1. Simplify the expression below using order of operations.

$$2 + (4 \times 5) \div 5$$

$\boxed{6}$

2. Simplify the expression below using order of operations.

$$9 + 4 \times 2 + 2$$

$\boxed{19}$

3. Simplify the expression below using order of operations.

$$(8 + 2) \times 1 - 8$$

$\boxed{2}$

4. Simplify the expression below using order of operations.

$$1 \times 7 + 6 - 5$$

$\boxed{8}$

5. Simplify the expression below using order of operations.

$$7 + 10 \div (4 - 2)$$

$\boxed{12}$

6. Simplify the expression below using order of operations.

$$8 \times (10 + 2) - 6^2$$

$\boxed{60}$

7. Simplify the expression below using order of operations.

$$5^2 + 5^1 \times 8 \div 10$$

$\boxed{29}$

8. Simplify the expression below using order of operations.

$$5 + \frac{\left(1^3 - 1^2\right)}{4}$$

$\boxed{5}$

9. Simplify the expression below using order of operations.

$$\frac{\left(4 + 2^3\right)}{4} + 1$$

$\boxed{4}$

10. Simplify the expression below using order of operations.

$$9 + \frac{(2 - 2)}{2^2}$$

$\boxed{9}$

11. Simplify: $\frac{20}{56}$

$\boxed{\frac{5}{14}}$

12. Simplify: $\frac{21}{33}$

$\boxed{\frac{7}{11}}$

13. Simplify: $\frac{24}{27}$

$\boxed{\frac{8}{9}}$

14. Simplify: $\frac{15}{36}$

$\boxed{\frac{5}{12}}$

15. Simplify: $\frac{40}{110}$

$\boxed{\frac{4}{11}}$

16. Perform the operation and reduce the answer fully. Make sure to express your answer as a simplified fraction.

$$\frac{2}{3} \div \frac{5}{4}$$

$$\boxed{\frac{8}{15}}$$

17. Perform the operation and reduce the answer fully. Make sure to express your answer as a simplified fraction.

$$\frac{1}{9} \div \frac{1}{3}$$

$$\boxed{\frac{1}{3}}$$

18. Perform the operation and reduce the answer fully. Make sure to express your answer as a simplified fraction.

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

$$\boxed{\frac{1}{6}}$$

19. Perform the operation and reduce the answer fully. Make sure to express your answer as a simplified fraction.

$$\frac{7}{8} \times \frac{1}{5}$$

$$\boxed{\frac{7}{40}}$$

20. Perform the operation and reduce the answer fully. Make sure to express your answer as a simplified fraction.

$$\frac{1}{2} \div \frac{5}{6}$$

$$\boxed{\frac{3}{5}}$$

21. In a medical lab, different testing machinery needs to be cleaned on different schedules. A machine that checks for antibodies needs to be cleaned every 5 tests. A machine that checks for white blood cells needs to be cleaned every 40 tests. Assume every sample needs to be tested for both antibodies and white blood cells. What is the least number of tests before both machines have to be cleaned?

There will be at least $\underline{40}$ tests before both machines need to be cleaned.

22. Josiah is throwing a party. He has 9 pencils and 3 stickers that he will use to create gift bags for party guests. Assume that Josiah wants to make as many gift bags as possible, sharing pencils and stickers equally among his friends. How many gift bags would there be?

There will be $\underline{3}$ gift bags.

23. Kylie wants to take a train to Raleigh. There are two trains that go in that direction. There's a local train, which makes stops along the way and there's an express train, which doesn't make stops along the way. Kylie got to the station just as two trains pulled away, one express and one local. If a local train runs every 2 hours and an express train runs every 4 hours, how much longer will it be until the next time two trains leave at the same time?

It will be 4 hours until the next time two trains leave at the same time.

24. At a recent student council meeting, there were 9 sixth graders and 18 seventh graders. They wanted to form as many committees as possible where each committee has the same number of sixth graders and seventh graders. What was the largest number of committees they could form?

There will be 9 committees.

25. As a special promotion, a baseball team gives a certain number of baseball cards to every person entering the stadium. Over a five-minute period, 18 baseball cards are given out in total. Over the next five minutes, 6 baseball cards are given out in total. Assume each person receives the same number of cards. What is the greatest possible number of cards each person received?

The greatest possible number each person received is 6 cards.

26. A bakery sells vanilla cupcakes and chocolate cupcakes. One day it sold 169 vanilla and 91 chocolate. What percent of the cupcakes sold that day were vanilla?

65

27. Kaj's family took a road trip to Mount Rushmore. Kaj fell asleep 23% of the way through the trip. If the total length of the trip was 700 miles, how many miles had they travelled when Kaj fell asleep?

161

28. Mariana has a toy car collection. She keeps some in a display case and the rest on the wall. 90 of her toy cars are on the wall, and 55% of her toy cars are in the display case. What is the total number of toy cars in Mariana's collection?

200

29. Caroline answered 134 questions correctly on her multiple choice history final that had a total of 200 problems. What percentage of questions did Caroline answer correctly?

67

30. A bakery sells chocolate cupcakes and mocha cupcakes. One day it sold 120 chocolate and 380 mocha. What percent of the cupcakes sold that day were chocolate?

24

31. Choose **all** the ratios below that are equivalent to $12 : 28$.

- [x] **3:7**
- [x] **24:56**
- [x] **36:84**
- [ ] **56:24**
- [ ] **14:6**

32. Choose **all** the ratios below that are equivalent to $1 : 2$.

- [x] **4:8**
- [x] **3:6**
- [x] **2:4**
- [ ] **4:2**
- [ ] **2:1**

33. Choose **all** the ratios below that are equivalent to $6:42$.

- ☐ **7:1**
- ☐ **5:41**
- ☑ **1:7**
- ☑ **12:84**
- ☐ **84:12**

34. Choose **all** the ratios below that are equivalent to $20:16$.

- ☑ **5:4**
- ☑ **40:32**
- ☑ **80:64**
- ☑ **10:8**
- ☐ **19:15**

35. Choose **all** the ratios below that are equivalent to $3:1$.

- ☐ **4:2**
- ☑ **18:6**
- ☐ **2:6**
- ☑ **12:4**
- ☐ **4:12**

36. A certain recipe for trail mix calls for $7\frac{2}{3}$ cups of peanuts and $2\frac{3}{4}$ cups of raisins and makes 22 servings. Henry wants to make enough for 11 servings. How many cups of peanuts does he need? State your answer as a fraction or mixed number in simplest form.

$$\boxed{3\frac{5}{6} \text{ cups}}$$

37. A certain recipe for fruit salad calls for $7\frac{1}{2}$ cups of chopped kiwis and $4\frac{1}{3}$ cups of chopped oranges and makes 15 servings. Nora wants to make enough for 5 servings. How many cups of chopped oranges does she need? State your answer as a fraction or mixed number in simplest form.

$$\boxed{1\frac{4}{9} \text{ cups}}$$

38. A certain spice mix calls for $3\frac{3}{4}$ teaspoons of garlic powder and $7\frac{3}{4}$ teaspoons of ground pepper and makes 30 servings. Khadija wants to make enough for 10 servings. How many teaspoons of garlic powder does she need? State your answer as a fraction or mixed number in simplest form.

