HOMEWORK

Homework Problems

Circle the homework problems assigned to you by the computer, then complete them below.

Explain
Plotting Points

Use Figure 3.1.9 to answer questions 1 through 8.

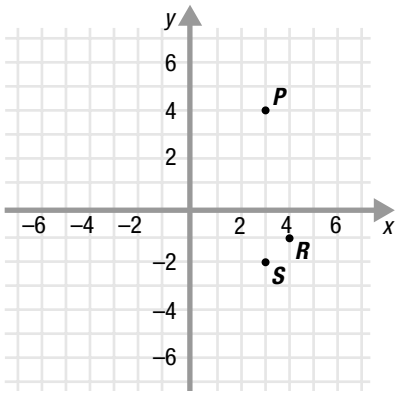


FIgure 3.1.9

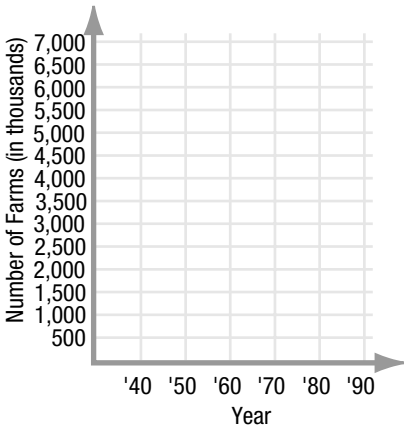


Figure 3.1.10

1. Find the coordinates of point *P*.
2. Plot the point *Q*(–2, 5).
3. In what quadrant does the point *R*(4, –1) lie?
4. Find the coordinates of point *S.*
5. Plot the point *T*(–3, 6).
6. Plot a point which lies in Quadrant III.
7. Plot the point *U*(0, 5).
8. Plot a point in Quadrant I whose *x*-coordinate is 4.
9. For selected years, the number of farms in the United States is listed in the table below. Use this information to plot the ordered pairs (year, number of farms) on the grid in Figure 3.1.10.

Year	Number of Farms (in thousands)	Number of Average Acres per Farm
1940	6,102	175
1950	5,388	216
1960	3,962	297
1970	2,954	373
1980	2,440	426
1990	2,143	461

10. Using the data provided in problem (9), plot the ordered pairs (year, average number of acres per farm) on the grid in Figure 3.1.11.

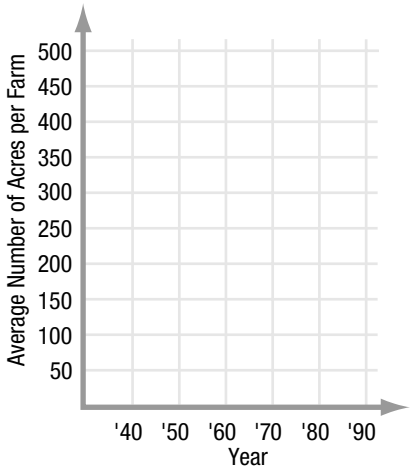


Figure 3.1.11

11. Plot the point $V(-3, 0)$.

12. Plot a point which does not lie in any quadrant.

Rise and Run

13. Draw one vertical and one horizontal line to show the rise and the run in moving from $P_1(1, 3)$ to $P_2(4, 6)$.

14. Plot the points $Q_1(-2, 3)$ and $Q_2(3, 4)$. Draw one vertical and one horizontal line to find the rise and the run in moving from Q_1 to Q_2.

15. Use rise $= y_2 - y_1$ and run $= x_2 - x_1$ to find the rise and the run in moving from $R_1(2, 5)$ to $R_2(5, 7)$.

16. Find the rise and the run in moving from $S_1(6, 7)$ to $S_2(2, -4)$ by drawing one vertical and one horizontal line on the graph.

17. Find the rise and the run from $T_1(-1, -4)$ to $T_2(-5, -8)$ by subtracting the appropriate coordinates.

18. Which is greater, the rise from $U_1(-9, -6)$ to $U_2(-1, 5)$ or the rise from $V_1(0, -6)$ to $V_2(10, 2)$?

19. Find the rise and the run from $W_1(-7, 11)$ to $W_2(17, 19)$ by subtracting the appropriate coordinates.

20. Given $P_1(1, 2)$, find the coordinates of P_2 if the rise from P_1 to P_2 is 2 and the run is 5. Use the grid in Figure 3.1.12.

