

6.RP.1 Answers

1. A
2. B
3. D
4. A
5. C, E
6. A, D, E

7. $\frac{5 \text{ cups of bread crumbs}}{9 \text{ pounds of ground beef}}$

Rubric

1 point for correct ratio

8. 4:16 or 4 to 16 or $\frac{4}{16}$

Rubric

1 point for finding the correct quantities;
1 point for the correct ratio

9. The number of boys in fifth grade is 100, and the number of boys in sixth grade is $100 - 7 = 93$, for a total of $100 + 93 = 193$ boys in the middle school. The number of fifth grade girls is 110, and the number of sixth grade girls is $93 + 10 = 103$, for a total of $110 + 103 = 213$ girls. The ratio of girls to boys in the middle school is 213:193.

Rubric

1 point for correct answer; 2 points for showing appropriate work

10. a. 1:11

b. $\frac{1}{11}$

- c. There are more students because there are 11 students for each teacher.

Rubric

- a. 1 point
- b. 1 point
- c. 1 point for correct answer; 1 point for correct explanation

11. a. $1\frac{1}{2}$ cups of ingredients

- b. No; there is twice as much water for uncooked rice, but the amount of water is not twice the total amount of the ingredients. The ratio of cups of water to total cups of ingredients

is $1:1\frac{1}{2}$.

Rubric

- a. 1 point
- b. 1 point for knowing that the ratio in b is not correct; 1 point for giving the correct ratio

12. a. 3:5

- b. No; the ratio says that Erica wins 3 games for every 5 games played. It does not tell you the total number of games played.

Rubric

- a. 1 point
- b. 1 point for correct answer; 1 point for appropriate explanation

6.RP.2 Answers

1. B
2. A
3. A
4. D, E
5. A, B
6. B
7. A
8. G
9. E
10. D

11. a. $\frac{180 \text{ students}}{20 \text{ teams}} = \frac{9 \text{ students}}{1 \text{ team}}$
 b. $\frac{180 \text{ students}}{15 \text{ teams}} = \frac{12 \text{ students}}{1 \text{ team}}$; there are 12 students on each team.

Rubric

- a. 1 point
- b. 1 point

12. Kyle divided the numerator and denominator by 2 to find the unit rate. Kyle should have multiplied by 2 to find the price per pound.

$$\frac{\$2.98 \cdot 2}{\frac{1}{2} \text{ pound} \cdot 2} = \frac{\$5.96}{1 \text{ pound}}$$

The ham is selling for \$5.96 per pound.

Rubric

1 point for identifying the error; 1 point for the correct unit rate; 1 point for showing appropriate work

13. $\frac{\$5.90}{1 \text{ pound}} = \frac{\$5.90}{16 \text{ ounces}} \cup \frac{\$0.37}{1 \text{ ounce}}$

Rubric

- 1 point for answer;
- 1 point for appropriate work

14. Wholesaler C has the lowest price per pound.

Wholesaler A:

$$\frac{\$40.00}{10 \text{ pounds}} = \frac{\$40.00 \div 10}{10 \text{ pounds} \div 10} = \frac{\$4.00}{1 \text{ pound}}$$

Wholesaler B:

$$\frac{\$45.00}{15 \text{ pounds}} = \frac{\$45.00 \div 15}{15 \text{ pounds} \div 15} = \frac{\$3.00}{1 \text{ pound}}$$

Wholesaler C:

$$\frac{\$50.00}{20 \text{ pounds}} = \frac{\$50.00 \div 20}{20 \text{ pounds} \div 20} = \frac{\$2.50}{1 \text{ pound}}$$

Rubric

1 point for each computation; 1 point for identifying the wholesaler with the best price

15. John and Maria spent \$4.25 per hour for the trip.

John and Maria spent

$$\$9.00 + \$5.00 + \$3.00 = \$17.00 \text{ for the trip.}$$

Their trip lasted 4.25 hours because they started at 11:30 A.M. and finished at 3:45 P.M.

The ratio of money spent to time hiked is

$$\frac{\$17.00}{4.25 \text{ hours}} \text{ and the unit rate is } \frac{\$17.00}{4.25 \text{ hours}} = \frac{\$17.00 \div 4.25}{4.25 \text{ hours} \div 4.25} = \frac{\$4.00}{1 \text{ hour}}$$

Rubric

1 point for the correct unit rate; 4 points for showing appropriate work

6.RP.3a Answers

1. A
2. C
3. C
4. A
5. a. Yes
b. No
c. Yes
d. Yes

6.

Fuel (kg)	63	70	84	98	112
Additive (g)	27	30	36	42	48

Rubric

1 point for each correct value

7. Option B

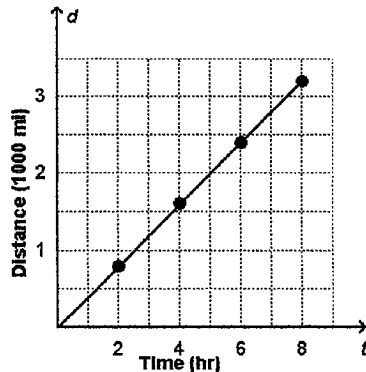
Option A can travel 22 miles on 1 gallon, Option B can travel 23 miles on 1 gallon, and Option C can travel 20 miles on 1 gallon. The ratio of distance to fuel is highest for Option B.

Rubric

1 point for the correct option; 1 point for a correct explanation

8.

Distance (miles)	800	1600	2400	3200
Time (hr)	2	4	6	8



(Students may switch which quantity goes on which axis for full credit, as long as they apply their decision correctly.)

Rubric

1 point for each correct ordered pair in the table, 2 points for a correct graph

9. a.

Distance (mi)	50	100	150	200	250
Time (hr)	1	2	3	4	5

- b. The ratio of 250 miles to 5 hours would change.
- c. I would expect the ratio to be lower because the car would travel a smaller distance in one hour if it had to stop for repairs.

Rubric

- a. 0.5 point for each entry in the table
- b. 1 point for noting that the ratio of 250 miles to 5 hours would change
- c. 2 points for explaining how the ratio would change and why

6.RP.3b Answers

1. B

2. D

3. A

4. D

5. A

6. a. The small truck traveled at 60 miles per hour, and the large truck traveled at 45 miles per hour.

b. The trip took the small truck 3.75 hours and the large truck 5 hours.

Rubric

a. 0.5 point for each correct speed

b. 0.5 point for each correct time

7. The two shoppers did not buy the same kind of meat; the first shopper paid \$3.29 per pound, and the second shopper paid \$4.19 per pound.

Rubric

1 point for the correct answer; 2 points for an appropriate explanation

8. a. No; Lupita paid \$2.40 per pound for her pretzels. Charles paid \$2.55 per pound for his pretzels. Lupita got a better deal because \$2.40 per pound is less than \$2.55 per pound.

b. \$17.85

Rubric

a. 1 point for correct answer; 2 points for explanation

b. 1 point for answer

9. Sam should rent the first car and bring \$70.60 for gas.

The first car gets 15 miles per gallon, while the second car only gets 12 miles per gallon. Sam should choose the first car. Sam's estimate for how much he will pay for gas indicates a unit rate of \$3.53 per gallon. At 15 miles per gallon, Sam will need 20 gallons to make the 300-mile trip. So Sam should bring \$70.60 for gas.

Rubric

1 point for the correct car;

1 point for correct amount of money for gas;

3 points for appropriate explanation with necessary calculations

10. If Martha buys all the \$1.29 songs and 6 of the \$0.99 songs, she will be getting 9 songs for \$9.81. She will pay \$1.09 per song.

$$\frac{\$9.81}{9 \text{ songs}} = \frac{\$9.81 \overline{) 9}}{9 \text{ songs} \overline{) 9}} = \frac{\$1.09}{1 \text{ song}}$$

If she buys the album, she will be getting 12 songs for \$9.99. She will pay \$0.83 per song.

$$\frac{\$9.96}{12 \text{ songs}} = \frac{\$9.96 \overline{) 12}}{12 \text{ songs} \overline{) 12}} = \frac{\$0.83}{1 \text{ song}}$$

The whole album is a better deal in terms of price per song.

Rubric:

1 point for the answer;

1 point for the price for just the songs she likes;

1 point for each of the unit rates

6.RP.3c Answers

1. B
 2. C
 3. C
 4. C
 5. C, E
 6. C
 7. B
 8. F
 9. A
 10. E
11. a. $\$20 \leftrightarrow \frac{4.75}{100} = \0.95
- b. $\$20 \leftrightarrow \frac{6}{100} = \1.20
 $\$1.20 - \$0.95 = \$0.25$
 She would pay \$0.25 more in sales tax in South Carolina.
- Rubric**
- a. 1 point
 - b. 2 points
12. a. 4,000; 400; 40
- b. When the percent is multiplied by 10, the resulting whole is divided by 10.
 - c. 200; the percent changed from 2.5% to 25% (a multiplication by 10), so the whole, 2,000, will be divided by 10: $2,000 \div 10 = 200$. So, 25% of 200 is 50.
- Rubric**
- a. 1 point for each correct answer
 - b. 1 point for the explanation
 - c. 1 point for the explanation; 1 point for the answer

13. a. \$410
- b. Write 82% as a fraction with denominator 100. Then multiply by Jane's regular pay.

$$\frac{82}{100} \cdot 500 = 410$$

The answer, \$410, is the same as part a.

- c. To find $n\%$ of an amount A :

$$A - \frac{n}{100} \cdot A = A - \frac{nA}{100}$$

Also:

$$\left(\frac{100}{100} - \frac{n}{100} \right) A$$

Use the distributive property and simplify.

$$\begin{aligned} \left(\frac{100}{100} - \frac{n}{100} \right) A &= \frac{100}{100} \cdot A - \frac{n}{100} \cdot A \\ &= A - \frac{nA}{100} \end{aligned}$$

Both methods result in the expression

$$A - \frac{nA}{100}$$

Rubric

- a. 1 point
- b. 1 point
- c. 4 points

6.RP.3d Answers

1. C
2. B
3. B
4. A
5. B, C
6. a. yes
b. yes
c. yes
d. no

7. The chemist has about

$$4 \text{ fl oz} \times \frac{29.6 \text{ mL}}{1 \text{ fl oz}} = 118.4 \text{ mL, so he or she needs } 500 \text{ mL} - 118.4 \text{ mL} = 381.6 \text{ mL more.}$$

Rubric

1 point for correct answer; 1 point for appropriate work

8. Find the surface area of the box in square inches.

$$\begin{aligned} &2(6 \text{ in.} \times 6 \text{ in.}) + 2(6 \text{ in.} \times 12 \text{ in.}) \\ &+ 2(6 \text{ in.} \times 12 \text{ in.}) \\ &= 2(36 \text{ in.}^2) + 2(72 \text{ in.}^2) + 2(72 \text{ in.}^2) \\ &= 72 \text{ in.}^2 + 144 \text{ in.}^2 + 144 \text{ in.}^2 \\ &= 360 \text{ in.}^2 \end{aligned}$$

Convert the surface area to square centimeters. Multiply the surface area by two factors of $\frac{2.54 \text{ centimeters}}{1 \text{ inch}}$.

Find the number of square meters.

$$360 \text{ in.}^2 \times \frac{2.54 \text{ cm}}{1 \text{ in.}} \times \frac{2.54 \text{ cm}}{1 \text{ in.}} = 2,323 \text{ square centimeters}$$

Rubric

1 point for the correct answer; 2 points for appropriate work

9. $12 \text{ feet} \times \frac{1 \text{ yard}}{3 \text{ feet}} = 4 \text{ yards};$

$15 \text{ feet} \times \frac{1 \text{ yard}}{3 \text{ feet}} = 5 \text{ yards};$

Area of floor = $4 \text{ yards} \times 5 \text{ yards} = 20 \text{ square yards}$

Rubric

1 point for correct area; 1 point for appropriate work

10. The salesman was in error when he said there were 3 square feet in a square yard.

Since 1 yard = 3 feet, 1 square yard is $3 \text{ feet} \times 3 \text{ feet} = 9 \text{ square feet}$.