$1\frac{1}{4}$ teaspoons

39. A certain recipe for fruit salad calls for $6\frac{3}{4}$ cups of chopped apples and $7\frac{1}{2}$ cups of chopped bananas and makes 36 servings. Gabriella wants to make enough for 12 servings. How many cups of chopped bananas does she need? State your answer as a fraction or mixed number in simplest form.

$2\frac{1}{2}$ cups

40. A certain recipe for frosting calls for $3\frac{1}{2}$ teaspoons of orange food dye and $5\frac{1}{2}$ teaspoons of yellow food dye and makes 9 servings. Jack wants to make enough for 3 servings. How many teaspoons of orange food dye does he need? State your answer as a fraction or mixed number in simplest form.

$1\frac{1}{6}$ teaspoons

41. A certain recipe for snack mix calls for 1 cup of pretzels, 5 cups of cheese puffs, and 6 cups of crunchy cereal. Write a three-part ratio representing the mix. Then write a part-to-whole ratio of crunchy cereal to the total snack mix. Finally, write a fraction in simplest form to express the proportion of crunchy cereal to the whole.

crunchy cereal : pretzels : cheese puffs =

$6:1:5$

crunchy cereal : snack mix = $6:12$

Proportion of crunchy cereal (out of whole) = $\frac{1}{2}$

42. A certain mix of paint calls for 5 gallons of red paint, 2 gallons of yellow paint, and 7 gallons of white paint. Write a three-part ratio representing the mix. Then write a part-to-whole ratio of yellow paint to the total mixed paint. Finally, write a fraction in simplest form to express the proportion of yellow paint to the whole.

yellow paint : white paint : red paint =

$2:7:5$

yellow paint : mixed paint = $2:14$

Proportion of yellow paint (out of whole) = $\frac{1}{7}$

43. A certain recipe for fruit salad calls for 2 cups of apples, 5 cups of kiwis, and 3 cups of cantaloupes. Write a three-part ratio representing the mix. Then write a part-to-whole ratio of cantaloupes to the total fruit salad. Finally, write a fraction in simplest form to express the proportion of cantaloupes to the whole.

cantaloupes : apples : kiwis =

$3:2:5$

cantaloupes : fruit salad = $3:10$

Proportion of cantaloupes (out of whole) = $\frac{3}{10}$

44. A certain recipe for trail mix calls for 2 cups of almonds, 3 cups of chocolate chips, and 1 cup of coconut. Write a three-part ratio representing the mix. Then write a part-to-whole ratio of almonds to the total trail mix. Finally, write a fraction in simplest form to express the proportion of almonds to the whole.

almonds : chocolate chips : coconut =

$2:3:1$

almonds : trail mix = $2:6$

Proportion of almonds (out of whole) = $\frac{1}{3}$

45. A certain recipe for trail mix calls for 8 cups of almonds, 3 cups of chocolate chips, and 1 cup of coconut. Write a three-part ratio representing the mix. Then write a part-to-whole ratio of chocolate chips to the total trail mix. Finally, write a fraction in simplest form to express the proportion of chocolate chips to the whole.

chocolate chips : coconut : almonds =

$3:1:8$

chocolate chips : trail mix = $3:12$

Proportion of chocolate chips (out of whole) = $\frac{1}{4}$

46. Find the value of x in the equation below.

$$10 = x - 17$$

$$\boxed{x = 27}$$

47. Find the value of x in the equation below.

$$13 + x = 19$$

$$\boxed{x = 6}$$

48. Find the value of x in the equation below.

$$\frac{x}{7} = 5$$

$$\boxed{x = 35}$$

49. Find the value of x in the equation below.

$$7x = 14$$

$$\boxed{x = 2}$$

50. Find the value of x in the equation below.

$$17 = x + 16$$

$$\boxed{x = 1}$$

51. Find the value of x in the equation below.

$$\frac{x}{4} = 7.5$$

$$\boxed{x = 30}$$

52. Find the value of x in the equation below.

$$5.2 = x - 6$$

$$\boxed{x = 11.2}$$

53. Find the value of x in the equation below.

$$14.4 = 2x$$

$$\boxed{x = 7.2}$$

54. Find the value of x in the equation below.

$$19.8 = 1.4 + x$$

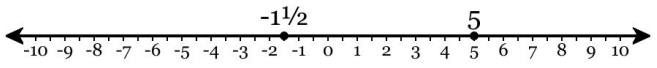
$$\boxed{x = 18.4}$$

55. Find the value of x in the equation below.

$$8.8 = 8x$$

$$\boxed{x = 1.1}$$

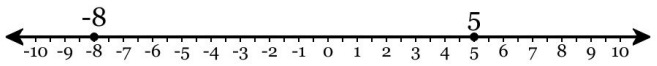
56. Plot 5 and -1½ on the number line below.



5 > -1½

5 is greater than -1½ because it is further to the right on the number line.

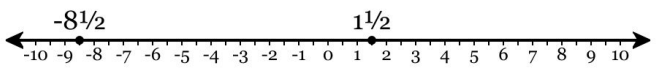
57. Plot 5 and -8 on the number line below.



5 > -8

5 is greater than -8 because it is further to the right on the number line.

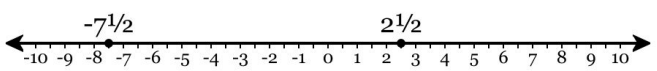
58. Plot -8½ and 1½ on the number line below.



-8½ < 1½

-8½ is less than 1½ because it is further to the left on the number line.

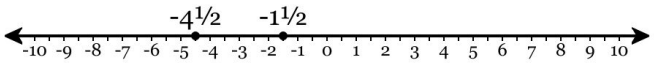
59. Plot -7½ and 2½ on the number line below.



