters.
3. Wednesday has the greatest temperature difference, and Monday has the smallest.

1.5 Irrational Numbers

Answer not provided.

Chapter 2 Exponents and Polynomials

2.1 Introduction to Exponents

A. Definition of exponents

(Page 34)

1. Negative 4 to the fifth power. The base. The exponent. Negative.

2. (1) 1000 (2) -1 (3) 0.001 (4) $\frac{81}{16}$.

2.2 Properties of Exponents

A. Five properties of exponents

1. Product rule (Page 35)

1. (1) No. (2) No. (3) No. (4) No.

2. (1) 5 (2) 4, 3.

3. (1) 10^7 (2) a^{10} (3) x^{13} .

2. Quotient rule (Page 37)

1. (1) a^4 (2) $(-b)^5$ (3) x^5 (4) $(-y)^{10}$.

2. (1) a^8 (2) x^6 (3) m^9

3. Power over power rule (Page 38)

1. (1) No. (2) No. (3) No.

2. (1) 2^6 (2) y^{10} (3) x^{12} (4) y^{12} (5) 1

4. Power over a product rule (Page 39)

1. (1) No. (2) No..

2. (1) $9a^2$ (2) $-27a^3$ (3) a^2b^4 (4) -8×10^9 (5) a^4b^6

5. Power over a quotient rule (Page 40)

1. (1) $\frac{16}{9}$ (2) $-\frac{1}{64}$ (3) -81 (4) 243.

B. Using the properties of exponents to simplify expressions

(Page 43)

1. (1) $0.1a$ (2) $\frac{33+a}{5}$ (3) $\frac{8}{a-b}$ (4) $(\pi r^2 - a^2)cm^2$.

C. Definition and types of polynomials

(Page 45)

1. (1) Yes. (2) Yes. (3) Yes.

(4) Yes. (5) Yes. (6) No.

2. (1) $-\frac{2}{3}$, 3. (2) 1, 2. (3) 5, 2. (4) $-\frac{7}{2}$, 4.

D. The degree of a polynomial

(Page 47)

(1) Terms: 3. Degree: 2. (2) Terms: 3. Degree: 3.

(3) Terms: 3. Degree: 2. (4) Terms: 2. Degree: 4.

E. Polynomials in ascending or descending order

(Page 48)

1. (1) In ascending order on x : $-\frac{1}{3} + x + 2x^2 + \frac{2}{5}x^3 - 5x^4$.

(2) In descending order on x : $-5x^4 + \frac{2}{5}x^3 + 2x^2 + x - \frac{1}{3}$.

2. (1) In descending order on x : $x^4 + 3x^3y - 5x^2y^3 - 2xy^2 - y^4$

(2) In descending order on y : $-y^4 - 5x^2y^3 - 2xy^2 + 3x^3y + x^4$

2.3 Operations of Exponents

A. Addition and subtraction of two exponents or more

(Page 49)

(1) $13\frac{1}{27}$. (2) 23.

B. Multiplication of two exponents or more and division of two exponents

(1) $-\frac{243}{25}$ (2) 432 (3) $\frac{1}{256}$

C. Mixed operations of rational numbers

(Page 51)

(1) 30 (2) 0 (3) -8

2.4 Applications of Exponents—Scientific Notation

A. Write large numbers with 10^n (n is a positive integer)

(Page 52)

1. (1) 8×10^2 (2) 1.8×10^6 (3) 1.23×10^3

2. (1) 100000 (2) 5180 (3) 7040000.

A. Write small numbers with 10^n (n is a negative integer)

(Page 55)

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

2. (1) 10^{-6} (2) 10^{-6} (3) 10^{-3} (4) 10^{-3} (5) 10^{-4} (6) 10^{-6} .

3. (1) 3×10^{-5} (2) -6.4×10^{-6} (3) 3.14×10^{-5} (4) 2.013×10^6

Chapter 3 Ratios and Percent

3.1 Ratios

(Page 60)

1. Water: 1350g. Sugar: 150g.
2. Class (1): 23. Class (2): 22. Class (3): 25.

3.2 Equivalent ratios

(Page 61)

- (1) 24 boys. (2) 270 pages.

3.3 Ratios of three or more numbers

(Page 63)

1. 156: 30: 9: 25.
2. Class (1): 48. Class (2): 40. Class (3): 50.
3. 21cm, 28cm, 35cm.