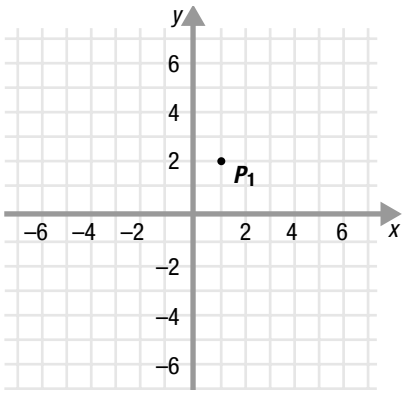


Figure 3.1.12

21. Plotted in Figure 3.1.13 is the federal minimum hourly wage rate (for nonfarm workers) for selected years. Use this information to determine which five-year period had the greatest rise in minimum wage. (You can refer to the table for more accurate numbers.)

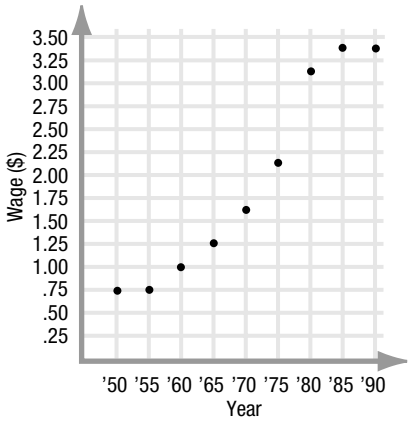


Figure 3.1.13

Year	Wage
1950	$ .75
1955	$ .75
1960	$1.00
1965	$1.25
1970	$1.60
1975	$2.10
1980	$3.10
1985	$3.35
1990	$3.35

22. Use the graph and table in problem (21) to determine which five-year period had the smallest rise in minimum wage.

23. Find the rise and the run from $P_1(-68, -32)$ to $P_2(17, 94)$ by subtracting the appropriate coordinates.

24. Starting at $P_1(-3, -6)$, find the coordinates of P_2 if the rise from P_1 to P_2 is 8 and the run is 7.

The Distance Formula

25. If $a = 5$ and $b = 12$, use the Pythagorean Theorem to find c, the length of the hypotenuse of the right triangle shown in Figure 3.1.14.

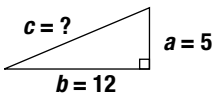


Figure 3.1.14

26. What is the equation of a circle whose center is at (2, 3) and whose radius is 4?

27. Using the distance formula, find the distance between (0, 0) and (5, 2).

28. Use the Pythagorean Theorem to find the distance between (0, 0) and (6, 8). See Figure 3.1.15.

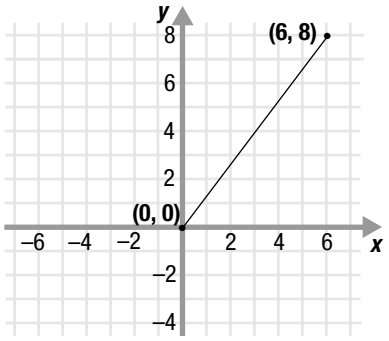


Figure 3.1.15

29. Find the center and the radius of the circle whose equation is $(x + 5)^2 + (y - 7)^2 = 2^2$.

30. Using the distance formula, find the distance between (–2, 4) and (–1, –7).

31. Use the Pythagorean Theorem to find the distance between (–2, –1) and (5, –6). See Figure 3.1.16.

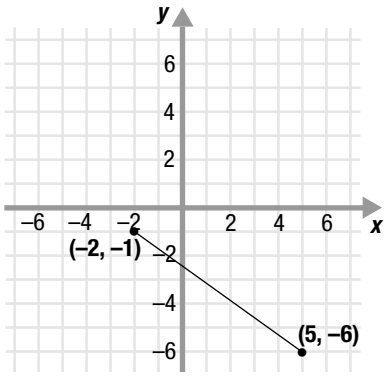


Figure 3.1.16

32. Find the center and the radius of the circle whose equation is: $(x - 6)^2 + (y + 1)^2 = 16$.

33. A fullback takes the ball from his 5 yard line (30 yards from the sideline) to his 45 yard line (50 yards from the same sideline). How many yards did he actually run? (You can express your answer as the square of the distance.) Start by finding *a* and *b* as shown in Figure 3.1.17. Then find *c*.

