

Middle School Mathematics

Companion

**Practice Workbook
Sampler Answer Key**



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Grade 6

Ratio Tables

1. Multiply the amount of each ingredient by 5.
2. C
- 3a. \$7.50
- 3b. \$24
- 3c. \$2.50
4. D
5. The correct price for 5 pizzas is \$60 instead of \$72.

6a. 20,250 lbs

6b.

Concrete (cu yd)	1	2	3	4
Cement (cu ft)	6	12	18	24
Sand (cu ft)	15	30	45	60
Gravel (cu ft)	$12\frac{1}{2}$	25	$37\frac{1}{2}$	50
Water (cu ft)	3	6	9	12


7.

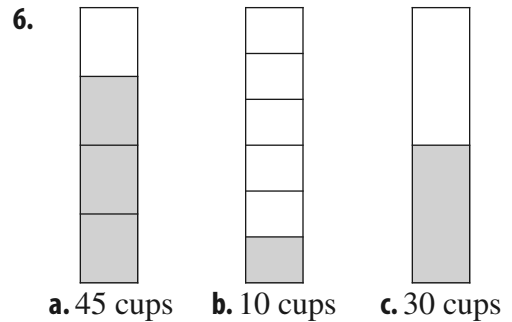
Rows	1	5	10	25
Spaces	15	75	150	375

8. about 50 students

9. 11 cars

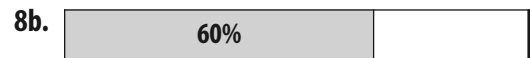
Bar Models

1. $\frac{1}{5}, \frac{1}{5}, \frac{1}{5}, \frac{1}{5}, \frac{1}{5}$
2. $\frac{2}{3}$
3. B
- 4a. 
- 4b. $\frac{1}{4}$
- 5a. $\frac{3}{10}$
- 5b. 600 liters



7. B

- 8a. 3.0 MB is 30% of the program. That means that 10% is 1.0 MB. She can multiply 1.0 by 10 to get 10.0 MB, which is 100% of the program.



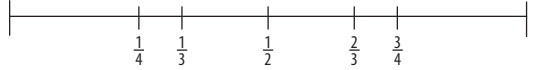
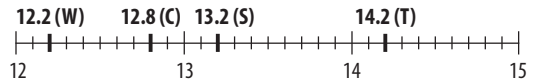
9. \$5.80

10. There are 240 pencils in 16 boxes, not 200.

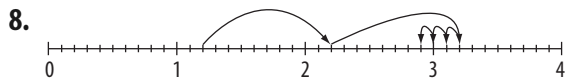
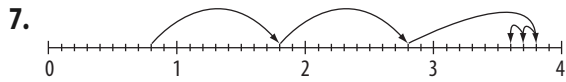
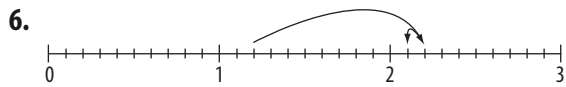
11.

Number of Cows	1	10	30	50
Eyes	2	20	60	100
Ears	2	20	60	100
Feet	4	40	120	200
Stomachs	4	40	120	200

Number Lines

1. 
2. X: Overlook
Y: Old Cabin
Z: Stream Crossing
3. $\frac{1}{4}$
- 4a. 
- 4b. Chen and Sanchez
- 4c. 2.0 meters

5. Any number from 0.0 to 3.0 is acceptable, if correctly labeled.



9. $\frac{1}{2}$



Double Number Lines

1. 41 km or 42 km

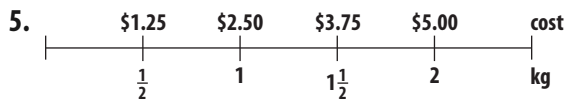
2. C

3. 10 blocks; 1 mile

4a. *Possible answer:* He could look up 200 miles and multiply the time by 2.

4b. He must assume that the bus travels at a constant speed.

4c. 8 hours



6. B

7. 1,000 millimeters



8b. \$5.28

9.

Days	2	3	5	10	12
Training Hours	3	$4\frac{1}{2}$	$7\frac{1}{2}$	15	18

10. $\frac{3}{4}$

Applications of Models

1. 24 cartons



2b. 0.6 cm

3. 13 tents

4.