3.4 Proportions

A. Introduction to proportions

(Page 64)

1. 30m. 2. 160 tons.

B. Applications of proportions---proportional scales

(Page 66)

1. 1: 10000. 2. 1: 6000000. 3. 170km.

3.5 Percent

A. The meaning of percent

(Page 67)

1. (1) 100% (2) The defect rate is $\frac{2}{200} = 1\%$. (3) 108%

2. No sure, because the total numbers of students in both schools are not given.

B. Applications of percent

(Page 68)

1.

	Football	Basketball	Volleyball	Badminton rackets	Badminton birdies
Original price	300	520	480	350	15
Current price	240	416	384	280	12

2.

	Brand A	Brand B
Original price (JPY)	20000	22000
Discount	15% off	20% off
Current price (JPY)	17000	17600

Brand A is cheaper after the discount.

3.6 Applications of ratios

(Page 70)

1. 370 thousand baht.

2. 32.1 thousand baht.

Chapter 4 Linear Equations

4.1 Linear Equations in One Variable

(Page 74)

1. Let x be the number of people needed to be moved to Group two.

The equations is

$$26 - x = \frac{1}{2}(22 + x)$$

2. Let x be the annual interest rate.

The equations is

$$3000 \cdot x \times 3 = 2700$$

4.2 Solving Linear Equations

A. The meaning of solutions to linear equations

(Page 76)

(1) -3 is a solution. (2) 3 is a solution.

B. Solving one-step linear equations

(Page 79)

1. Solving simple linear equations in one step

1. (1) Incorrect. (2) Incorrect. (3) Incorrect. (4) Incorrect.

2. (1) $x = 9$. (2) $x = -2$. (3) $x = -15$. (4) $y = 2$.

2. Solving linear equations in more steps

(Page 80)

1. $x = 3$. 2. $y = -1$.

C. Problems that can use linear equations to graph and solve

(Page 81)

He uses 5 seconds. (Hint: Let x be the number of seconds the student uses from speeding up till reaching the finish line and use the equation $6(65 - x) + 8x = 400$ to solve.)

4.3 Solving Problems Using Linear Equations in One Variable

(Page 82)

1. There are 23 girls. (Hint: Let x be the number of girls and use the equation $x = \frac{4}{5}(48 - x) + 3$ to solve.)
2. Two students have received the first award. (Hint: Let x be the number of students who have received the first award and use the equation $200x + 50(22 - x) = 1400$ to solve.)

(Page 83)

There are 48 students in Susan's class. (Hint: Let x be the number of students in Susan's class and use the equation $\frac{x}{8} = \frac{x}{12} + 2$ to solve.)

Chapter 5 Graphing

5.1 Ordered Pairs and Graphing

A. Definition of ordered pair and graphing

(Page 87)

Answer not provided.

(Page 89)

1. D.
2. A is in Quadrant II, B is in Quadrant IV, C is in Quadrant I, and D is in Quadrant III.
3. M is on the x -axis, N is on the y -axis.

B. Understanding the rectangular coordinate system

(Page 92)

1. $A: (-2, 2), B: (0, -2), C: (3, 0), D: (1, 2), O: (0, 0)$.
2. Answer not provided.

5.2 Linear Relationship between Two Variables

A. Creating a table to graph an equation on the rectangular coordinate system

(Page 94, 95~96)

Answer not provided.

B. Creating a model (relationship table, numerical chart, or analysis chart) to draw conclusion

(Page 97)

The equation: $y = 2x$ ($x > 0$). The graph is not provided. When the base length is 2, the area is 4.

5.3 Linear Relationship between Two Variables

A. Determining whether an ordered pair is a solution to an equation

(Page 98)

1. Yes. 2. No.

B. Recognizing when an ordered pair is a y -intercept or an x -intercept

(Page 99)

1. x -intercept: $(-\frac{1}{2}, 0)$, y -intercept: $(0, 2)$.
2. x -intercept: $(\frac{9}{5}, 0)$, y -intercept: $(0, -\frac{9}{8})$.

(Page 100)

1. 4, 3 2. 3, 0. 3. 5.