-7½ < 2½

-7½ is less than 2½ because it is further to the left on the number line.

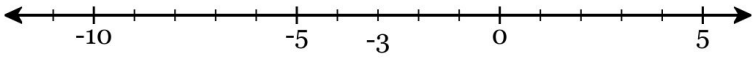
60. Plot -4½ and -1½ on the number line below.



$-4\frac{1}{2} < -1\frac{1}{2}$

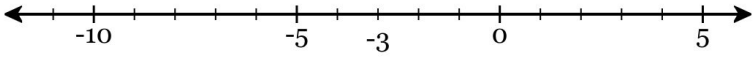
-4½ is less than -1½ because it is further to the left on the number line.

61. Select the values that make the inequality $w < -3$ true. (Numbers written in order from least to greatest going across.)



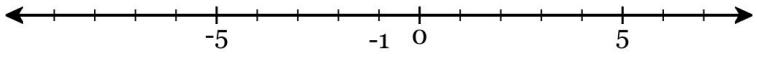
☑ **-11**	☑ **-8**	☑ **-6**
☑ **-4**	☑ **-3.1**	☑ **-3.01**
☑ **-3.001**	☐ -3	☐ -2.999
☐ -2.99	☐ -2.9	☐ -2
☐ 0	☐ 2	☐ 5

62. Select the values that make the inequality $b > -3$ true. (Numbers written in order from least to greatest going across.)



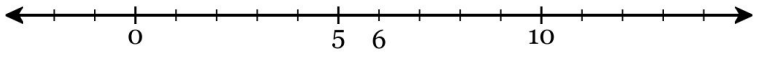
☐ -11	☐ -8	☐ -6
☐ -4	☐ -3.1	☐ -3.01
☐ -3.001	☐ -3	☑ **-2.999**
☑ **-2.99**	☑ **-2.9**	☑ **-2**
☑ **0**	☑ **2**	☑ **5**

63. Select the values that make the inequality $a \geq -1$ true. (Numbers written in order from least to greatest going across.)



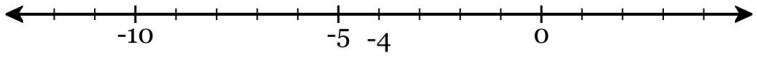
☐ -9	☐ -6	☐ -4
☐ -2	☐ -1.1	☐ -1.01
☐ -1.001	☑ **-1**	☑ **-0.999**
☑ **-0.99**	☑ **-0.9**	☑ **0**
☑ **2**	☑ **4**	☑ **7**

64. Select the values that make the inequality $n \leq 6$ true. (Numbers written in order from least to greatest going across.)



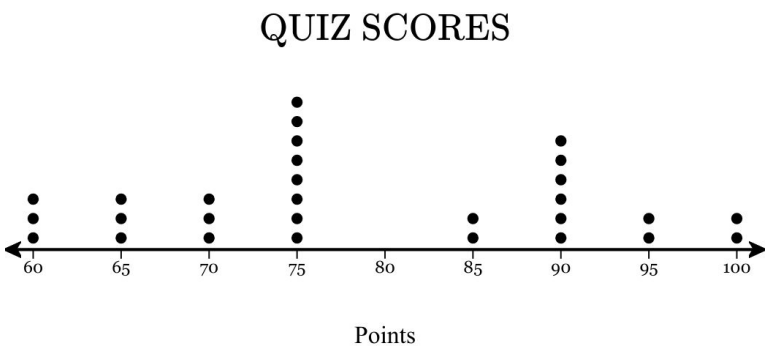
☑ **-2**	☑ **1**	☑ **3**
☑ **5**	☑ **5.9**	☑ **5.99**
☑ **5.999**	☑ **6**	☐ 6.001
☐ 6.01	☐ 6.1	☐ 7
☐ 9	☐ 11	☐ 14

65. Select the values that make the inequality $d > -4$ true. (Numbers written in order from least to greatest going across.)



☐ -12	☐ -9	☐ -7
☐ -5	☐ -4.1	☐ -4.01
☐ -4.001	☐ -4	☑ **-3.999**
☑ **-3.99**	☑ **-3.9**	☑ **-3**
☑ **-1**	☑ **1**	☑ **4**

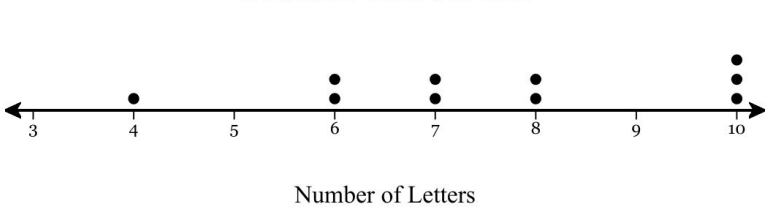
66. A teacher put all her students' quiz scores up on the dot plot below.



How many students scored less than 75?

9 students

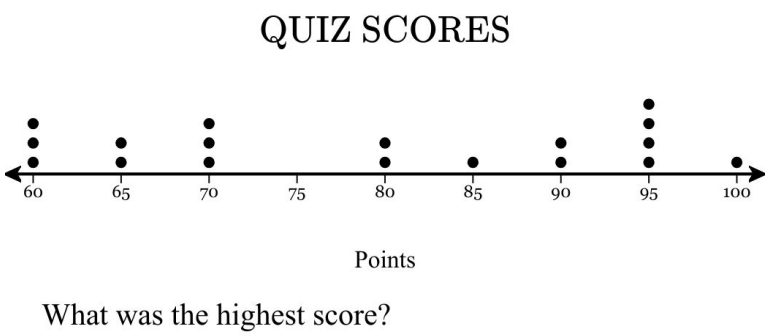
67. The graph below represents the result of a survey in which a number of students reported how many letters were in their last names.



What was the range of name lengths?

6 letters

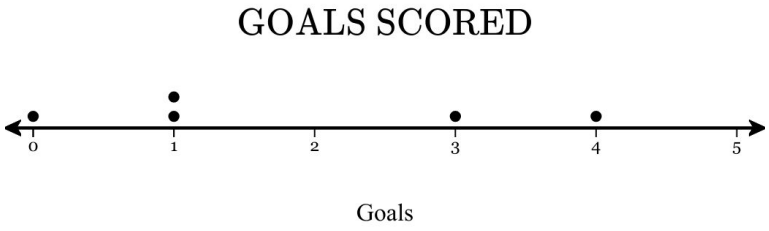
68. A teacher put all her students' quiz scores up on the dot plot below.