The actual number of square yards is

$$270 \text{ square feet} \times \frac{1 \text{ square yard}}{9 \text{ square feet}} = 30 \text{ square yards}$$

The actual cost is

$$30 \text{ square yards} \times \frac{\$12.00}{1 \text{ square yard}} = \$360.$$

Rubric

2 points for identifying error; 2 points for calculating actual cost

11. a.

Juice	Milliliters	Cups
Cranberry	3,500	15
Orange	950	4
Lemon	240	1

- b. 1 quart of cranberry juice holds 4 cups,

so $15 \text{ cups} \times \frac{1 \text{ quart}}{4 \text{ cups}} = 3\frac{3}{4} \text{ quarts}.$

Because only whole quarts can be bought, 4 quarts of cranberry juice are needed, and one quarter of a quart (one cup) will be left over.

Rubric

- a. 1 point for each missing table value
- b. 1 point for number of quarts; 1 point for noting there will be juice left over; 1 point for explanation

6.NS.1 Answers

1. C
2. D
3. C
4. B
5. C
6. C
7. 10, 3, 8

Rubric

1 point for each number

8. There are 4 whole $\frac{3}{16}$ -foot sections.

$$\frac{11}{12} \div \frac{3}{16} = \frac{11}{12} \square \frac{16}{3} = \frac{176}{36} = \frac{44}{9}$$

$\frac{44}{9}$ is not a whole number. However,

since $\frac{44}{9} = 4\frac{8}{9}$, there are 4 whole

$\frac{3}{16}$ -foot sections, with some left over that

Ida cannot use.

Rubric

1 point for answer;

1 point for work;

1 point for explanation

9. a. $\frac{1}{2} \div \frac{5}{64} = \frac{1}{2} \square \frac{64}{5} = \frac{64}{10} = \frac{32}{5} = 6\frac{2}{5}$

servings

- b. Since $\frac{32}{5} = 6\frac{2}{5}$, she has enough milk

for 6 full days.

Rubric

a. 1 point for answer;

1 point for work

b. 1 point for answer;

1 point for explanation

10. Juan set up the problem incorrectly as $\frac{5}{7} \div \frac{3}{4}$. In the problem, $\frac{3}{4}$ is the dividend

and $\frac{5}{7}$ is the divisor. The correct work is

$$\frac{3}{4} \div \frac{5}{7} = \frac{3}{4} \square \frac{7}{5} = \frac{21}{20}$$

The quotient is $\frac{21}{20}$.

Rubric

2 points for error description;

1 point for corrected work;

1 point for quotient

11. a. Possible answer: Sally requires several rectangular pieces of construction paper for an art project. The pieces need to have an area of $\frac{1}{4}$ square inch. She has several strips of paper left from the last art project that are each $\frac{7}{16}$ inch wide. How long should each piece be cut to meet her requirements for this project?

b. $\frac{1}{4} \div \frac{7}{16} = \frac{1}{4} \square \frac{16}{7} = \frac{4}{7}$

- c. Possible answer: Sally should cut the strips into lengths of $\frac{4}{7}$ inch.

Rubric

a. 2 points for reasonable situation

b. 1 point

c. 1 point for correct interpretation of answer according to part a

6.NS.2 Answers

1. D
2. B
3. B
4. C
5. B, C, D
- 6.

$$\begin{array}{r} 13 \\ 102 \overline{)1326} \\ \underline{-102} \\ 306 \\ \underline{-306} \\ 0 \end{array}$$

The floors are 13 feet tall.

Rubric

1 point for work; 1 point for answer

7. a. 32 apples
- b. 48 bags

Rubric

- a. 1 point
- b. 2 points

8. Yes;

$$\begin{array}{r} 6 \\ 15 \overline{)98} \\ \underline{-90} \\ 8 \end{array}$$

Martina has enough money to pay for 6 months of the service. She will have \$8 left over.

Rubric

1 point for the answer; 1 point for explaining the remainder in the context of the problem; 1 point for explaining the quotient in the context of the problem

9. a. The remainder, 87, is larger than the divisor, 62, so 16 is not the maximum number of times 62 can go into 1079.
- b. Maurice found a quotient that is too small, so increase 16 by 1 in the expression $16 \times 62 + 87$, subtract 62 from 87, and see if that gives a remainder of less than 62. If you multiply 62 by 17, you get 1054, which is 25 less than the dividend of 1079. The correct quotient is 17 with a remainder of 25.

Rubric

1 point for the error;
1 point for the correct answer;
3 points for explaining an appropriate method that doesn't involve division

10. a. The administrator's plan will not be as effective because there will be $342 \div 38 = 9$ students on each team. This is more than 7 students per team.
- b. Divide the number of students by 7.

$$\begin{array}{r} 48 \\ 7 \overline{)342} \\ \underline{-28} \\ 62 \\ \underline{-56} \\ 6 \end{array}$$

There will be 49 teams. The teams will not all have the same number of students because there will be 48 teams of 7 students and 1 team of 6 students.

Rubric

- a. 2 points
- b. 1 point for stating there will be 49 teams; 1 point for stating the teams do not all have the same number of students; 1 point for stating why

11. a.

$$\begin{array}{r} 9 \\ 13 \overline{)117} \\ \underline{-117} \\ 0 \end{array} \quad \begin{array}{r} 9 \\ 13 \overline{)118} \\ \underline{-117} \\ 1 \end{array} \quad \begin{array}{r} 9 \\ 13 \overline{)119} \\ \underline{-117} \\ 2 \end{array}$$

- b. $120 \div 13$ will be 9 with a remainder of 3. In each of the three quotients, the remainder increased by 1 every time the dividend increased by 1.
- c. The remainder cannot be the same as the divisor. The correct quotient is 10.

Rubric:

- a. 1 point for each quotient;
- b. 1 point for the quotient of $120 \div 13$;
1 point for explaining the pattern
- c. 1 point for explaining the error; 1 point for correct quotient

6.NS.3 Answers

1. D
2. A
3. A
4. B
5. F
6. H
7. D
8. B
9. E
10. A
11. C
12. G
13. a. \$67.16
- b. \$56.47

Rubric

- a. 1 point
- b. 1 point

14. $0.3125 \overline{)5.625} \rightarrow 3,125 \overline{)56,250}$.

$$\begin{array}{r}
 18 \\
 3,125 \overline{)56,250} \\
 \underline{-3,125} \\
 25,000 \\
 \underline{-25,000} \\
 0
 \end{array}$$

Mariposa can get eighteen 0.3125-inch strips from the 5.625-inch wooden board.

Rubric

- 1 point for work;
- 1 point for answer

15. Jean-Paul did not line the numbers up by place value when adding. The easiest way to do this is to line up the decimal points.

$$\begin{array}{r}
 \overset{1}{2} \overset{1}{8} 7 4 \\
 + 1. 2 8 6 0 \\
 \hline
 5. 5 7 3 4
 \end{array}$$

$4.2874 + 1.286 = 5.5734$

Rubric

- 1 point for error;
- 2 points for corrected work;
- 1 point for answer

16. a. The difference in price is \$0.38 per gallon.
 b. $\$0.38 \times 15.25 = \$5.795 \approx \$5.80$

Rubric

- a. 1 point
- b. 1 point for answer; 1 point for work

17. a. Shen earned \$69.60 the first week, \$84.00 the second week, \$52.80 the third week, and \$64.80 the fourth week.
 b. Shen had $0.5 \times 69.60 + 0.5 \times 52.80 = \61.20 in the bank at the end of last month.
 c. Shen had earned $\$69.60 + \$84.00 + \$52.80 + 64.80 = \271.20 for the month. He put \$61.20 in the bank, so he has $\$271.20 - \$61.20 = \$210.00$ to spend at the end of last month.

Rubric

- a. 0.5 point for each amount
- b. 1 point for answer; 1 point for work
- c. 1 point for answer; 1 point for work

18. The second steak is the better buy.
 The first steak costs \$7.00 per pound and the second costs \$6.20 per pound.

Rubric

- 1 point for answer;
- 2 points for an explanation that includes the prices per pound

6.NS.4 Answers

1. D
2. B
3. A
4. B
5. A
6. No, the greatest common factor of 85 and 99 is 1. The only way to rewrite $85 + 99$ using the distributive property is to write $1(85 + 99)$.

Rubric

1 point for answer;
2 points for explanation

7. The LCM of 6 and 9 is 18. Therefore, Charlie and Dasha will both be traveling on business trips in 18 months, and so will need to hire someone then.

Rubric

1 point for answer; 1 point for explanation

8. The GCF of 96 and 80 is 16, so Salvatore can make 16 party favors. Each one will have 6 pencils and 5 boxes of raisins.

Rubric

1 point for using the GCF to find the number of party favors;
1 point for number of pencils per party favor;
1 point for number of boxes of raisins per party favor

9. Possible answers:
 - a. The LCM is the greater of the two numbers. For example, the LCM of 3 and 9 is 9.
 - b. The LCM is the product of the two numbers. For example, the LCM of 5 and 9 is 45.

Rubric

- a. 1 point for answer; 1 point for valid example
- b. 1 point for answer; 1 point for valid example

10. a. 1
- b. 1
- c. The only factors of a prime number are 1 and itself, so the greatest common factor of two prime numbers is always 1.

Rubric

- a. 1 point
- b. 1 point
- c. 2 points

11. Possible answer:

- a. $36 + 45 = 3(12 + 15)$
- b. $36 + 45 = 9(4 + 5)$
- c. This cannot be done in more than two ways because 3 and 9 are the only common factors of 36 and 45 other than 1.

Rubric

- a. 1 point
- b. 1 point
- c. 1 point for stating that it cannot be done in more than two ways; 1 point for explanation

12. a. No, she cannot make 10 platters of cupcakes; 72 is not divisible by 10.
- b. The GCF of 72 and 80 is 8, so she can make 8 platters. Each platter will have 9 vanilla cupcakes and 10 chocolate cupcakes.

Rubric

- a. 1 point for answer; 1 point for explanation
- b. 1 point for number of platters; 1 point for number of vanilla and chocolate cupcakes

6.NS.5 Answers

1. C
2. C
3. B
4. A, D, E
5. a. 30,000
- b. -1,200
- c. 0

Rubric

1 point for each part

6. a. -9
- b. 1
- c. 0
- d. -2

Rubric

1 point for each part

7. A positive number indicates money being deposited, so it is a credit to the account. A negative number indicates money being withdrawn, so it is a debit to the account. Zero means that money is neither being deposited nor withdrawn, so there is no change.

Rubric

1 point for positive number interpretation;
1 point for negative number interpretation; 2 points for interpretation of zero

8. a. -73; 0 represents sea level
- b. 16.78; 0 represents no deposit or withdrawal
- c. -15; 0 represents no change in temperature

Rubric

- a. 1 point for signed number; 1 point for interpreting 0
- b. 1 point for signed number; 1 point for interpreting 0
- c. 1 point for signed number; 1 point for interpreting 0

9. a. Possible answers: climbing to a height of 50 feet; depositing \$50 into a bank account
- b. Possible answers: diving to a depth of 50 feet; withdrawing \$50 from a bank account

Rubric

- a. 1 point for each reasonable answer
- b. 1 point for each reasonable answer

6.NS.6a, 6.NS.6b Answers

1. D
2. A
3. D
4. B
5. A
6. B, C, E
7. The opposite of -5 is 5 .
The opposite of 0 is 0 .
The opposite of 2 is -2 .
The opposite of 4 is -4 .



Rubric

0.5 point for each nonzero point;
1 point for zero and its opposite (they are the same point)

8. -35 feet

Rubric

1 point for the correct number; 1 point for including units

9. A reflection across the y -axis would move the point to Quadrant III. The x -coordinate would change from positive to negative.