Bags of Trail Mix	8	16	24	40
Raisins (cups)	2	4	6	10
Nuts (cups)	3	6	9	15
Pretzels (cups)	$\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{1}{4}$	$3\frac{3}{4}$
Cereal (cups)	$1\frac{1}{2}$	3	$4\frac{1}{2}$	$7\frac{1}{2}$

5a. 3 jumps (+ 1 cm + 1 cm - 1mm)

5b. 50 jumps

6a. 5% = \$3.75; 10% = \$7.50

6b. Add 5% + 10%; \$3.75 + \$7.50 = \$11.25

7a. *Sample answer:*

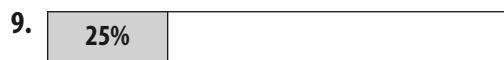
Number	1	2	4	10
Cost	\$2.50	\$5.00	\$10.00	\$25.00

7b. *Sample answer:*



7c. \$60

8. 560



Grade 7

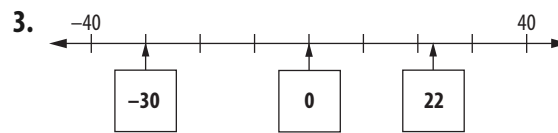
Introduction to Integers

- 1a. There is a 3-hour time difference between the two cities.
- 1b. You subtract 3 hours from the time in New York to get the time in San Francisco.
- 1c. 2 P.M.
2. C
3. B
4. All positive Celsius temperatures are above freezing, so it will probably not snow when the temperature is positive. All negative Celsius temperatures are below freezing, so it could snow when the temperature is negative.
- 5a. Adding all the positive numbers gives the number of comics that were delivered: 140. Adding all the negative numbers gives the number of comics that were sold: 56.
- 5b. There were more comics in the store at the end of the day. A greater number were delivered than were sold.
- 5c. *Sample answer:* Keilani would probably use a positive number to describe the change in number of books, because there were more, not fewer, at the end of the day.
6. *Sample answer:* I would use positive numbers to show deposits, when money is added. I would use negative numbers to show withdrawals, when money is taken away.
7. B
8. 6,666,666,666 dozen eggs, or about 6.7 billion dozen eggs

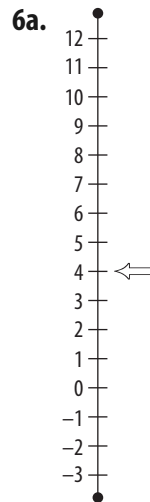
Locating Integers on the Number Line

- 1a. $<$; -35 is less than 15
- 1b. $>$; 200 is greater than -300
- 1c. $>$; -43 is greater than -47

- 2a. 20 2c. 20
- 2b. -15 2d. -90



4. B
5. B

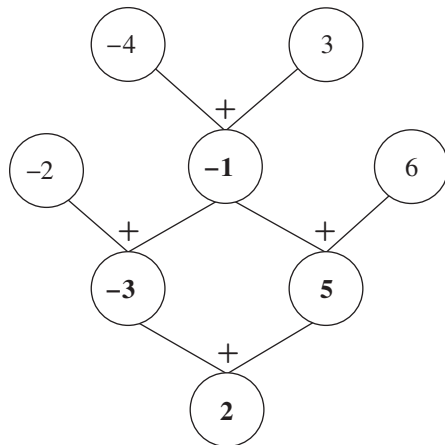


- 6b. The delivery person made the delivery at Level 4 (*see answer 6a above*).
- 6c. $-2 + 6 = 4$
- 7a. Sometimes true; *sample answer:* true for $2 > 1$, but not true for $1 > 2$
- 7b. Never true; *sample answer:* not true for $-2 > 1$ and not true for $-1 > 2$
- 7c. Always true; *sample answer:* true for $1 > -1$ and true for $1 > -150$
8. A
9. A negative number represents a temperature below freezing.