What was the highest score?

100 points

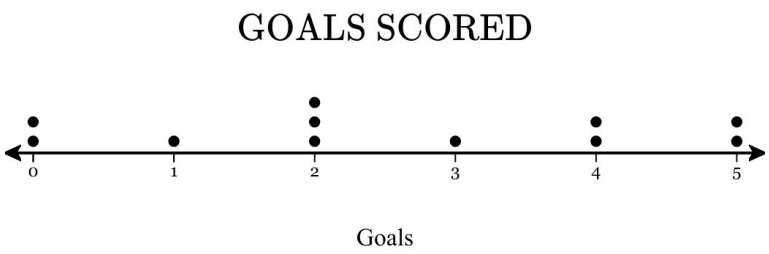
69. The dot plot below represents the number of goals scored by the boys' soccer team in every game so far this season.



How many games have students played?

5 games

70. The dot plot below represents the number of goals scored by the girls' soccer team in every game so far this season.



What was the median number of goals scored?

2 goals

71. Find the median and mean of the data set below:

$30, 8, 50, 30, 28, 40$

$\text{Median} = 30$

$\text{Mean} = 31$

72. Find the median and mean of the data set below:

$2, 9, 7, 0, 8$

$\text{Median} = 7$

$\text{Mean} = 5.2$

73. Find the median and mean of the data set below:

$$32, 7, 4, 37, 9, 33, 46$$

$\text{Median} = 32$

$\text{Mean} = 24$

74. Find the median and mean of the data set below:

$$30, 25, 38, 22, 1, 37$$

$\text{Median} = 27.5$

$\text{Mean} = 25.5$

75. Find the median and mean of the data set below:

$$43, 18, 24, 49, 24$$

$\text{Median} = 24$

$\text{Mean} = 31.6$

76. Which expression is equivalent to $9d - 3d + 2$?

A. $8d$

B. $4d$

C. $2 + 6d$

D. $9d - 1$

77. Which expression is equivalent to $9f + 9 + 2f - 6$?

A. $7f + 15$

B. $18f - 4$

C. $7f + 3$

D. $3 + 11f$

78. The width of a rectangle measures $(10a + 10)$ centimeters, and its length measures $(4a + 6)$ centimeters. Which expression represents the perimeter, in centimeters, of the rectangle?

A. $32 + 28a$

B. $20a + 10$

C. $20 + 40a$

D. $16 + 14a$

79. A triangle has side lengths of $(3m + 9n)$ centimeters, $(10p + 8m)$ centimeters, and $(7p + 8n)$ centimeters. Which expression represents the perimeter, in centimeters, of the triangle?

A. $17n + 11m + 17p$

B. $15np + 18mp + 12mn$

C. $11m + 18p + 16n$

D. $18mp + 27np$

80. The width of a rectangle measures $(7c + 9d)$ centimeters, and its length measures $(4c - 7d)$ centimeters. Which expression represents the perimeter, in centimeters, of the rectangle?

A. $9 + 22c - 14d$

B. $4 + 22c$

C. $11c + 2$

D. $22c + 4d$

81. Which expression is equivalent to the expression below?

$$2(6r + 2s) + 9r$$

A. $2(6r + 2s + 9r)$ B. $-r + 4s$

C. $3r + 2s$ D. $21r + 4s$

82. Which expression is equivalent to the expression below?

$$6(7t) + 3t$$

A. $25t$ B. $42t + 7t^2$

C. $10t + 6$ D. $45t$

83. Which expression is equivalent to the expression below?

$$r + r + r + r + r + r$$

A. r^6 B. 6 C. $\frac{r}{6}$ D. $6r$

84. Which pair of expressions below are equivalent?

A. $k + k + k + m$ and $4km$

B. $3(6k + 9)$ and $18k + 9$

C. $k + k + k + k + k + k$ and k^6

D. $3(6k)$ and $18k$

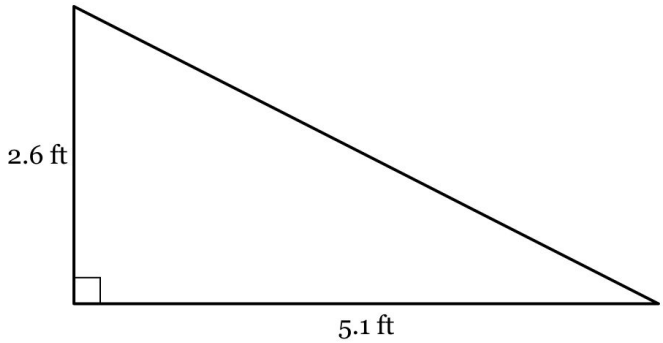
85. Which expression is equivalent to the expression below?

$$8t + 2v + t + t$$

A. $6t + 2v$ B. $12t$

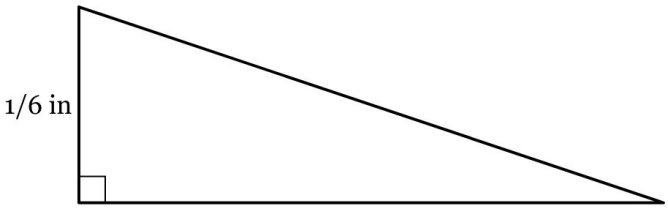
C. $8t$ D. $10t + 2v$

86. What is the area, in square feet, of the shape below?



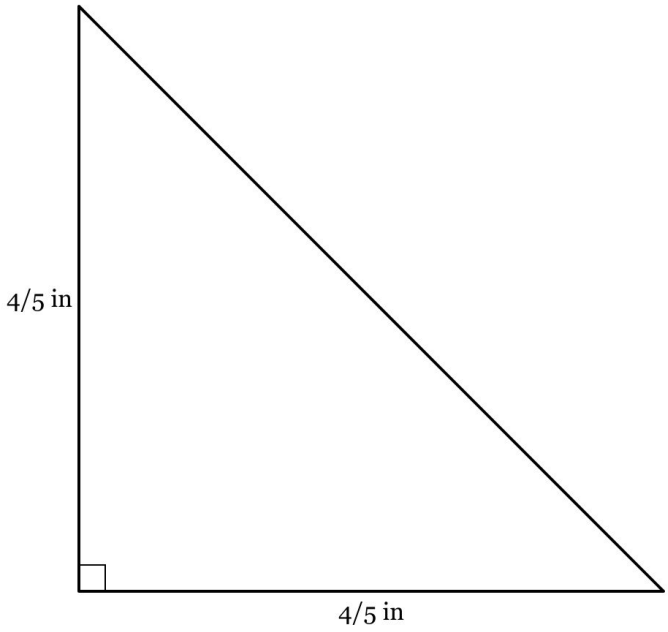
$A = 6.63 \text{ ft}^2$

87. The area of the triangle below is $\frac{1}{24}$ square inches. What is the length of the base? Express your answer as a fraction in simplest form.