Rubric

1 point for identifying the transformation;
1 point for identifying sign change

10. The students should go to the science lab. The teachers' lounge is represented by -2 on the number line. The opposite of -2 is 2 , so the next clue is in the room represented by 2 on the number line, the science lab.

Rubric

2 points for answer;
2 points for the explanation

11. a. 8 , -1 , and -7
b. -8 , 1 , and 7
c. The opposite of the opposite of a number is the same as the original number.

Rubric

- a. 0.5 point for each opposite
- b. 0.5 point for each opposite
- c. 1 point

12. Quadrant I: Possible answer: $y = 1$
Quadrant IV: Possible answer: $y = -1$

The ordered pair $\left(\frac{2}{3}, y\right)$ cannot be in

Quadrant II or Quadrant III because the x -coordinate is positive.

Rubric

- 1 point for Quadrant I value;
- 1 point for Quadrant IV value;
- 1 point for stating the point cannot be in Quadrant II or Quadrant III;
- 1 point for explanation

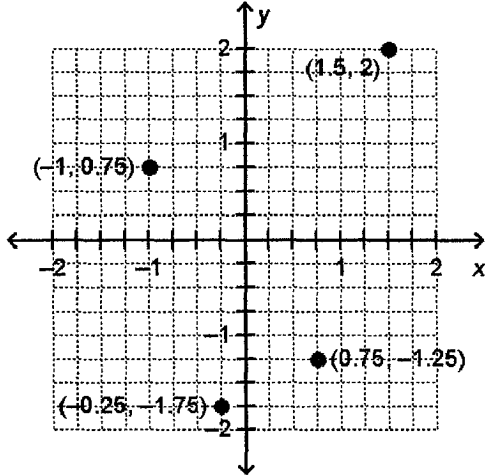
13. a. The y -coordinate of the point $(-4, -3)$ has the opposite sign of the y -coordinate of $(-4, 3)$.
b. The x -coordinate of the point $(4, 3)$ has the opposite sign of the x -coordinate of $(-4, 3)$.
c. A reflection across the x - and then the y -axis would result in a change to the signs of both coordinates. If $(-4, 3)$ were reflected across the x -axis and then that point was reflected across the y -axis, the resulting point would be $(4, -3)$.

Rubric

- a. 1 point for noting the sign change
- b. 1 point for noting the sign change
- c. 1 point for noting the sign changes;
1 point for the coordinates of the result

6.NS.6c Answers

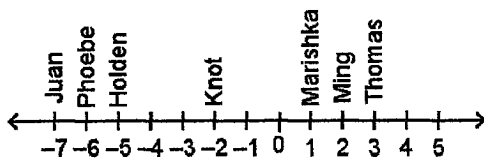
1. C
2. B
3. D
4. A
5. B, D, F, G
- 6.



Rubric

1 point for each graphed and labeled point

7. Holden will be at -5 and Marishka will be at 1 . Holden's side pulls the knot 2 units in the negative direction, so all the students move 2 units in the negative direction, as shown on the number line.



Rubric

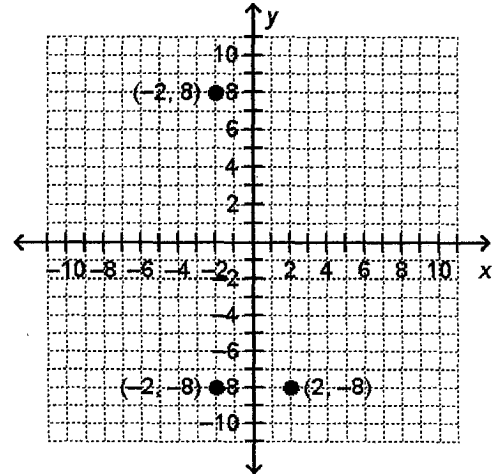
1 point for Holden's position;
 1 point for Marishka's position;
 2 points for correct number line and labels

8. The coordinates of the library are $(-4, -1)$. The coordinates of the school are $(3, 4)$. The coordinates of the bike shop are $(4, -3)$. The coordinates of the baseball field are $(-3, 3)$.

Rubric

1 point for each ordered pair

9. The points are graphed and labeled below.



Rubric

- a. 1 point for graphed and labeled point
- b. 1 point for coordinates of point;
 1 point for graphed and labeled point
- c. 1 point for coordinates of point;
 1 point for graphed and labeled point

6.NS.7a Answers

1. A
2. C
3. B
4. D
5. A, B, D, G

6. 10 is to the left of 17 on a number line.
17 is to the right of 10 on a number line.

Rubric

1 point for each answer

7. x is between 0.001 and 10,000. Since $0.001 < x$, x is to the right of 0.001 on a number line. Since $x < 10,000$, x is to the left of 10,000. Since x is to the right of 0.001 and to the left of 10,000, x is between the two numbers.

Rubric

1 point for answer; 2 points for explanation

8. a. $\frac{1}{2}$, $4\frac{1}{6}$, 22, and 1,000,000

- b. $-1,000$, $\frac{18}{19}$, 0, and 0.2

Rubric

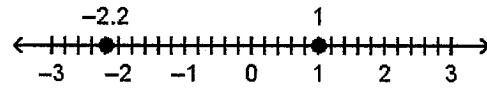
- a. 0.5 point per number
- b. 0.5 point per number

9. a. Possible answer: $-2.25 < 2$; -2.25 is to the left of 2 on the number line, so -2.25 is less than 2.
b. Yes; Possible answer: $2 > -2.25$

Rubric

- a. 1 point for correct inequality;
1 point for explanation
- b. 1 point for correct answer;
1 point for inequality

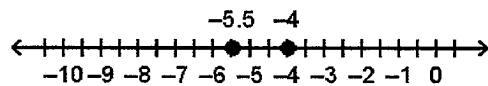
10. They are both correct. As shown on the number line, 1 is to the right of -2.2 . It is also correct to say that -2.2 is to the left of 1.



Rubric

- 1 point for the answer;
1 point for the explanation;
1 point for each graphed number

11. a.



- b. -5.5 is to the left of -4 ; -4 is to the right of -5.5 .
- c. Possible answer: $-6 < -5.5$
- d. Possible answer: $-4 < -3$

Rubric

- a. 0.5 point for each graphed number
- b. 0.5 point for each description
- c. 1 point
- d. 1 point

6.NS.7b Answers

1. C
2. A
3. A
4. C
5. B, D
6. $\frac{1}{4}$ cup, $\frac{1}{2}$ cup, $\frac{2}{3}$ cup, $\frac{3}{4}$ cup

The recipe requires a smaller amount of sugar than the other ingredients.

Rubric

2 points for correctly ordered list of values;

1 point for stating the recipe requires the least amount of sugar

7. Possible answer: 1 hour: $425 \text{ ft} < 550 \text{ ft}$;
2 hours: $775 \text{ ft} > 700 \text{ ft}$

Chuck was at a higher elevation after 2 hours.

Rubric

1 point for each inequality;

1 point for who was at a higher elevation after 2 hours

8. Flower 1 change in height: $1\frac{13}{16}$ in.
Flower 2 change in height: $\frac{1}{2}$ in.
Flower 3 change in height: $3\frac{5}{16}$ in.
Flower 4 change in height: $1\frac{3}{16}$ in.

From least growth to most growth, the order is Flower 2, Flower 4, Flower 1, and Flower 3. Flower 3 grew the most in one month.

Rubric

0.5 point for each height difference;

2 points for ordered list;

0.5 point for answer

9. Possible answer: $-34^\circ\text{F} < -22^\circ\text{F}$,
 $-34^\circ\text{F} > -56^\circ\text{F}$, $-22^\circ\text{F} > -56^\circ\text{F}$

Juneau has the highest record low.

Rubric

1 point for each inequality;

1 point for stating Juneau has the highest record low

10. a. Sam deposited \$127.15 and Nima deposited \$142.98. An inequality that compares these total deposits is $\$127.15 < \142.98 (or $\$142.98 > \127.15). Nima deposited more money.
b. Nima withdrew \$37.28, so she has a total of $\$142.98 - \$37.28 = \$105.70$. If Sam has more money in his account, he must have at least \$105.71. That means the largest withdrawal he could make is $\$127.15 - \$105.71 = \$21.44$.

Rubric

a. 1 point for the total deposits, 1 point for a correct inequality

b. 1 point for correct answer; 2 points for appropriate explanation

6.NS.7c, 6.NS.7d Answers

1. C
2. B
3. B
4. D
5. B, F
6. -2.25 and 2.25

$$\square \frac{3}{4} \text{ and } 0.75$$

Rubric

1 point for each pair of numbers

7. Vince spent more money;
 $\square \$25.00 \square \square \18.25 .

Rubric

1 point for correct answer; 1 point for inequality

8. a. Possible answer: $a = 2, b = 1$
b. Possible answer: $a = 2, b = -3$
c. Possible answer: $a = 2, b = -2$

Rubric

1 point for each part

9. a. Since the sign is 282 feet below sea level, the elevation of the sign relative to sea level is -282 feet.
b. Since the sign is 282 feet below sea level and the elevation of sea level is 0 feet, Monica must hike up 282 feet to reach sea level.

Rubric

- a. 1 point for answer; 1 point for a reasonable explanation
b. 1 point for answer; 1 point for a reasonable explanation

10. a. Yvette travels farther from Second Street. The grocery store is $|-3| = 3$ units from 0, and the fruit stand is $|1| = 1$ unit from 0. Thus, Yvette travels farther from Second Street to the grocery store than Naomi travels from Second Street to the fruit stand.
b. On the number line, the location of First Street is -4 . Since Second Street is represented by 0 on the number line, the absolute value of the location is the distance. First Street is $|-4| = 4$ units from 0. Since each unit represents 100 feet, Anzelm is $4 \bullet 100$ feet = 400 feet from Second Street.

Rubric

- a. 1 point for answer; 2 points for justification
b. 1 point for answer; 2 points for justification
11. If $a > b$ and a and b are both negative, it is not possible for $|a| \square |b|$.
Since $a > b$, a is to the right of b on a number line. Since a and b are negative numbers, both a and b are to the left of 0 on a number line. Since the distance from a to 0 must be less than the distance from b to 0 on a number line, $|a| \square |b|$. So $|a| \square |b|$ is not possible.

Rubric

1 point for answer; 3 points for a reasonable explanation

6.NS.8 Answers

1. C
2. C
3. A
4. Meena travels $|5 - 2| = 3$ blocks, and Jerry travels $|-5 - 1| = 6$ blocks.

Rubric

1 point for each distance

5. a. $|1 - (-4)| = 5$ units
- b. $|-3 - 3| = 6$ units

Rubric

- a. 1 point
- b. 1 point

6. Starting at point $(-1, 4)$ and moving clockwise to find each side length:

The distance between $(-1, 4)$ and $(4, 4)$ is $|-1 - 4| = |-5| = 5$. The length of this section is 5 feet.

The distance between $(4, 4)$ and $(4, -5)$ is $|4 - (-5)| = |9| = 9$. The length of this section is 9 feet.

The distance between $(4, -5)$ and $(-4, -5)$ is $|4 - (-4)| = |8| = 8$. The length of this section is 8 feet.

The distance between $(-4, -5)$ and $(-4, -1)$ is $|-5 - (-1)| = |-4| = 4$. The length of this section is 4 feet.

The distance between $(-4, -1)$ and $(-1, -1)$ is $|-4 - (-1)| = |-3| = 3$. The length of this section is 3 feet.

The distance between $(-1, -1)$ and $(-1, 4)$ is $|-1 - 4| = |-5| = 5$. The length of this section is 5 feet.

The perimeter of the garden is the sum of these distances,

$$5 + 9 + 8 + 4 + 3 + 5 = 34 \text{ feet.}$$

Ravel needs 34 feet of fence.