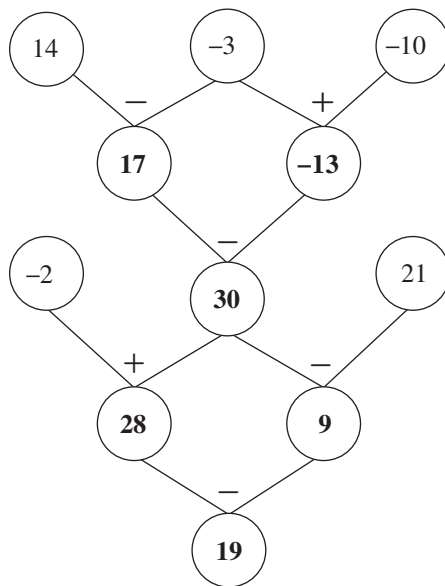
Adding and Subtracting Integers

- 1a. 5 1b. -7
- 2a. -3 2b. 9
- 3a. -3 3c. -1
- 3b. 16 3d. 0

4.



5.



6. B

7. C

8. In both cases, you take away 5, or move to the left on a number line: -5 is the same as $+(-5)$; In both cases, you add 5, or move to the right on a number line: $-(-5)$ is the same as $+5$.

9. If a business has lost more money than it has earned, its total sum would be written in red. This number represents a negative number because it is less than \$0.

10. $-500 - 100 + 25 + 200 - 150 - 75 - 100 + 120 = -580$ feet

11. Yes, the number 0 is neither positive nor negative.

12. C

Multiplying Integers

1a. $100 \times 4 = 100 + 100 + 100 + 100 = 400$

1b. $-17 \times 3 = (-17) + (-17) + (-17) = -51$

1c. $-30 \times 6 = (-30) + (-30) + (-30) + (-30) + (-30) + (-30) = -180$

2a. -140

2b. 1,122

3a. -100

3b. 24

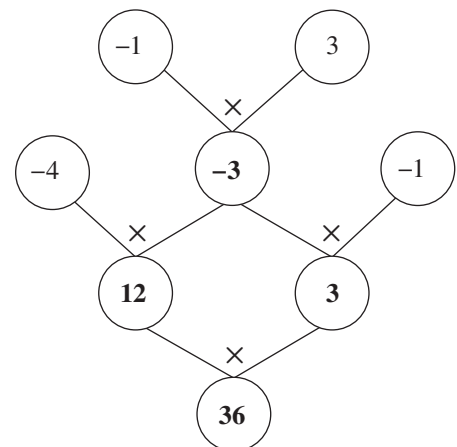
3c. $-2,000$

4. D

5. C

6. $47 \times 7 = 47 + 47 + 47 + 47 + 47 + 47 + 47 = 329$; 329 million people are served every week

7.



8a. The product of three negative numbers is negative. The product of two negative numbers is positive, and that number multiplied by another negative number gives a negative number.

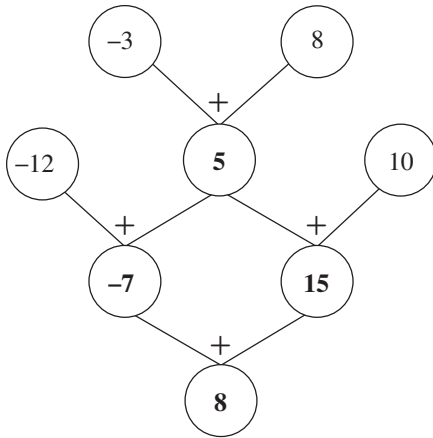
8b. The product of four negative numbers is positive. The product of three negative numbers is negative, and that number multiplied by another negative number gives a positive number.

8c. The product of an even number of negative numbers is positive. The product of an odd number of negative numbers is negative.

9. His total change in altitude is $-1,200$ m;
 $-150 \times 8 = -1,200$. At the end of
 8 hours, he is at $2,800$ m;
 $4,000 + (-1,200) = 2,800$.