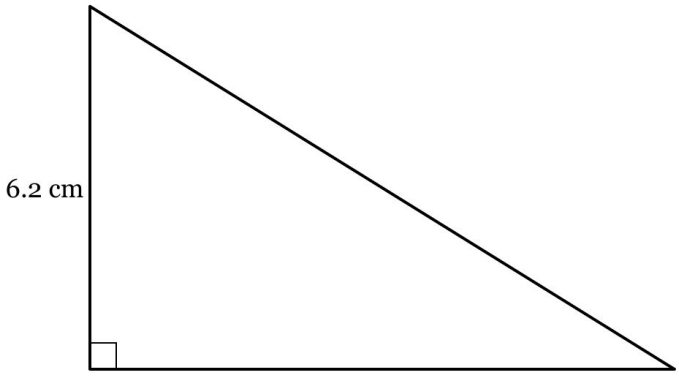
$b = \frac{1}{2} \text{ in}$

88. What is the area, in square inches, of the shape below? Express your answer as a fraction in simplest form.



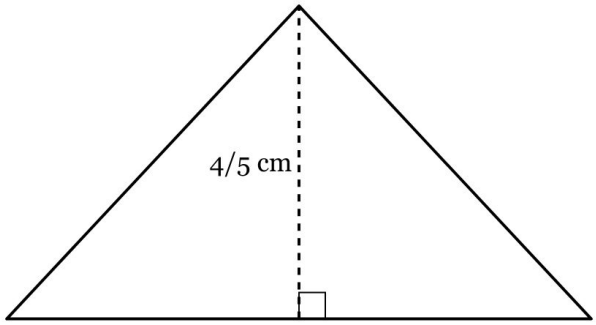
$$A = \frac{8}{25} \text{ in}^2$$

89. The area of the triangle below is 31 square centimeters. What is the length of the base?



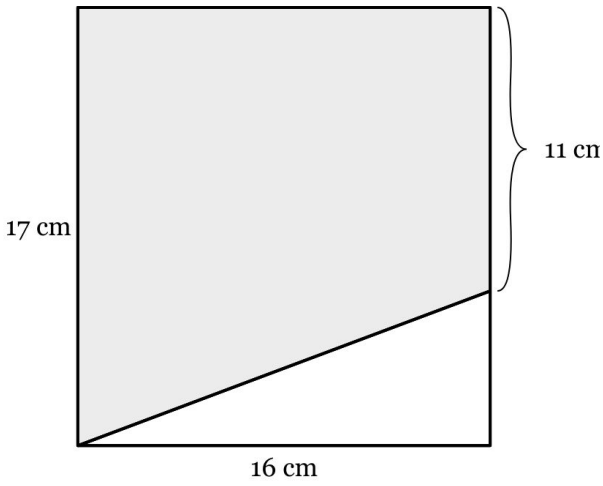
$$b = 10 \text{ cm}$$

90. The area of the triangle below is $\frac{3}{5}$ square centimeters. What is the length of the base? Express your answer as a fraction in simplest form.