Rubric

- 2 points for the lengths of all the sections;
1 point for reasonable work;
1 point for answer

7. a. Jamie went to city hall first. The distance between Jamie's house and city hall is 4 blocks. The distance between Jamie's house and the grocery store is 5 blocks. The distance between Jamie's house and the mall is 5 blocks. The distance between Jamie's house and the doctor's office is 5 blocks. City hall is the only location that is 4 blocks away.
- b. Jamie went to either the mall or the grocery store second. The distance between city hall and the mall is 7 blocks. The distance between city hall and the grocery store is 7 blocks. The distance between city hall and the doctor's office is 9 blocks. The mall and the grocery store are both 7 blocks away. The mall and the grocery store are the only possible second stops.

Rubric

- a. 1 point for answer; 1 point for explanation
- b. 1 point for each answer; 1 point for explanation

6.EE.1 Answers

1. B
2. D
3. A
4. B
5. B, D, E
6. G
7. F
8. H
9. A
10. C
11. Louis switched the bases and the exponents. He evaluated $5^3 + 3^6$ instead of $3^5 + 6^3$.

$$3^5 \square 6^3 \square 3 \square 3 \square 3 \square 3 \square 3 \square 6 \square 6 \square 6$$

$$\square 459$$

Rubric

1 point for identifying mistake; 1 point for correct expansion; 1 point for correct answer

12.

$$11^2 \square 2^3 \square 3^5 \square 9^3$$

$$\square (11 \square 11)(2 \square 2 \square 2) \square$$

$$(3 \square 3 \square 3 \square 3 \square 3) \square (9 \square 9 \square 9)$$

$$\square (121)(8) \square 243 \square 729$$

$$\square 968 \square 243 \square 729$$

$$\square 1,940$$

Rubric

1 point for answer; 3 points for work

13. a. The area of the square is $8^2 = 8 \times 8 = 64$ square centimeters.
- b. The surface area of the cube is $6 \times 8^2 = 6 \times 8 \times 8 = 384$ square centimeters.
- c. The volume of the cube is $8^3 = 8 \times 8 \times 8 = 512$ cubic centimeters.

Rubric

- a. 1 point for expression; 1 point for evaluating
 - b. 1 point for expression; 1 point for evaluating
 - c. 1 point for expression; 1 point for evaluating
14. a. Kerry puts $2 \times 2 = 2^2$ pennies into the jar on the second day, $2 \times 2 \times 2 = 2^3$ pennies into the jar on the third day, and $2 \times 2 \times 2 \times 2 = 2^4$ pennies into the jar on the fourth day.
 - b. For each day, the exponent that 2 is being raised to increases by 1.
 - c. On the seventh day, she will put 2^7 pennies into the jar. $2^7 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 128$
 - d. There will be \$2.54 in the jar at the end of the week.

Rubric

- a. 1 point for each expression
- b. 1 point
- c. 1 point for expression; 1 point for expanding and evaluating
- d. 1 point

6.EE.2a Answers

1. B
2. A
3. C
4. D
5. A, C, E
6. A, C, F
7. a. +
b. -
c. ÷
d. -
e. ×
f. +

8. a. Clark made $r + 3$ hits in the first hour.
b. Rebecca made $2c - 5$ hits in the second hour.

Rubric

- a. 1 point
- b. 1 point

9. a. There are $t + 3$ lions.
b. There are $2(t + 3)$ bears. ($2t + 6$ is also acceptable.)

Rubric

- a. 1 point
- b. 1 point

10. a. $n + 3$
b. $n + 3$
c. $n + 3$
d. The statements in parts a through c represent the same expression, $n + 3$.

Rubric

- a. 1 point
- b. 1 point
- c. 1 point
- d. 1 point

11. a. The number of lights required in the room is $\frac{S}{5}$.
b. The construction crew has $\frac{S}{5} \square 10$ lights.
c. The construction crew has $\frac{S}{5} \square 15$ lights.
d. The construction crew has $2\left(\frac{S}{5}\right)$ lights.

Rubric

- a. 1 point
- b. 1 point
- c. 1 point
- d. 1 point

12. Sal gave Trudy $c - 3$ apple pies, which is 3 apple pies fewer than c cherry pies. Sal should have given Trudy $c + 3$ apple pies.

Rubric

1 point for mistake; 1 point for correction

6.EE.2b Answers

1. A
2. C
3. B
4. D
5. a. Product
- b. Difference
- c. Sum
- d. Product
- e. Sum
- f. Quotient
6. The expression is $7(2 + x)$. The factors of the expression are 7 and $(2 + x)$.

Rubric

1 point for expression; 1 point for each factor

7. Possible answer:
One sum is $14 + b$, with terms 14 and b .
Another sum is $b + 27d$, with terms b and $27d$.

Rubric

1 point for each sum; 1 point for each set of terms

8. The products are $14n$ and $6k$. The coefficients are 14 and 6.

Rubric

1 point for each product; 1 point for coefficients

9. a. Terms: $7x^2$, $2y$, and -8 ; Products: $7x^2$ and $2y$; Coefficients: 7 and 2
- b. First, evaluate x^2 . Next, multiply 7 and x^2 and multiply 2 and y . Finally, add and subtract terms. The value of the expression at $x = 2$ and $y = -1$ is 18.

Rubric

- a. 1 point for terms; 1 point for products; 1 point for coefficients
- b. 1 point for order of operations; 1 point for value of expression

10. No, this is not correct. Lara found the terms of the two sums. The factors of the product are $(5 + s)$ and $(k + 7)$.

Rubric

1 point for answer; 2 points for explaining the mistake; 1 point for each correct factor

11. a. The two sums are $56xy + 5$ and

$$6x - \frac{y}{20}$$

- b. The terms of the expression are $56xy$, 5, $-6x$, and $\frac{y}{20}$.
- c. The product is $-6x$ and the coefficient is -6 .
- d. The quotient is $\frac{y}{20}$.

Rubric

- a. 1 point for each sum
- b. 1 point
- c. 1 point for product; 1 point for coefficient
- d. 1 point

12. Sums: $x + 5$, $y + 9$, $2 + x$, $y + 23$, and $(x + 5)(y + 9) + (2 + x)(y + 23)$

Products: $(x + 5)(y + 9)$ and $(2 + x)(y + 23)$

Factors: $(x + 5)$, $(y + 9)$, $(2 + x)$, and $(y + 23)$

Rubric

1 point for sums $x + 5$, $y + 9$, $2 + x$, and $y + 23$; 1 point for sum $(x + 5)(y + 9) + (2 + x)(y + 23)$; 1 point for products; 1 point for factors

6.EE.2c Answers

1. B
2. C
3. A
4. D
5. A, D, E
6. The surface area is 70 square feet.

$$A \square 2(5)(3) \square 2(5)(2.5) \square 2(3)(2.5)$$

$$\square 10(3) \square 10(2.5) \square 6(2.5)$$

$$\square 30 \square 25 \square 15$$

$$\square 70$$

The volume is 37.5 cubic feet.

$$V \square (5)(3)(2.5)$$

$$\square 15(2.5)$$

$$\square 37.5$$

Rubric

1 point for surface area; 1 point for surface area work; 1 point for volume; 1 point for volume work

7. 76

Rubric

2 points

8. a. Mandy has $4q$ nickels and $q + 10$ dimes.
- b. If Mandy has \$5 in quarters, she has $5.00 \div 0.25 = 20$ quarters. So, she has $4q = 4(20) = 80$ nickels and $q + 10 = 20 + 10 = 30$ dimes.

Rubric

- a. 1 point for each expression
- b. 1 point for number of nickels; 1 point for number of dimes

9. At $k = 5$:

$$11(5) \square 9 \square 5^2 \square \frac{15}{5} \square 11(5) \square 9 \square 25 \square \frac{15}{5}$$

$$\square 55 \square 9 \square 25 \square \frac{15}{5}$$

$$\square 55 \square 9 \square 25 \square 3$$

$$\square 64 \square 25 \square 3$$

$$\square 36$$

Rubric

1 point for answer; 1 point for reasonable work

10. In the first line of Mark's work, he subtracted 2 from 12 before evaluating the exponent. The order of operations states that exponents should be evaluated first and that subtraction should be performed last.

$$4(2) \square 12 \square 2^2 \square 4(2) \square 12 \square 4$$

$$\square 8 \square 12 \square 4$$

$$\square 20 \square 4$$

$$\square 16$$

Rubric

2 points for identifying mistake; 1 point for correcting mistake; 1 point for reasonable work

11. a. The volume of one tissue box is $4^3 = 64$ cubic inches.
- b. The volume of the crate will be equal to the total volume of 32 tissue boxes, which is $32 \times 64 = 2048$ cubic inches.
- c. No; if you only know the volume, you don't know how the boxes are arranged. They could be in one layer of 32 boxes, two layers of 16 boxes, etc.

Rubric

- a. 1 point
- b. 1 point for answer; 1 point for explanation
- c. 1 point for answer; 1 point for explanation

12. a. $7m \square 10 \left(\frac{d}{3} \right)$

- b. It will cost \$69.

$$7(7) \square 10 \left(\frac{6}{3} \right) \square 7(7) \square 10(2)$$

$$\square 49 \square 20$$

$$\square 69$$

c. It will cost \$51.

$$7(3) \square 10\left(\frac{9}{3}\right) \square 7(3) \square 10(3)$$

$$\square 21 \square 30$$

$$\square 51$$

Rubric

a. 1 point

b. 1 point for answer; 1 point for work

c. 1 point for answer; 1 point for work

6.EE.3 Answers

1. A
2. A
3. C
4. C
5. B, C, E
6. a.

$$23y - (7x - 2y) - x + 23y - 7x - (-2y) - x$$

$$= 23y - 7x + 2y + x = 23y + 2y - 7x + x$$

b. $23y - 7x + 2y + x = 23y + 2y - 7x + x$

c. $23y + 2y - 7x + x = 25y - 6x$

Rubric

- a. 1 point
 - b. 1 point
 - c. 1 point
7. Possible answer: Use the associative property of addition to move the parentheses to the right, and then combine like terms.

$$(2x - 3y) - y - 2x - (3y - y)$$

$$= 2x - 4y - 2x + 4y$$

Rubric

1 point for answer; 1 point for reasonable work; 1 point for using properties of operations correctly

8. a. $a + n + 2a + 10$
- b. Possible answer: First, use the commutative property of addition to move $2a$ to the left of n ,
 $a + n + 2a + 10 = a + 2a + n + 10$. Then combine like terms to simplify as shown below.
 $a + n + 2a + 10 = a + 2a + n + 10$
 $= 3a + n + 10$

Rubric

- a. 1 point
 - b. 1 point for answer; 1 point for reasonable work; 1 point for explaining use of properties of operations
9. a. Areas of faces: ac, ac, bc, bc, ab, ab
 $A = ac + ac + bc + bc + ab + ab$
 $= 2ac + 2bc + 2ab$
 $= 2(ac + bc + ab)$
- b. Substitute a for b and c in the expression $2(ac + bc + ab)$.
 $A = 2(ac + bc + ab)$
 $= 2(a \cdot a + a \cdot a + a \cdot a)$
 $= 2(a^2 + a^2 + a^2)$
 $= 2(3a^2)$
 $= (2 \cdot 3)a^2$
 $= 6a^2$

Rubric

- a. 1 point for areas; 1 point for expression; 1 point for reasonable work
 - b. 1 point for answer; 1 point for reasonable work
10. Laura did not distribute the negative sign to $12y$ when evaluating $-4(2x + 3y)$. Using the distributive property,
 $-4(2x + 3y) = -8x - 12y$.
 $12x - 18y - 4(2x + 3y) =$
 $12x - 18y - 8x - 12y$
 Use the commutative property to move $-8x$ to the left of $-18y$. Then combine like terms.
 $12x - 18y - 8x - 12y = 12x - 8x - 18y - 12y$
 $= 4x - 30y$

Rubric

1 point for identifying error; 1 point for correcting error; 1 point for correct equivalent expression; 1 point for reasonable work

6.EE.4 Answers

1. C
2. D
3. B
4. B, C, E
5. E
6. B
7. D
8. A
9. G
10. a. $p + t + 2(p + t)$
b. $3(p + t)$
c. Yes, Blaine and Tanya sold the same amount. They both sold $3p + 3t$ pumpkins and tomatoes.
Blaine: $p + t + 2(p + t) = p + t + 2p + 2t = 3p + 3t$
Tanya: $3(p + t) = 3p + 3t$

Rubric

- a. 1 point
 - b. 1 point
 - c. 1 point for answer; 1 point for explanation
11. a. $1\frac{3}{4}b + 1\frac{1}{2}b$
b. $\frac{2}{3}b + 1\frac{1}{3}b$
c. Peter did add enough flour to his cookies, but he did not add enough sugar. He added $2b$ cups of sugar, but he needed $2\frac{2}{3}b$ cups.