10. C

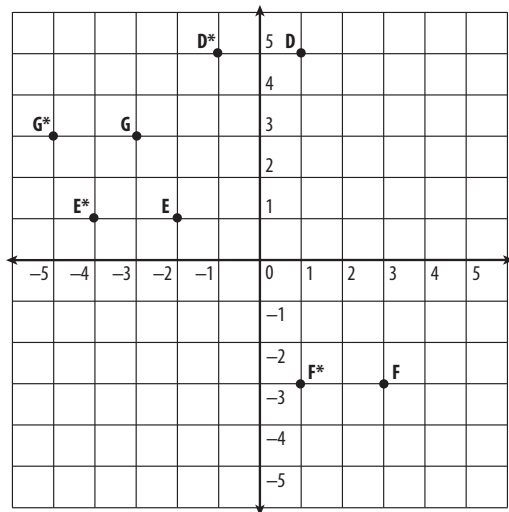
11.



Coordinate Pairs

- 1a. (2, 3)
 1b. (4, -1)
 1c. (-3, 5)
 1d. (-2, -4)
 2a. the origin
 2b. (0, 0)

3.



4. Each point moves two units to the left.
 Point D*: (-1, 5)
 Point E*: (-4, 1)
 Point F*: (1, -3)
 Point G*: (-5, 3)

5. D

6. C

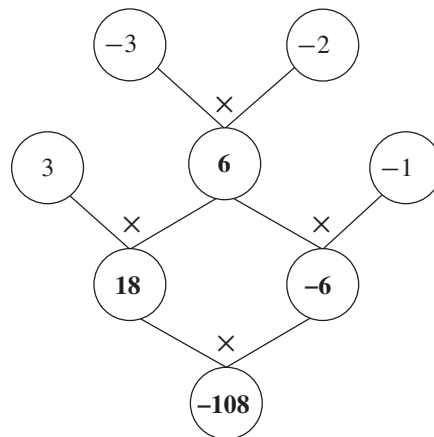
7a. They all have a first coordinate of 0.

7b. It causes the drawing to become a flat line along the y-axis.

8. D

9. A thermometer is like a vertical number line because it has lines that are spaced evenly apart and labeled with increasing positive numbers that go up from 0 and decreasing negative numbers that go down from 0.

10.



Division of Integers

- 1a. -3 ; $-27 = 9 \times ?$; $-27 = 9 \times -3$
 1b. 1 ; $-1 = -1 \times ?$; $-1 = -1 \times 1$
 2a. 30
 2b. -6
 3a. -5
 3b. 3
 3c. -48
 4. D
 5. A

6. The final answer is positive. A negative number divided by a positive number is negative, because when the numbers have different signs, the answer is negative. That negative number divided by a negative number is positive, because when the numbers have the same sign, the answer is positive.
- 7a. \$12; $-10 + 35 + 17 + 3 \times (-10) = 12$
- 7b. \$3; $12 \div 4 = 3$
8. In both fractions, the numerator and the denominator have different signs. In a division problem, when the signs are different, the answer will be negative. Thus, both fractions represent a negative quotient of 3 divided by 4.
9. The temperature dropped 3 degrees each hour. $(-24^{\circ}\text{C} \div 8 \text{ hours} = -3^{\circ}\text{C}/\text{hour})$
10. -5°C ; $-14 + (-8) + 2 + 8 + 0 + (-10) + (-13) = -35$; $-35 \div 7 = -5$

Grade 8

Operating with Sequences

1. 201

2. D

3.

A
-7
-2
3
8
13
18
↓
$5n - 12$

B
36
27
18
9
0
-9
↓
$45 - 9n$ or $-9n + 45$

C
-13
-2
9
20
31
42
↓
$11n - 24$

4a. 1, -2, -5

4b. -3 (the negative step value)

5a. 3, 7, 9

5b. $2n - 1$

5c. *Sample Answer:*



6. C

7a. $-13 + 4h$

7b. $-6 + 7c$

8.

9
12
15
18
21
24
↓
$6 + 3x$

3
2
1
0
-1
-2
↓
$4 - x$

6
10
14
18
22
26
↓
$2 + 4x$

9. $7 + 5b$

10. A

11. 6 years

12a. $-6 + 12x$

12b. $-2 - 2x$

13. $\frac{1}{19}$

14. about 12

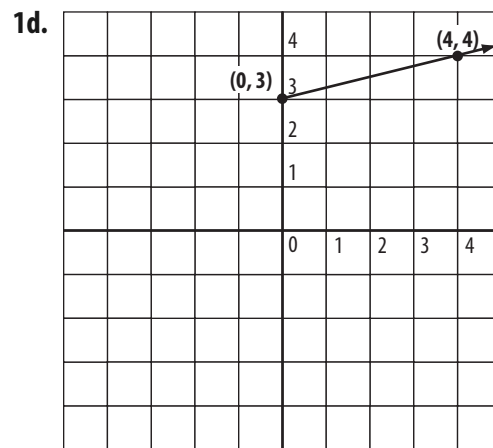
Slope

1a. the depth of the pool

1b. the number of steps taken

1c.