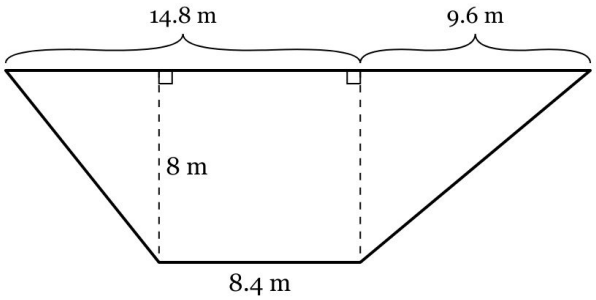
$$b = \frac{3}{2} \text{ cm}$$

91. What is the area, in square centimeters, of the shaded part of the rectangle below?



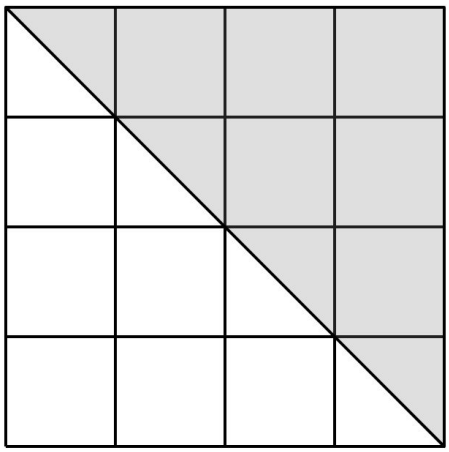
$$A = 224 \text{ cm}^2$$

92. What is the area, in square meters, of the trapezoid below?



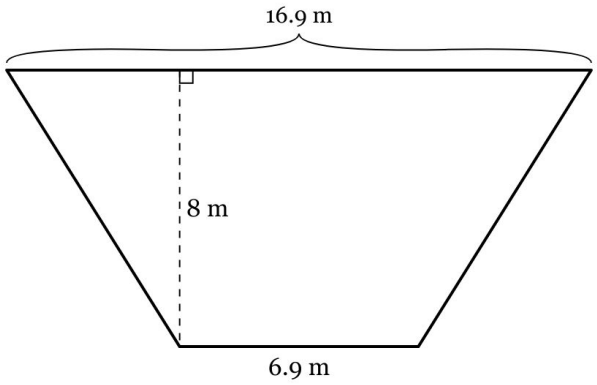
$A = 131.2\ \text{m}^2$

93. The grid you see below is in the shape of a rectangle. What is the area, in square units, of the shaded part?



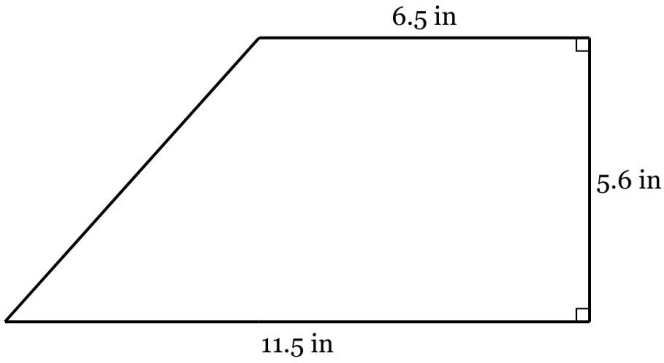
$A = 8\ \text{units}^2$

94. What is the area, in square meters, of the isosceles trapezoid below?



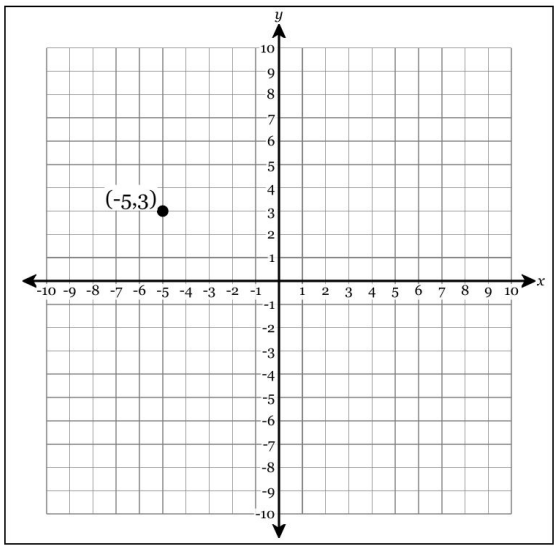
$A = 95.2\ \text{m}^2$

95. What is the area, in square inches, of the trapezoid below?

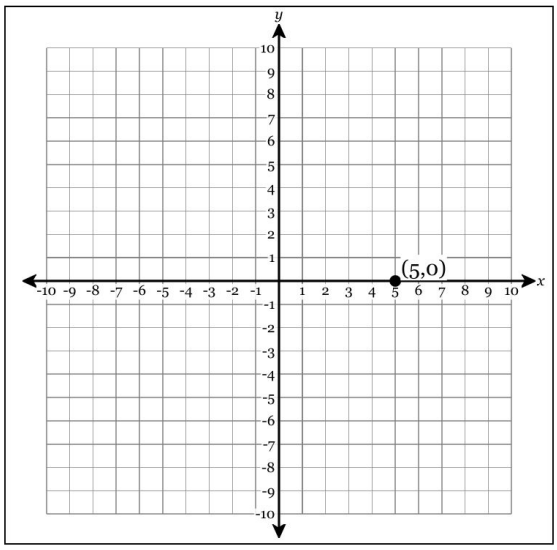


$A = 50.4\ \text{in}^2$

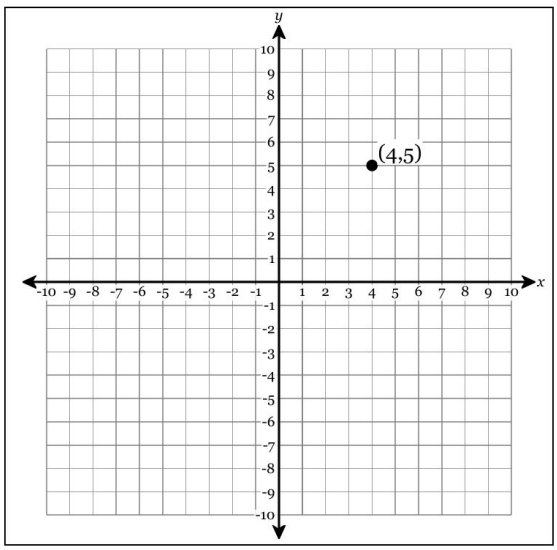
96. Plot the point $(-5, 3)$.



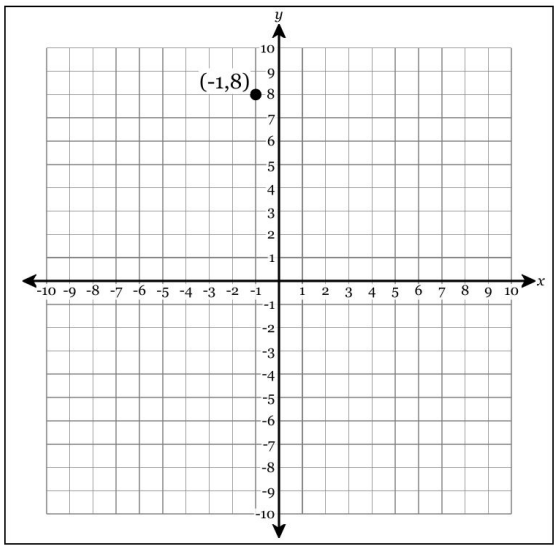
97. Plot the point $(5, 0)$.



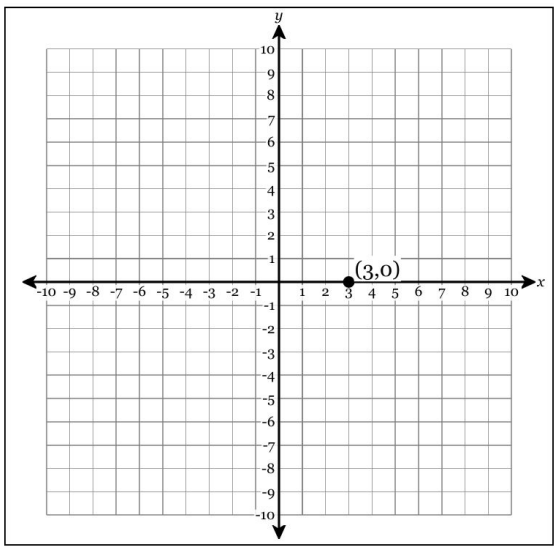
98. Plot the point $(4, 5)$.



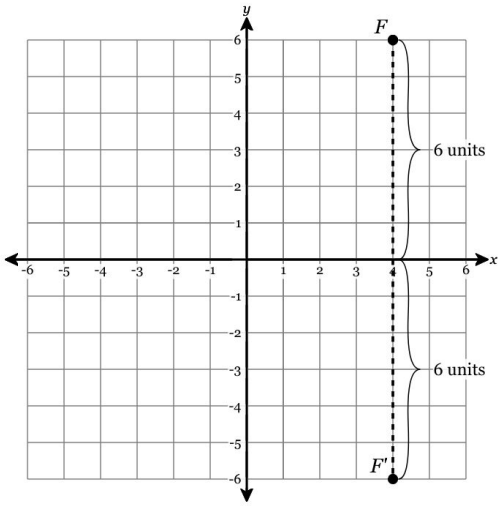
99. Plot the point $(-1, 8)$.