So, the expression:
 $(8x - 12y) + y + 2(3 + 3x)$
 is equivalent to the expression:
 $-11y + 6 + 14x$.

$$1\frac{3}{4}b + 1\frac{1}{2}b + \frac{7}{4}b + \frac{2}{4}b = 2\frac{1}{4}b$$

$$\frac{2}{3}b + 1\frac{1}{3}b + \frac{2}{3}b + \frac{4}{3}b = 2b$$

Rubric

- a. 1 point
 - b. 1 point
 - c. 0.5 point for each simplification; 0.5 point for each answer
12. Possible solution:
 First, use the distributive property and the associative property of multiplication to simplify $2(3 + 3x)$.
- $$(8x - 12y) + y + 2(3 + 3x) = (8x - 12y) + y + 2 \cdot 3 + 2 \cdot (3x) = (8x - 12y) + y + 6 + (2 \cdot 3)x = (8x - 12y) + y + 6 + 6x$$
- Use the associative property of addition to move the parentheses to the right. Combine like terms inside the parentheses.
- $$(8x - 12y) + y + 6 + 6x = 8x + (-12y + y) + 6 + 6x = 8x - 11y + 6 + 6x$$
- Use the commutative property of addition to move $8x$ to the right of 6.
- $$8x - 11y + 6 + 6x = -11y + 6 + 8x + 6x$$
- Finally, combine like terms.
- $$-11y + 6 + 8x + 6x = -11y + 6 + 14x$$
- ### Rubric
- 1 point for answer; 3 points for using properties of operations correctly
13. a. $2(n + 1) + n + 3 + n + 1 + n + 1 + n + 2n$
b. $2(n + 1) + n + 3 + n + 1 + n + 1 + n + 2n$

$$2n + 2 + n + 3 + n + 1 + n + 1 + n + 2n$$

$$2n + n + n + n + n + 2n + 2 + 3 + 1 + 1$$

$$8n + 7$$

- c. No, Nick's expression is not correct. His expression simplifies to $8n + 6$, and $8n + 6 \neq 8n + 7$.

$$2n + 1 + 2n + 4n + 5$$

$$2n + 2n + 4n + 1 + 5$$

$$8n + 6$$

Rubric

- a. 1 point
b. 1 point for simplification; 2 points for reasonable work
c. 1 point for answer; 2 points for reasonable work

6.EE.5 Answers

1. B
2. C
3. B
4. B
5. A, C, D
6. $x = 4$:

$$\begin{array}{l} ? \\ 7 \square 5(4) \square 16 \end{array}$$

$$\begin{array}{l} ? \\ 7 \square 20 \square 16 \end{array}$$

$$7 \surd 4$$

4 is not a solution of $7 \leq 5x - 16$ because 7 is not less than or equal to 4.

Rubric

1 point for answer; 1 point for reasonable work

7. No. When substituting 7 for x , the left side of the inequality is equal to $9(7) - 3 = 63 - 3 = 60$, which is equal to 60 and produces a false statement.

Rubric

1 point for answer; 2 points for explanation

8. Substituting 1 for x makes the equation true.

$$x = 0:$$

$$\begin{array}{l} ? \\ 4(0) \square 9 \square 13 \end{array}$$

$$\begin{array}{l} ? \\ 0 \square 9 \square 13 \end{array}$$

$$9 \square 13$$

$$x = 1:$$

$$\begin{array}{l} ? \\ 4(1) \square 9 \square 13 \end{array}$$

$$\begin{array}{l} ? \\ 4 \square 9 \square 13 \end{array}$$

$$13 \square 13$$

$$x = 2:$$

$$\begin{array}{l} ? \\ 4(2) \square 9 \square 13 \end{array}$$

$$\begin{array}{l} ? \\ 8 \square 9 \square 13 \end{array}$$

$$17 \square 13$$

Rubric

1 point for answer; 1 point for reasonable work.

9. All values from the set of natural numbers except for 1 make the inequality true. When substituting 1 for x , the left side of the inequality is equal to $6 + 2(1) = 6 + 2 = 8$, which is not greater than 8. When substituting 2 for x , the left side of the inequality is equal to $6 + 2(2) = 6 + 4 = 10$, which is greater than 8. Since the left side of the inequality increases as the value of x increases, the inequality is true for all natural numbers greater than 1.

Rubric

1 point for answer; 2 points for explanation

10. a. $300 = 22.5t + 75$
- b. Yes, Kyle will have enough to buy the computer if he saves for 10 days because 10 is a solution of the equation $300 = 22.5t + 75$.

$$\begin{array}{l} ? \\ 300 \square 22.5(10) \square 75 \end{array}$$

$$\begin{array}{l} ? \\ 300 \square 225 \square 75 \end{array}$$

$$300 \square 300$$

Rubric

- a. 2 points
- b. 1 point for answer; 1 point for explanation

11. a. 1, 2, and 3 are solutions of $11 \geq 2x + 5$.

$$\begin{array}{ll} \begin{array}{l} ? \\ 11 \square 2(1) \square 5 \end{array} & \begin{array}{l} ? \\ 11 \square 2(2) \square 5 \end{array} \end{array}$$

$$\begin{array}{ll} \begin{array}{l} ? \\ 11 \square 2 \square 5 \end{array} & \begin{array}{l} ? \\ 11 \square 4 \square 5 \end{array} \end{array}$$

$$11 \square 7 \qquad 11 \square 9$$

$$\begin{array}{ll} \begin{array}{l} ? \\ 11 \square 2(3) \square 5 \end{array} & \begin{array}{l} ? \\ 11 \square 2(4) \square 5 \end{array} \end{array}$$

$$\begin{array}{ll} \begin{array}{l} ? \\ 11 \square 6 \square 5 \end{array} & \begin{array}{l} ? \\ 11 \square 8 \square 5 \end{array} \end{array}$$

$$11 \square 11 \qquad 11 \surd 13$$

b. 1 and 2 are solutions of $11 > 2x + 5$.

$$11 \overset{?}{\square} 2(1) \overset{?}{\square} 5$$

$$11 \overset{?}{\square} 2 \overset{?}{\square} 5$$

$$11 \square 7$$

$$11 \overset{?}{\square} 2(2) \overset{?}{\square} 5$$

$$11 \overset{?}{\square} 4 \overset{?}{\square} 5$$

$$11 \square 9$$

$$11 \overset{?}{\square} 2(3) \overset{?}{\square} 5$$

$$11 \overset{?}{\square} 6 \overset{?}{\square} 5$$

$$11 \not\square 11$$

$$11 \overset{?}{\square} 2(4) \overset{?}{\square} 5$$

$$11 \overset{?}{\square} 8 \overset{?}{\square} 5$$

$$11 \not\square 13$$

c. The answer from part a includes 3 as a solution, while the answer from part b does not.

Rubric

a. 1 point for solutions; 1 point for reasonable work

b. 1 point for solutions; 1 point for reasonable work

c. 1 point

12. Jasmine is incorrect about 3 being a solution of the inequality $16 \geq 11x - 6$. The inequality is not true when substituting 3 for x :

$$16 \overset{?}{\square} 11(3) \overset{?}{\square} 6$$

$$16 \overset{?}{\square} 33 \overset{?}{\square} 6$$

$$16 \not\square 27$$

Jasmine is correct that 2 is a solution of the inequality $16 \geq 11x - 6$. The inequality is true when substituting 2 for x :

$$16 \overset{?}{\square} 11(2) \overset{?}{\square} 6$$

$$16 \overset{?}{\square} 22 \overset{?}{\square} 6$$

$$16 \square 16$$

Rubric

1 point for saying 3 is not a solution;

1 point for saying 2 is a solution; 2 points for explanation with work

6.EE.6 Answers

1. B
2. B
3. C
4. A
5. B, D
6. Possible answer: $3(q - 5)$; q is the number of quarters Marie has.

Rubric

1 point for expression; 1 point for defining variable

7. a. $\frac{1}{2}y \square 3$

b. The value of x is $6\frac{1}{2}$.

$$\begin{aligned} \frac{1}{2}(7) \square 3 \square \frac{7}{2} \square 3 \\ \square \frac{7}{2} \square \frac{6}{2} \\ \square \frac{13}{2} \square 6\frac{1}{2} \end{aligned}$$

Rubric

- a. 1 point
- b. 1 point for answer; 1 point for reasonable work

8. a. $d - 11$; d is the number of daisies planted.
- b. 7

Rubric

- a. 1 point for expression; 1 point for defining variable
- b. 1 point

9. a. Adult tickets: a
Student tickets: $3a$
Senior tickets: $a - 8$
- b. $a + 3a + (a - 8) = 5a - 8$
- c. No, Elena only sells 67 tickets.
 $5(15) - 8 = 75 - 8 = 67$

Rubric

- a. 1 point for each expression
- b. 0.5 point
- c. 1 point for answer; 0.5 point for work

10. a. Let s be the total number of shells.

First pile: $\frac{s}{2}$ shells

Second pile: $\frac{s}{2} \square 10$ shells

Third pile:

$$\begin{aligned} s \square \left(\frac{s}{2} \square \left(\frac{s}{2} \square 10 \right) \right) \square s \square \left(\frac{s}{2} \square \frac{s}{2} \square 10 \right) \\ \square s \square (s \square 10) \\ \square s \square s \square 10 \\ \square 10 \text{ shells} \end{aligned}$$

- b. The students collected 44 shells.

First way: Use the expressions from part a. If the first pile contains 22 shells, the second pile contains 10 fewer than the first pile, or $22 - 10 = 12$ shells. The third pile contains 10 shells. The total number of shells the students collected is the sum of 22, 12, and 10, or $22 + 12 + 10 = 44$ shells.

Second way: Use the information given about the first pile. The first pile contains half as many shells as the number the students collected. So, the total number of shells is double the amount in the first pile, $2 \square 22$, or 44 shells.

Rubric

- a. 1 point for each expression; 1 point for defining variable
- b. 1 point for total shells; 1 point for each method explanation

6.EE.7 Answers

1. B
2. D
3. C
4. A
5. $3 \square \times \square 9$
 $3 \square 3 \square \times \square 9 \square 3$
 $\quad \quad \quad \times \square 6$

Rubric

1 point for answer; 1 point for reasonable work

6. The equation $3\frac{1}{4} \square h \square 4\frac{1}{8}$ models the situation.

$$3\frac{1}{4} \square h \square 4\frac{1}{8}$$

$$\frac{13}{4} \square h \square \frac{33}{8}$$

$$\frac{13}{4} \square \frac{13}{4} \square h \square \frac{33}{8} \square \frac{13}{4}$$

$$h \square \frac{33}{8} \square \frac{26}{8}$$

$$h \square \frac{7}{8}$$

The flower grew $\frac{7}{8}$ inch during the week.