C. Graphing linear equations using the y -intercepts and x -intercepts

(Page 102)

1. $x = -1$. 2. $(3, 0)$

5.4 Applications of Graphing

(Page 103~104)

- (1) 4km, 2min (2) 4min (3) 1km, 1min
(4) 6min (5) 5km, 2min.

(Page 105)

- (1) 12:30, 45km (2) 10:30, 30min, 30km (3) 15km
(4) 20km/hour (5) 18km.

Chapter 6 Geometry

6.1 Basic Geometry

6.1.1 Points, lines, rays, line segments, and angles

(Page 113)

1. Answers not provided.
2. $\angle A, \angle 1, \angle \alpha, \angle ABC, \angle ADB, \angle BDC, \angle ADC, \angle C$.

6.1.2 Properties of a Line Segment

(Page 115)

1. 6 cm . 2.16.

6.2 Angle Bisectors and Perpendicular Bisector of Line Segments

A. Definition of angle bisectors

(Page 117)

1. 45° . 2. 90°

B. Definition of perpendicular bisector of a line segment

(Page 119)

The perimeter: 12 cm . The area: 6 cm^2 .

6.3 Constructing Angles with Triangular Rulers

(Page 120)

Answers not provided.

6.4 Constructing Triangles

(Page 121)

It is a right triangle.

6.5 Parallelograms

(Page 123)

Answer not provided.

6.6 Two-dimensional and Three-dimensional Geometric Shapes

6.6.1 Two-dimensional and Three-dimensional Geometric Shapes

(Page 125~126)

1. Cylinder, Triangular prism, Triangular pyramid, Cone, Prism, Sphere.
2. Answer not provided.
3. Answer not provided.

6.6.2 Cross-section of Three-dimensional Geometric Shapes

(Page 126~127)

Rectangle. Circle. Triangle.

6.6.3 Three-view of Three-dimensional Geometric Shapes

(Page 129)

Answers not provided.

6.7 Geometric Graphics

6.7.1 Side Lengths of Triangles

(Page 132)

- (1) Yes. (2) No.

(Page 132)

Answers not provided.

6.7.2 Interior and Exterior Angles of Triangles

A. Definition of interior & exterior angles of a triangle

B. Relationship and sum of various triangle's interior angles

(Page 137)

1. (1) 540° (2) 1800°
2. Hexagon.
3. (1) 1440° , 144° (2) 10

C. Relationship and sum of various triangles' exterior angles

(Page 139)

1. (1) 90° (2) 85° (3) 95°
2. 60° , 75°

Practice (Page 140)

1. 115° , 2.8

6.7.3 Tangrams

6.8 Parallel Lines

6.8.1 Understanding "Three Lines and Eight Angles"

(Page 143)

$\angle 4$, $\angle 2$, $\angle 5$.

6.8.2 Parallel lines

A. Constructing parallel lines and the axioms of parallel lines

(Page 144)

Answer not provided.

B. Determining whether two lines are parallel

(Page 147)

1. Answer not provided.
2. Hint: $\angle EAC = \angle C = 60^\circ$.

C. Properties of parallel lines

(Page 149)

1. $\angle 2 = 50^\circ$, $\angle 3 = 50^\circ$, $\angle 4 = 130^\circ$.
2. $\angle 1 = 35^\circ$.

D. Applications of parallel lines' properties

(Page 150)

1. $\angle C = 40^\circ$.
2. $\angle ACE = 120^\circ$.

6.8.3 Parallel Lines Related Translation Transformations

A. Definition of translation transformation and its properties

(Page 153)

1. Answer not provided.
2. 3, 4, 3, 1.
3. Answer not provided.

B. Translations performed in a rectangular coordinate system

(Page 155)

1. $(2, 0)$, $(-1, 0)$
2. $(-1, 0)$, $(-2, -3)$, $(1, -2)$.

(Page 157)

1. Right, 3. Up, 8.
2. $A(1, 4)$, $B(-1, 2)$, $C(2, 2)$.

Chapter 7 Statistics—Collecting and Displaying Data

7.1 Collecting data

(Page 163)

Answer not provided.

7.2 Displaying data

(Page 166~167)

1. (1) 4, 80% (2) 5006, 50.1%, 4994, 49.9%

(3) Uncertain (4) Certain

2. (1) $a + b + c = d$ (2) $a, \frac{a}{d}$ (3) $b, \frac{b}{d}$.