100. Plot the point $(3, 0)$.



101. The point F is plotted on the coordinate grid below. Plot the point F', the reflection of F over the x-axis.

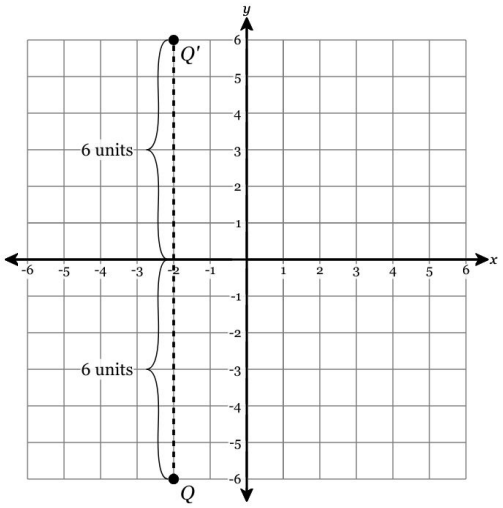


Coordinates of F: $(4, 6)$

Coordinates of F': $(4, -6)$

When a point is reflected over the x-axis, the **y-coordinate** changes sign.

102. The point Q is plotted on the coordinate grid below. Plot the point Q', the reflection of Q over the x-axis.

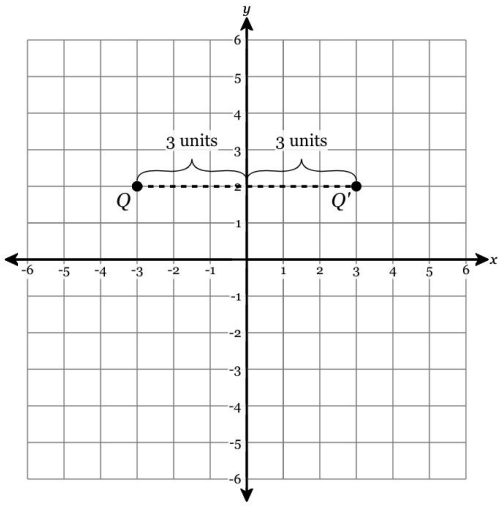


Coordinates of Q: $(-2, -6)$

Coordinates of Q': $(-2, 6)$

When a point is reflected over the x-axis, the **y-coordinate** changes sign.

103. The point Q is plotted on the coordinate grid below. Plot the point Q', the reflection of Q over the y-axis.

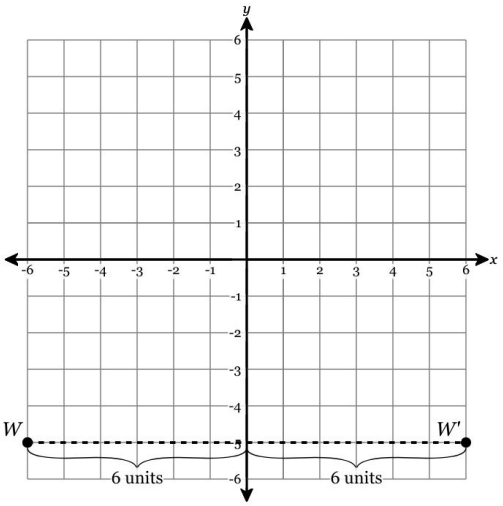


Coordinates of Q: $(-3, 2)$

Coordinates of Q': $(3, 2)$

When a point is reflected over the y-axis, the **x-coordinate** changes sign.

104. The point W is plotted on the coordinate grid below. Plot the point W', the reflection of W over the y-axis.

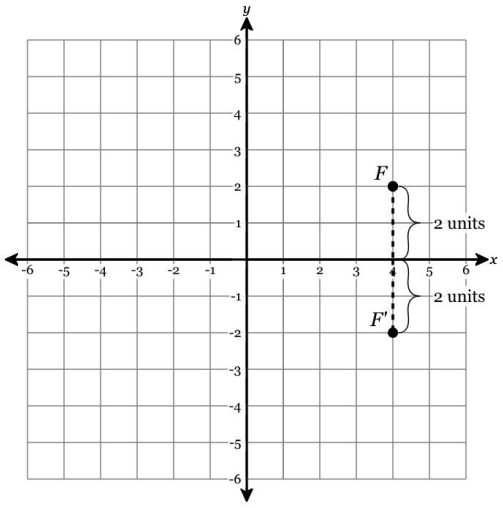


Coordinates of W: $(-6, -5)$

Coordinates of W': $(6, -5)$

When a point is reflected over the y-axis, the **x-coordinate** changes sign.

105. The point F is plotted on the coordinate grid below. Plot the point F', the reflection of F over the x-axis.



Coordinates of F: $(4, 2)$

Coordinates of F': $(4, -2)$

When a point is reflected over the x-axis, the **y-coordinate** changes sign.

106. A hot-air balloon rises in the air, or ascends, at a rate of 140 m/min. How far does it ascend in 3 minutes?

420 meters

107. A certain type of submarine dives, or descends, 550 feet in 5 minutes. At what rate does it dive?

110 feet per minute

108. A certain type of submarine dives, or descends, at a speed of 50 feet/minute. How long does it take for the submarine to descend 200 feet?

4 minutes

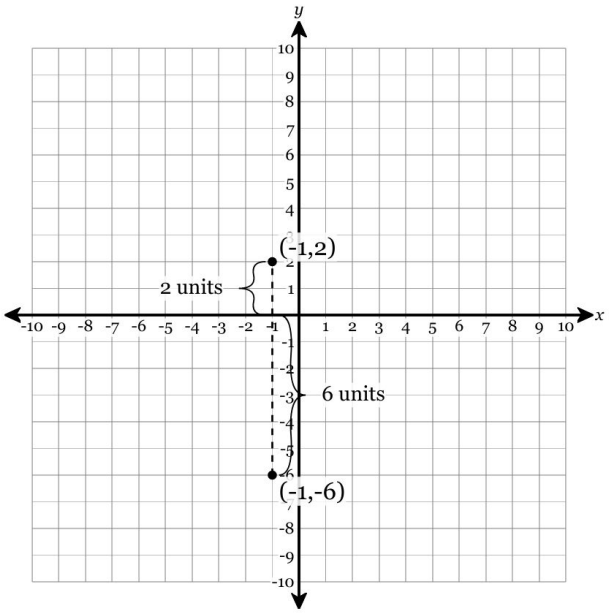
109. An alien space monster named Mathzilla is destroying the city! Malik manages to run 48 meters in 6 seconds before getting flattened like a pancake. What rate is Malik moving at?