Rubric

1 point for equation; 1 point for solving the equation; 1 point for stating how much the flower grew

7. Define n to be the other number in the sum.

$$n \square 6 \square 23$$

$$n \square 6 \square 6 \square 23 \square 6$$

$$n \square 17$$

Rubric

1 point for answer; 1 point for equation; 1 point for reasonable work

8. a. $1.5r = 72$
- b. 48 miles per hour
 $1.5r \square 72$
 $\frac{1.5r}{1.5} \square \frac{72}{1.5}$
 $r \square 48$

Rubric

- a. 1 point
- b. 1 point for answer; 1 point for reasonable work

9. a. First, convert $\frac{1}{4}$ gallon to cups.

$$\frac{1}{4} \text{ gallon} \left(\frac{16 \text{ cups}}{1 \text{ gallon}} \right) \square \frac{1}{4} (16) \text{ cups} \square 4 \text{ cups}$$

Define m to be the number of batches of muffins Kirk made.

$$\frac{2}{3}m \square 4$$

$$\frac{3}{2} \cdot \frac{2}{3}m \square \frac{4}{1} \cdot \frac{3}{2}$$

$$m \square \frac{12}{2}$$

$$m \square 6$$

Kirk made 6 batches of muffins.

- b. Define p to be the price per batch of muffins.

$$6p \square 108$$

$$\frac{6p}{6} \square \frac{108}{6}$$

$$p \square 18$$

Kirk earned \$18.00 per batch.

Rubric

- a. 1 point for unit conversion; 1 point for equation; 1 point for answer; 1 point for showing work
- b. 1 point for equation; 1 point for answer; 1 point for showing work

10. Lauren added $\frac{4}{5}$ to both sides instead of subtracting $\frac{4}{5}$ from both sides.

$$\frac{4}{5} \square x \square \frac{13}{5}$$

$$\frac{4}{5} \square \frac{4}{5} \square x \square \frac{13}{5} \square \frac{4}{5}$$

$$x \square \frac{9}{5}$$

Rubric

2 points for explanation of mistake;
1 point for correct answer; 1 point for reasonable work

11. a. $7s = 315$
b. Adam saves \$45 each week.

$$7s \square 315$$

$$\frac{7s}{7} \square \frac{315}{7}$$

$$s \square 45$$

- c. Adam needs to save
\$450 - \$315 = \$135 more to buy the computer. Let w be the additional number of weeks Adam must save.

$$45w \square 135$$

$$\frac{45w}{45} \square \frac{135}{45}$$

$$w \square 3$$

Adam must save for 3 more weeks to buy the computer.

Rubric

- a. 1 point
b. 1 point for answer; 1 point for reasonable work
c. 1 point for answer; 1 point for equation; 1 point for reasonable work

6.EE.8 Answers

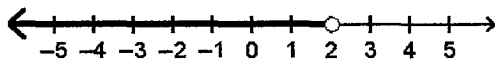
1. D
2. C
3. D
4. C
5. A, C, D
6. $c > 14.5$, where c is the total cost.

Rubric
2 points

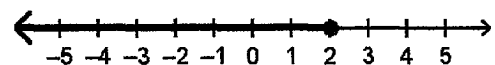
7. The values graphed on the number line are all numbers less than 11.
These values are the solutions of $x < 11$.
The inequality has infinitely many solutions.

Rubric
1 point for description; 1 point for inequality; 1 point for infinitely many

8.



represents the solutions of $x < 2$.



represents the solutions of $x \leq 2$.

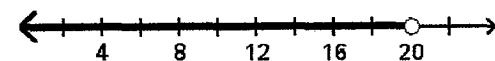
The solutions of both include all values less than 2. The solutions of $x < 2$ do not include 2, but 2 is a solution of $x \leq 2$.

Rubric
1 point for each graph; 1 point for similarity; 1 point for difference

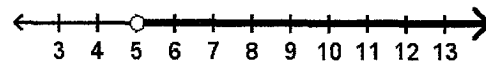
9. Keith wrote the correct inequality, but he did not graph the solutions correctly. Numbers less than 4 are to the left of 4 on the number line, not to the right.

Rubric
1 point for identifying mistake; 2 points for explanation

10. a. $n < 20$



- b. $m > 5$



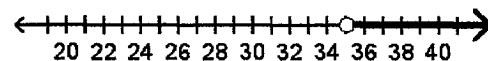
- c. The solutions of $n < 20$ are all numbers less than 20, and the solutions to $m > 5$ are all numbers greater than 5. The common solutions of the inequalities are all numbers between, but not equal to, 5 and 20.

Rubric

- a. 1 point for inequality; 1 point for graph
- b. 1 point for inequality; 1 point for graph
- c. 1 point for description; 1 point for common values

11. a. The inequality $d > 35$, where d is the number of miles Savannah commutes to work, represents the situation.

b.



- c. No, because 35 is not a solution of $d > 35$.

Rubric

- a. 1 point
- b. 1 point
- c. 1 point for answer; 1 point for explanation

12. a. $s \geq 31$

- b. Liam wants to save as much as or more than \$31.
- c. No, every solution does not represent a realistic amount. The amounts will get too large to be realistic amounts of money for Liam to save. Also, Liam cannot save anything smaller than a penny, so the graph will not be a solid line.

Rubric

- a. 1 point
- b. 1 point
- c. 1 point for answer; 2 points for explanation

6.EE.9 Answers

1. B
2. D
3. B
4. B, C, E
5. $c = 6b + 2.5$; the dependent variable is the total cost of the books c , and the independent variable is the number of books bought b . The total cost of the books increases by \$6.00 for each book bought.

Rubric

- 1 point for equation;
- 2 points for explanation

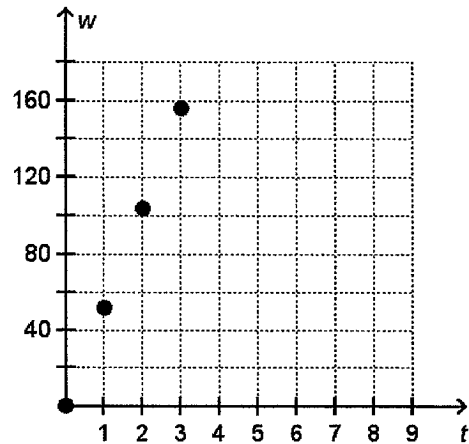
6. The cost increases by \$0.50 for every pencil bought; $c = 0.5p$.
(Also correct: The number of pencils bought increases by 2 for every \$1.00 spent; $p = 2c$.)

Rubric

- 1 point for relationship;
- 1 point for equation

7. a. The independent variable is t , and the dependent variable is w . The number of words typed increases by 52 over every minute spent typing.

b.

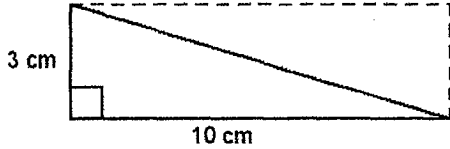


c. $w = 52t$

Rubric

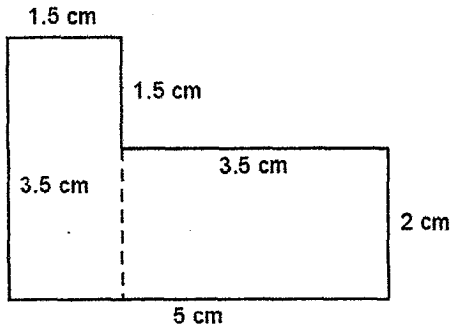
- 1 point for each variable
- 2 points
- 2 points

1. B
2. 12 mm^2
3. C
4. B
- 5.



The area of the rectangle is $(10)(3) = 30 \text{ cm}^2$.

6.



Area of left rectangle:

$$A = (1.5)(3.5) = 5.25 \text{ cm}^2$$

Area of right rectangle:

$$A = (5 - 1.5)(3.5 - 1.5) = (3.5)(2) = 7 \text{ cm}^2$$

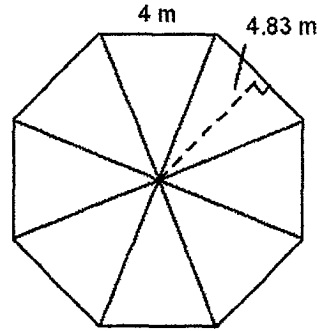
$$\text{Total area: } 5.25 \text{ cm}^2 + 7 \text{ cm}^2 = 12.25 \text{ cm}^2$$

Rubric

1 point for area;

2 points for reasonable work

7. a.



8 triangles are formed.

- b. The approximate area of one triangle is $\frac{1}{2}(4)(4.83) = 9.66 \text{ m}^2$. There are 8 triangles, so the approximate area of the octagon is $8(9.66) = 77.28 \text{ m}^2$.

Rubric

- a. 1 point for drawing; 1 point of triangles
- b. 1 point for answer; 1 point for work

8. Louis did not find the correct base of the rectangle, which is also the bottom base of the trapezoid. So, he incorrectly found the areas of the rectangle and trapezoid. The correct base of the rectangle is the combined length of the two squares and the shaded region:

$$2 \text{ in.} + 2 \text{ in.} + 4 \text{ in.} = 8 \text{ in.}$$

Area of rectangle:

$$A = (8)(1) = 8 \text{ in}^2$$

Area of trapezoid:

$$A = \frac{1}{2}(3)(8 + 4) = \frac{1}{2}(3)(12) = 18 \text{ in}^2$$

The correct area of the front of the birdhouse is $4 \text{ in}^2 + 4 \text{ in}^2 + 8 \text{ in}^2 + 18 \text{ in}^2 + 2 \text{ in}^2 = 36 \text{ in}^2$.

Rubric

- 2 points for identifying error; 1 point for correct areas of rectangle and trapezoid; 1 point for correct area

Lo. G. 2 Answers

1. D

2. C

3. C

$$4. \frac{2}{5} \text{ unit} \times \frac{1}{4} \text{ unit} \times \frac{3}{5} \text{ unit}$$

$$\frac{3}{5} \text{ unit} \times \frac{3}{10} \text{ unit} \times \frac{1}{3} \text{ unit}$$

$$\frac{4}{7} \text{ unit} \times 2\frac{5}{8} \text{ units} \times \frac{1}{25} \text{ unit}$$

5. $V = \ell wh$

$$= \left(\frac{2}{9}\right)\left(\frac{4}{9}\right)\left(\frac{7}{9}\right)$$

$$= \frac{56}{729} \text{ yd}^3$$

Rubric

1 point for answer; 1 point for work using the formula

6. Find the dimensions of the prism in terms of the number of cubes with side

length $\frac{1}{2}$ m.

$$6\frac{1}{2} \div \frac{1}{2} = \frac{13}{2} \cdot \frac{2}{1} = 13 \text{ cubes}$$

$$4 \div \frac{1}{2} = 4 \cdot \frac{2}{1} = 8 \text{ cubes}$$

$$1\frac{1}{2} \div \frac{1}{2} = \frac{3}{2} \cdot \frac{2}{1} = 3 \text{ cubes}$$

The prism is 13 cubes by 8 cubes by 3 cubes, so $13 \times 8 \times 3 = 312$ cubes fit into the prism.

Rubric

1 point for answer; 2 points for appropriate work

7. a. $V = \ell wh$

$$50 = 12\left(2\frac{1}{2}\right)h$$

$$50 = 12\left(\frac{5}{2}\right)h$$

$$50 = 30h$$

$$\frac{50}{30} = h$$

$$1\frac{2}{3} = h$$

The tank must be $1\frac{2}{3}$ ft high.

b. $V = \ell wh$

$$50 = 12w\left(3\frac{3}{4}\right)$$

$$50 = 12w\left(\frac{15}{4}\right)$$

$$50 = 45w$$

$$\frac{50}{45} = w$$

$$1\frac{1}{9} = w$$

The tank must be $1\frac{1}{9}$ ft wide.

Rubric

a. 1 point for answer; 1 point for reasonable work

b. 1 point for answer; 1 point for reasonable work

Co. G. 3 Answers

1. C
2. C
3. B
4. A, C, D
5. a. Yes
b. No
c. No
d. Yes

6. The perimeter is 24 cm. Because the hexagon is regular, all six sides are the same length. The length of the bottom side, with vertices $(-2, -2)$ and $(2, -2)$, is 4 cm. The perimeter is $6 \times 4 = 24$ cm.