S	0	1	2	3	6	14
D (in ft)	3	3.25	3.5	3.75	4.5	6.5



2a.

<i>x</i>	<i>y</i>
-2	10
-1	8
0	6
1	4
2	2

2b.

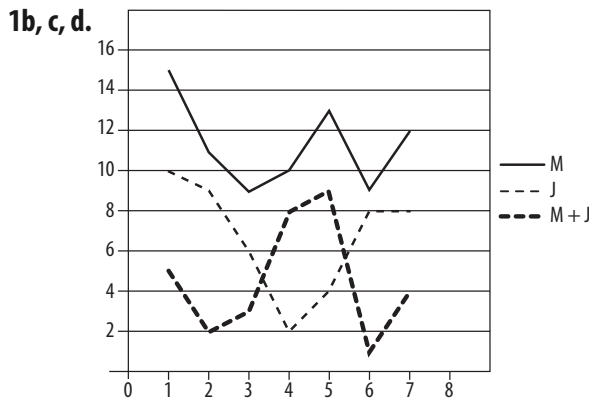
<i>x</i>	<i>y</i>
-2	10
-1	8
0	6
1	4
2	2

- 2c. Both graphs would be on the same line.
 3. D
 4a. Both graphs have a slope of 3.
 4b. The graphs appear different from each other because the scale of each grid is different.
 5. $y = -\frac{4}{3}x + 4$
 6a. $\frac{3}{2}$ 6c. $\frac{7}{3}$
 6b. $-\frac{7}{2}$ or -3.5 6d. $y = \frac{3}{2}x + -3.5$
 7. D
 8. $3f + 12$

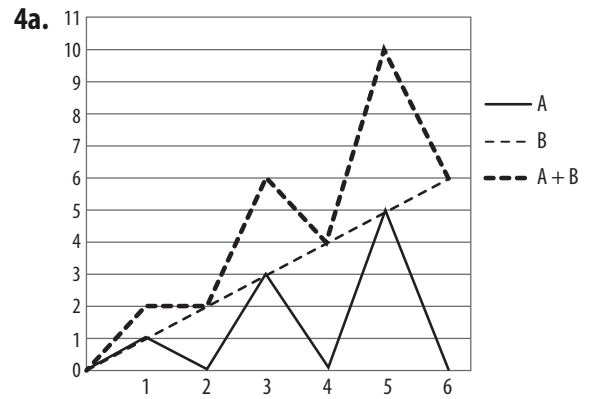
Adding Graphs

1a.

Day	Milk (M)	Orange Juice (J)	M + J
1	5	10	15
2	2	9	11
3	3	6	9
4	8	2	10
5	9	4	13
6	1	8	9
7	4	8	12



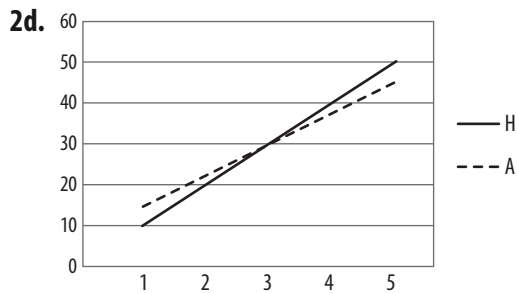
- 2a. $y = 42x$
 2b. 42
 2c. How fast you are moving with respect to land when walking on the moving boat.
 3. D