8 meters per second

110. Ella and her family are driving out of town for a relaxing beach vacation. How fast do they travel if their car drives 900 kilometers in 10 hours?

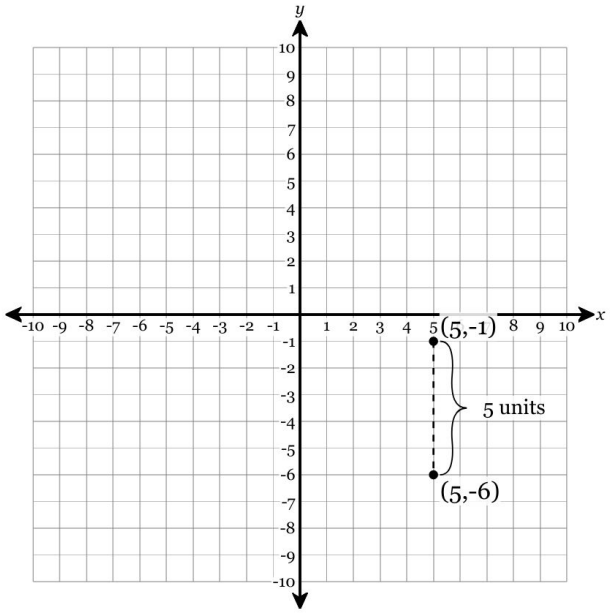
90 kilometers per hour

111. Plot the points $(-1, -6)$ and $(-1, 2)$. Then find the vertical distance between them.



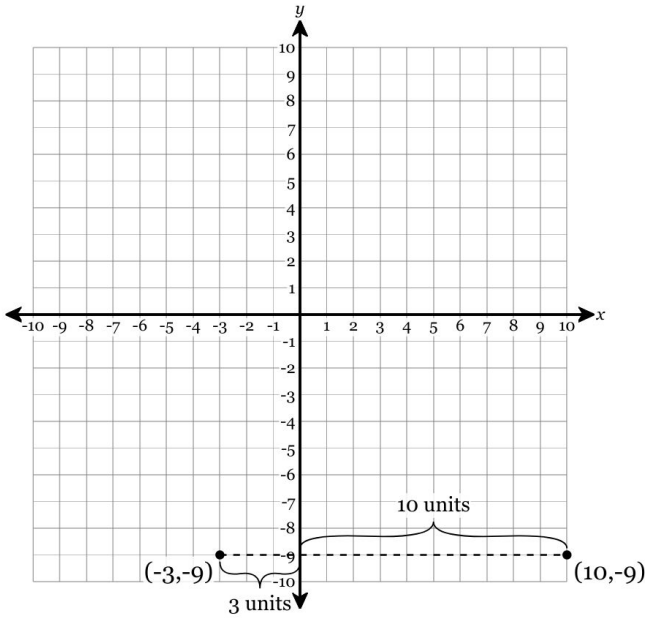
The vertical distance between the two points is 8 units.

112. Plot the points $(5, -1)$ and $(5, -6)$. Then find the vertical distance between them.



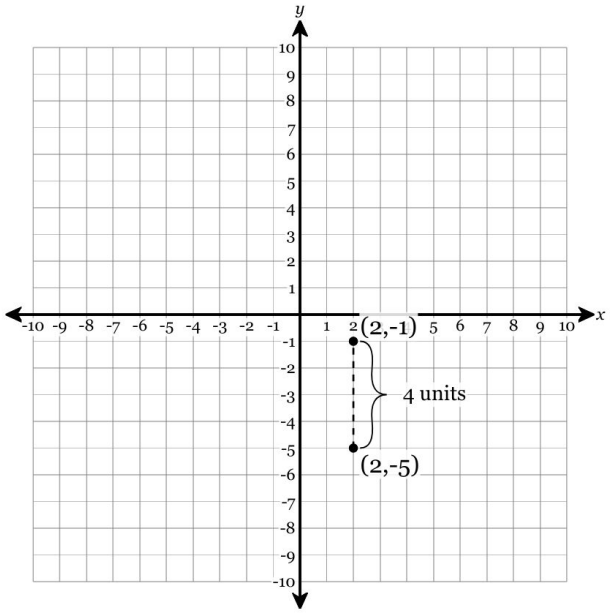
The vertical distance between the two points is 5 units.

113. Plot the points $(-3, -9)$ and $(10, -9)$. Then find the horizontal distance between them.



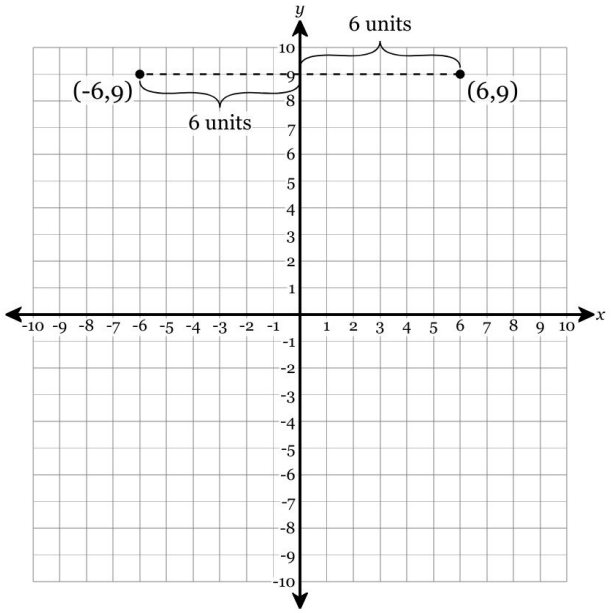
The horizontal distance between the two points is 13 units.

114. Plot the points $(2, -5)$ and $(2, -1)$. Then find the vertical distance between them.



The vertical distance between the two points is 4 units.

115. Plot the points $(6, 9)$ and $(-6, 9)$. Then find the horizontal distance between them.



The horizontal distance between the two points is 12 units.