Rubric

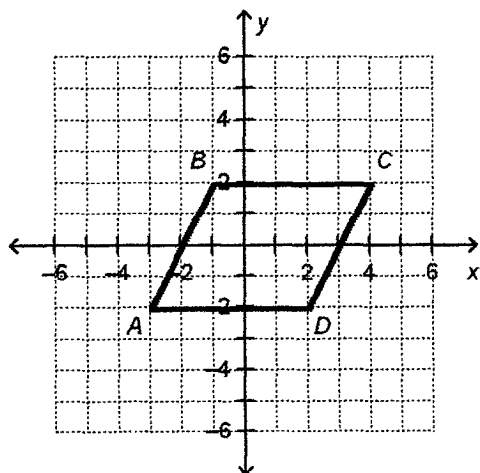
1 point for answer;
1 point for explanation

7. No. The curb lengths for all the spaces shown are 8 feet. For example, the distance between $(-8, 8)$ and $(0, 8)$ is 8 feet. This is less than the 9 feet required.

Rubric

1 point for answer;
1 point for explanation

8.

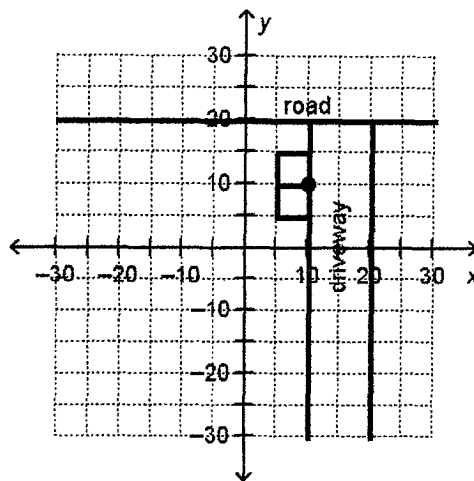


The shape is a parallelogram.

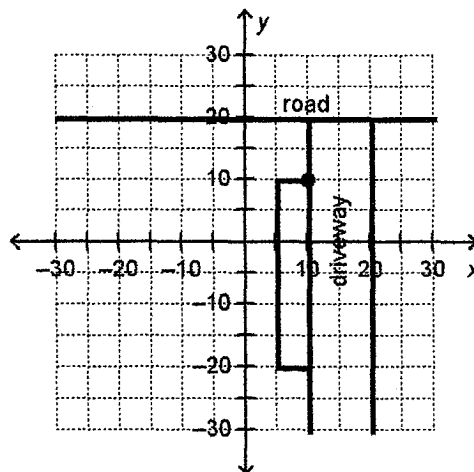
Rubric

1 point for the graph;
1 point for identifying the shape

9. a.

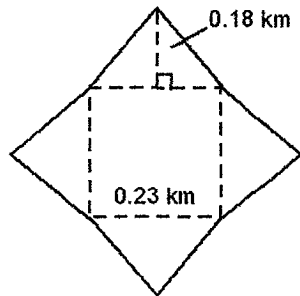


b. No; $(10, 10)$ could still be the upper-right corner of the flower bed, but $(10, 10)$ could not be the lower-right corner because the flower bed would extend into the road.



6. G. 4 Answers

1. C
2. C
3. D
4. 25 m^2 , 40 m^2
5. Possible net:



The area A of a triangle is $A = \frac{1}{2}bh$. The base b of each triangle is 0.23 km , and the height h of each triangle is 0.18 km . So, the area of each triangle is 0.0207 km^2 . So, the area of all four triangles is $4(0.0207) = 0.0828 \text{ km}^2$.

$$\begin{aligned} A &= \frac{1}{2} \times 0.23 \times 0.18 \\ &= 0.115 \times 0.18 \\ &= 0.0207 \end{aligned}$$

The area A of a square is $A = s^2$. The side length s of the square is 0.23 km . So, the area of the square is 0.0529 km^2 .

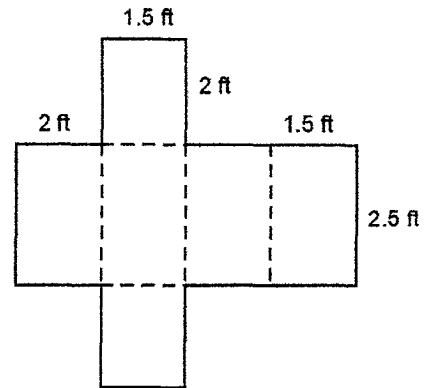
$$\begin{aligned} A &= 0.23^2 \\ &= 0.0529 \end{aligned}$$

So, the approximate surface area of the pyramid is the sum of the areas of each shape in the net, or $0.0828 \text{ km}^2 + 0.0529 \text{ km}^2 = 0.1357 \text{ km}^2$.

Rubric

1 point for net; 1 point for surface area;
1 point for reasonable work

6. a. Possible net:



b. The area A of a rectangle is $A = bh$, where b is the base of the rectangle and h is the height. The area of each rectangle with side lengths 1.5 ft and 2 ft is $1.5 \times 2 = 3 \text{ ft}^2$. Since there are two rectangles with these dimensions, the combined area is $2 \times 3 = 6 \text{ ft}^2$.

The area of each rectangle with side lengths 1.5 ft and 2.5 ft is $1.5 \times 2.5 = 3.75 \text{ ft}^2$. The area of each rectangle with side lengths 2 ft and 2.5 ft is $2 \times 2.5 = 5 \text{ ft}^2$. Since there are two rectangles of each type, the combined area is $2 \times 3.75 + 2 \times 5 = 17.5 \text{ ft}^2$.

So, the total surface area of the box is $6 \text{ ft}^2 + 17.5 \text{ ft}^2 = 23.5 \text{ ft}^2$.

c. The employee needs to wrap 8 boxes, each with a surface area of 23.5 ft^2 . So, the combined surface area needing to be wrapped is $8 \times 23.5 = 188 \text{ ft}^2$. Since there is only 160 square feet of wrapping paper left, the employee will not be able to wrap all of the gifts.

Rubric

- a. 1 point
- b. 1 point for surface area;
1 point for reasonable work
- c. 1 point for answer;
1 point for explanation

6.SP.1 Answers

1. B
2. C
3. C
4. A
5. C, E, F
6. This is a statistical question because the number of animals in the zoo each month can vary.

Rubric

1 point for answer; 1 point for explanation

7. a. Question 1 results in a single value: the number of hours Brian spent exercising last week. Question 2 results in a set of data: the number of hours Brian spends on each different type of exercise each week.
- b. Question 2 is a statistical question because it results in a data set that varies.
- c. Possible answer: How long does Brian spend exercising each day for 30 days?

Rubric

- a. 1 point
 - b. 1 point for answer;
1 point for explanation
 - c. 1 point for reasonable statistical question
8. a. Questions 1 and 3 are statistical questions because the refrigerators probably have different prices and sizes, so there is variation in the data. Question 2 is not statistical because it results in one value that does not vary.
 - b. Possible answer:
How much power does each refrigerator use?

- c. No; since all 10 refrigerators are the same model, all of their measurements will be exactly the same. This is not a question about a data set that varies.

Rubric

- a. 1 point for answer;
1 point for explanation
- b. 1 point for reasonable question
- c. 1 point for answer;
1 point for explanation

6.SP.2 Answers

1. B
2. C
3. B
4. A
5. B, D, E
6. a. To find the median of the data set, first put the data values in order from least to greatest.

\$36, \$41, \$57, \$70, \$75, \$80, \$86, \$89, \$123, \$148

There are two middle values of the ordered data set, so the median is the average of the two values.

$$\frac{75 + 80}{2} = 77.5$$

So, the median value is \$77.50.

- b. The upper quartile is \$89 and the lower quartile is \$57. So, the interquartile range is $89 - 57 = \$32$.

Rubric

- a. 1 point for answer; 1 point for reasonable work
 - b. 1 point for answer; 1 point for reasonable work
7. a. 54 inches
 - b. The majority of James's classmates are shorter than the average height; 8 are shorter and 6 are taller.

Rubric

- a. 1 point
- b. 1 point for answer; 1 point for explanation

8. a. First, order the values in the data set from least to greatest.

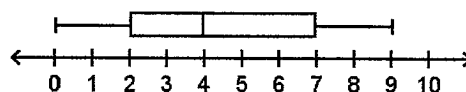
0, 1, 2, 2, 3, 4, 4, 5, 7, 7, 8, 9

The least value is 0 and the greatest value is 9.

The median is $\frac{4 + 4}{2} = 4$.

The lower quartile is $\frac{2 + 2}{2} = 2$ and the

upper quartile is $\frac{7 + 7}{2} = 7$.



- b. The distribution is roughly symmetric.
- c. The median number of runs Jackie's team scored was 4. So, Jackie's rivals had a higher median number of runs, 5.

Rubric

- a. 2 points for graph; 1 point for appropriate work
- b. 1 point
- c. 1 point

9. To find the mean absolute deviation, first find the mean of the data set. Round to the nearest whole number.

$$\frac{8+7+6.5+8+9+10+7.5+9.5+8+9.5+10+7+8+7}{14} = 8$$

The mean of the data set is about 8 hours. Use this to find the mean absolute deviation.

$$\frac{0+1+1.5+0+1+2+0.5+1.5+0+1.5+2+1+0+1}{14} = 1$$

The mean absolute deviation is the mean distance from each data value to the mean of the data set. So, the number of hours Linda sleeps each night is an average of 1 hour from the average number of hours she sleeps.

Rubric

1 point for mean; 1 point for mean absolute deviation; 1 point for explanation of distribution

10. a. The residents of Suzanne's street use an average of 88.75 gallons of water per day.

$$\frac{100+92+83+75+95+112+80+73}{8} = \frac{710}{8} = 88.75$$

The residents of Jason's street use an average of 85.9 gallons of water per day.

$$\frac{81+62+98+74+82+100+121+93+76+72}{10} = \frac{859}{10} = 85.9$$

So, the residents of Suzanne's street use more gallons of water per day on average.

- b. First, put the data sets in order.

Suzanne's street: 73, 75, 80, 83, 92, 95, 100, 112

Jason's street: 62, 72, 74, 76, 81, 82, 93, 98, 100, 121

For Suzanne's data set, the lower

quartile is $\frac{75+80}{2} = 77.5$ gallons per

day and the upper quartile is

$\frac{95+100}{2} = 97.5$ gallons per day. So,

the interquartile range is

$97.5 - 77.5 = 20$ gallons per day.

For Jason's data set, the lower quartile

is 74 gallons per day and the upper quartile is

98 gallons per day. So, the

interquartile range is $98 - 74 = 24$ gallons per day.

The interquartile range for Jason's

data set is greater than the

interquartile range for Suzanne's data

set. So, the middle half of the water

usage values in Jason's data set is

more spread out than in Suzanne's data set.

Rubric

- a. 1 point for answer; 1 point for mean of Suzanne's data; 1 point for mean of Jason's data
 b. 1 point for interquartile range for Suzanne's data; 1 point for interquartile range for Jason's data; 1 point for comparing spread

6.SP.3 Answers

1. A
2. C
3. A
4. D, E, F
5. A
6. E
7. D
8. C
9. B
10. F
11. a.

$$\frac{93+99+89+76+68+97+71}{7} = \frac{593}{7} \approx 84.7$$

The mean temperature is about 84.7 °F.

$$\frac{8.3+14.3+4.3+8.7+16.7+12.3+13.7}{7} = \frac{78.3}{7} \approx 11.2$$

The mean absolute deviation is about 11.2 °F.

- b. The mean is the average temperature of all the temperatures in the data set. The mean absolute deviation is the mean distance between all of the temperatures in the data set and the average temperature. The mean is a measure of center, and the mean absolute deviation is a measure of spread.