- 4b. $(0, 0), (1, 1), (3, 3), (5, 5)$
 4c. *Sample answer:* The **A + B** graph has some coordinates in common with the **B** graph, but none in common with the **A** graph. Because the **A + B** graph is the sum of **A** and **B**, many of its y -coordinates are larger than the y -coordinates on either individual graph.
 5. *Sample answer:* Two graphs that intersect at a point have that point in common. When you calculate the sum of the two graphs, the x -values stay the same. When you add the y -values at the intersection point, the new y -value is twice as much. When you cut the sum of the two graphs in half, the x -values again stay the same and you get the original intersecting y -value back.
 6. B
 7. $2 - 3x$
 8. B
 9. $-5d - 7$

Solving Equations

1. B
 2a. F is the fee. H is the number of hours worked.
 2b. 5 is a set charge for the call (regardless of number of hours worked); 8 is the charge per hour
 2c. $y = 10x$



2e. Hosea is more expensive for longer times, but for less than 2.5 hours, he is actually less expensive.

3. The intersection point represents where the cost per month for Company S and Company T are equal.

4a. $48 + 6n = 24 - 2n$
 $24 + 6n = -2n$
 $24 = -8n$
 $-3 = n$

4b. $48 + 6n$
 $\frac{-24 - 2n}{24 + 8n}$
 $8n = -24$
 $n = -3$

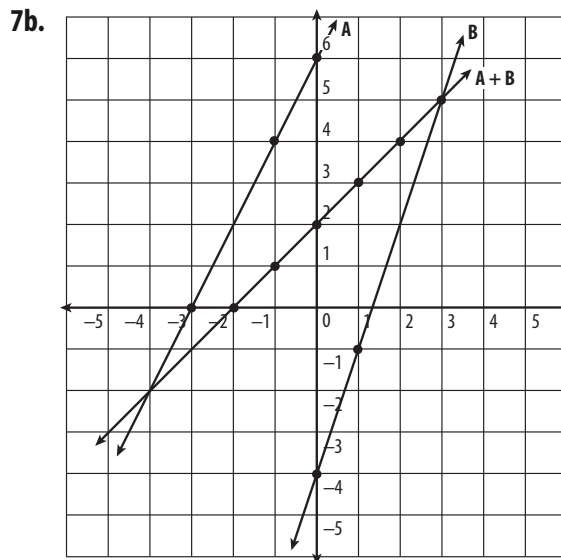
4c. The method does not matter. One may be more efficient than the other, but they both will result in the same solution.

5a. $4 + 3x = 3x + 10$
 $4 \neq 10$ So there is no solution.

5b. There is no solution, so the graphs do not intersect. Lines that are in the same plane but do not intersect (have the same slope) are parallel.

6. C

7a. $y = x + 2$



Formulas for Perimeters and Areas

1a. The first triangle has three congruent sides of length a . To find the perimeter P you would add $a + a + a$, which is the same as $P = 3a$.

1b. $Q = a + 2c$

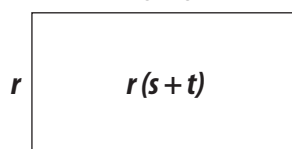
1c. $R = a + b + c$

2. $6x + 6y = 6(x + y) = 6(10) = 60$

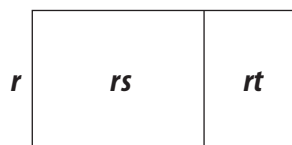
3. C

4. A

5a. $s + t$



5b. s t



5c. The dividing lines in the second rectangle just break the first rectangle into smaller pieces. They have the same area because they are the same rectangle.

5d. 315

6. C

7. 24 is the x -intercept

Solving Equations

1. $x = -16$

2. A

3a. *Sample answer: B*

3b. $6B$

3c. $B + 6B = 224$

$$7B = 224$$

$$B = 32$$

3d. 32 stamps

3e. 192 stamps

4. $p = -\frac{57}{11}$

5. B

6. $5x = 2x$

$$5x - 2x = 2x - 2x$$

$$3x = 0$$

$$\frac{3}{3}x = \frac{0}{3}$$

$$x = 0$$

7a. $2x + 6 + 4 = 2x + 10$

$$2x + 10 = 2x + 10$$

$$0 = 0$$

7b. $0 = 0$ is always true, so the equation is true for all values of x .

8a. $5(q + 2) + 10q = 200$

8b. Multiplying each side of the equation by the same value doesn't change the solution.

8c. The equation now has only integers, which are easier to work with than decimals.

9. D