Rubric

- a. 1 point for mean; 1 point for mean absolute deviation
 - b. 2 points
12. The mean absolute deviation measures the average variation between the number of hours Marissa jogs and her mean jogging time.
To find the mean absolute deviation, first find the mean.

$$\frac{4+4+1+6+5+4+6+3+3}{9} = \frac{36}{9} = 4$$

The mean is 4 hours.

$$\frac{0+0+3+2+1+0+2+1+1}{9} = \frac{10}{9} \approx 1$$

The mean absolute deviation is about 1 hour.

So, the average number of hours that Marissa's jogging times vary from her average jogging time is about 1 hour.

Rubric

1 point for answer; 1 point for using mean absolute deviation; 1 point for work

13. a. 1.5 cars
 b. The median is a measure of center.

Rubric

1 point for each part

14. a. First, order the data values from least to greatest.

6, 7, 8, 8, 9, 10, 10, 12, 13, 15

The median number of points per

game per player is $\frac{9+10}{2} = 9.5$.

- b. The upper quartile is 12 points and the lower quartile is 8 points. So, the interquartile range is $12 - 8 = 4$ points.

- c. The interquartile range for Sara's team is 4 points, which is more than the interquartile range of the other team. This means that the scores of Sara's team tend to vary more.

Rubric

- a. 1 point
 b. 1 point
 c. 1 point for noting that Sara's team has more variation in scores; 1 point for explanation

15. a.

$$\frac{4+5+5+6+6+6+8+11+12+12+13+15}{12} = \frac{103}{12} \approx 9$$

The mean is about 9 customers per hour.

- b. The median is $\frac{6+8}{2} = 7$ customers per hour.

- c. The mode is the value(s) that appears most often in the data set. Using a dot plot, the mode corresponds to the value with the tallest stack of dots. So, the mode of this data set is 6 customers per hour.

Rubric

- a. 1 point
 b. 1 point
 c. 1 point for explanation; 1 point for mode

16. No, neither claim is correct.

The mode is the value that appears most often in the data set. Two values, 6 and 9, both appear 3 times. Landon was correct in finding 6 as a mode, but 9 is also a mode of the data set.

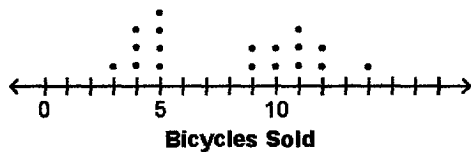
The range is the difference between the least and the greatest values in the data set. Landon asked for numbers between 1 and 10, but no one chose the number 1, so the least value in the data set is 2, not 1. So, the range is $10 - 2 = 8$.

Rubric

1 point for saying he is incorrect; 1 point for correct mode; 1 point for correct range; 2 points for work

6.SP.4 Answers

1. B, E, F, G, H
2. a. 3 dots
b. 0 dots
c. 2 dots
d. 1 dot
3. D
4. A
5. B
- 6.



The value with the highest number of dots above it in the dot plot is 5. So, 5 bicycles per month was the most frequent number of bicycles sold.

Rubric

2 points for graph;
1 point for most frequent

7. a. The median is the middle value in the data set.

First, order the values from least to greatest.

16, 17, 18, 18, 18, 19, 19, 20, 22, 22, 22, 24

Since there are two middle values, the median is the average of the 2:

$$\frac{19+19}{2} = 19 \text{ people.}$$

- b. The upper quartile is the median of the upper half of the data. The upper half of the data is 19, 20, 22, 22, 22, 24.

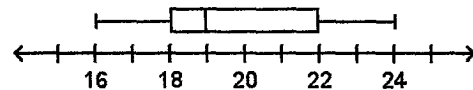
The median of this half is

$$\frac{22+22}{2} = 22 \text{ people.}$$

The lower quartile is the median of the lower half of the data. The lower half of the data is 16, 17, 18, 18, 18, 19. The median of this half is

$$\frac{18+18}{2} = 18 \text{ people.}$$

- c.

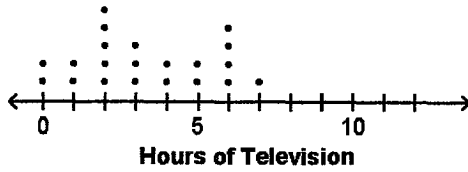


- d. The interquartile range is
 $22 - 18 = 4$ people.

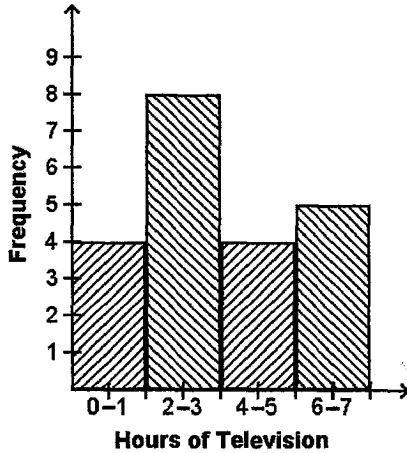
Rubric

- a. 1 point
- b. 1 point
- c. 2 points
- d. 1 point for interquartile range

8. a.



b.



c. Possible answer:

The dot plot displays the frequency of every value in the data set and the histogram groups the values into four equally sized intervals and displays the frequency of each interval. The dot plot shows there are peaks at 2 hours and 6 hours while the histogram shows there is a peak for the 2 to 3 hours interval.

Rubric

- a. 2 points
- b. 2 points
- c. 1 point for comparison; 1 point for explanation

6.SP.5a, 6.SP.5b Answers

1. C
2. B
3. D
4. A, D, E
5. a. Yes; 25
- b. Yes; 27
- c. No; a box plot shows the least and greatest values and the three quartiles. It does not show the number of observations in the data set.

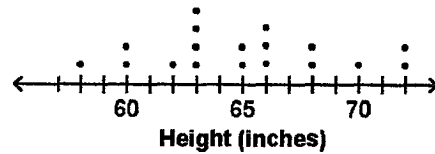
Rubric

- a. 1 point for answer;
0.5 point for number of observations
 - b. 1 point for answer;
0.5 point for number of observations
 - c. 1 point for answer;
1 point for explanation
6. Each dot represents an apartment with a certain amount of living space. The values are measured in square feet.

Rubric

1 point for each

7. a.



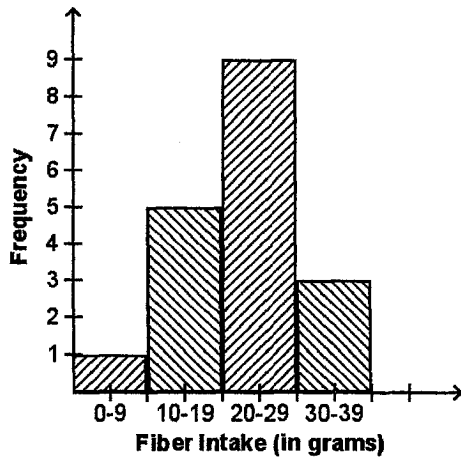
- b. Each dot represents the height, in inches, of one of Gabrielle's coworkers.
- c. The tallest coworker is 72 inches tall and the shortest coworker is 58 inches tall.
- d. Yes;
Possible answer: Gabrielle can collect the heights of her coworkers in centimeters.

Rubric

- a. 2 points
- b. 1 point
- c. 1 point
- d. 1 point

6.SP.5c Answers

1. C, E, G
2. C
3. C
4. A
5. D
6. E
7. E
8. G
9. A
10. B
- 11.



The overall distribution is symmetric.

Rubric

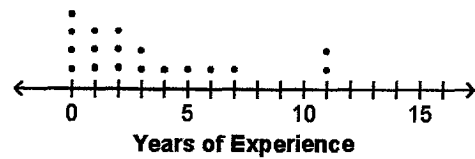
- 2 points for graph;
- 1 point for pattern of distribution

12. a. 6 and 9
- b. 6.4; the median rating is 6, so the average rating is above the median.

Rubric

- a. 1 point
- b. 1 point for each

13. a. The range is $11 - 0 = 11$ years.
- b.



- c. The overall pattern of the distribution is skewed right. There is a deviation from the pattern at 11 years, which has a frequency of 2 applicants.

Rubric

- a. 1 point
- b. 2 points
- c. 1 point

6.SP.5d Answers

1. B
2. C
3. B
4. D
5. B
6. B, E
7. a. First, find the mean of the data set.

$$\frac{4.5 + 5.5 + 4 + 3 + 2.5 + 4.5 + 2.5 + 1.5 + 2 + 4 + 4 + 3 + 4.5 + 4.5}{13}$$

So, the mean book price is \$3.50.
Then, find the mean absolute deviation of the data set.

$$\frac{1 + 2 + 0.5 + 0.5 + 1 + 1 + 1 + 2 + 1.5 + 0.5 + 0.5 + 0.5 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1}{13}$$

So, the mean absolute deviation of the book prices is \$1.00.

- b. First, order the data values from least to greatest.
\$1.50, \$2.00, \$2.50, \$2.50, \$3.00, \$3.00, \$4.00, \$4.00, \$4.00, \$4.50, \$4.50, \$4.50, \$5.50
The upper quartile is $\frac{4.5 + 4.5}{2} = 4.5$
and the lower quartile is $\frac{2.5 + 2.5}{2} = 2.5$. So, the interquartile range is $4.5 - 2.5 = \$2.00$.
- c. Look at the numbers of book prices within 1 mean absolute deviation of the mean. There are more prices between \$3.50 and \$4.50 than between \$2.50 and \$3.50. So, the overall shape of the distribution of the book prices is skewed left. Since the data is not symmetric, the interquartile range best describes the variability of the book prices.

Rubric

- a. 1 point
- b. 1 point
- c. 1 point for answer; 1 point for explanation
8. a. The mean of the data set is 11,000 cars.

$$\frac{9 + 10 + 11 + 12 + 11 + 13 + 12 + 13 + 8 + 14 + 11 + 9 + 10 + \dots}{14}$$

- b. To find the median of the data set, first order the data values from least to greatest.

8, 9, 9, 10, 10, 11, 11, 11, 11, 12, 12, 13, 13, 14

So, the median is 11,000 cars.

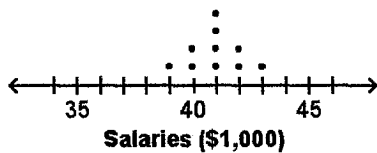
- c. The overall shape of the distribution of the data set is symmetric. So, the mean and the median are equally good descriptions of the typical number of cars passing through the intersection.

Rubric

- a. 1 point
 - b. 1 point
 - c. 1 point for answer; 1 point for explanation
9. The overall shape of the distribution is skewed right, so median and interquartile range best describe the data set.

Rubric

- 0.5 point for each measure; 1 point for explanation
10. a.



- b. Since the overall shape of the distribution of the data set is symmetric, the mean and the median are equally good descriptions of the salaries of the workers at the company.
- c. Using the mean and the mean absolute deviation:

$$\frac{41 + 39 + 42 + 41 + 40 + 41 + 42 + 43 + 40 + 41}{10} = \frac{410}{10} = 41$$

The mean of the data set is \$41,000. This describes the typical salary of the workers.

$$\frac{0 + 2 + 1 + 0 + 1 + 0 + 1 + 2 + 1 + 0}{10} = \frac{8}{10} = 0.8$$

The mean absolute deviation of the data set is about \$800. This describes the variability of the salaries of the workers.

Using the median and the interquartile range:

Order the data.

39, 40, 40, 41, 41, 41, 41, 42, 42, 43

The median of the data set is

$$\frac{41 + 41}{2} = 41, \text{ so the typical salary of}$$

the workers is \$41,000.

The upper quartile is 42 and the lower quartile is 40, so the interquartile range is

$42 - 40 = 2$, or \$2,000. This describes the variability of the salaries of the workers.

Rubric

- a. 1 point
- b. 1 point for each
- c. 1 point for each value; 1 point for each interpretation