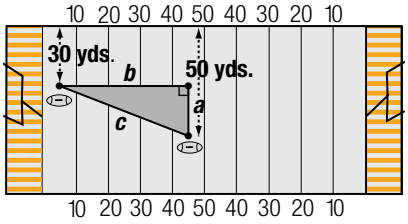


Figure 3.1.17

34. Marilena has been taking a shortcut across a lawn as shown in Figure 3.1.18. If the two lengths of the sidewalk measure 6 ft. and 8 ft., how much distance does Marilena save by taking the shortcut?

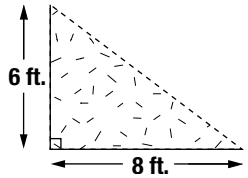


Figure 3.1.18

35. Write the equation of the circle with radius 5 whose center is at (–3, 2).

36. Using the distance formula, find the distance between (–4, 4) and (5, –8).

Explore

37. Plot three points in Quadrant II each of which has a *y*-coordinate equal to 5.

38. Plot three points, (*x, y*), where $y = x$.

39. Starting at the point $P_1(1, 1)$, if you rise 2 and also run 2, you end up at the point (3, 3). Start again at $P_1(1, 1)$ and plot three other points such that the rise and run are equal to each other.

40. Plot three points in Quadrant IV each of which has an *x*-coordinate equal to 3.

41. Plot three points, (*x, y*), where $y = x + 2$.

42. Starting at the point $Q_1(–2, –4)$, if you rise 2 and run 1, you end up at the point (–1, –2). Starting at the point $Q_1(–2, –4)$, plot three other points which have a rise which is twice as much as the run.

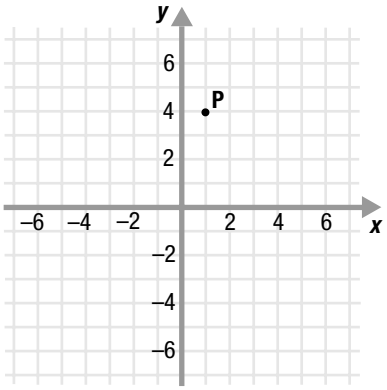
APPLY

Practice Problems

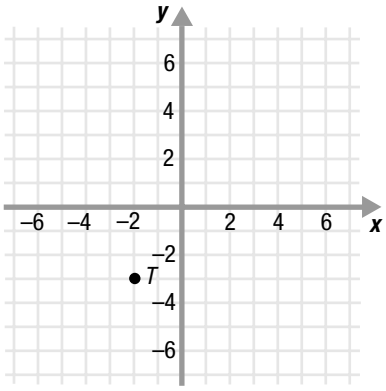
Here are some additional practice problems for you to try.

Plotting Points

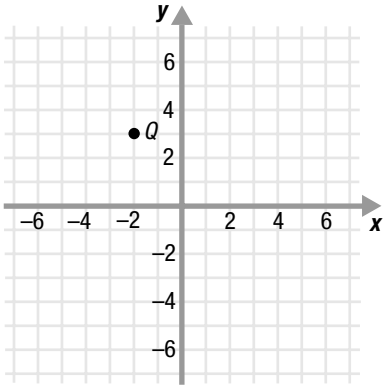
1. Plot the point (3, 5).
2. Plot the point (6, 1).
3. Plot the point (4, 1).
4. Plot the point (–3, 4).
5. Plot the point (–5, 6).
6. Plot the point (–1, 2).
7. Plot the point (–1, –5).
8. Plot the point (–6, –2).
9. Plot the point (–3, –5).
11. Plot the point (4, –4).
12. Plot the point (4, –2).
13. Plot the point (0, –3).
14. Plot the point (2, 0).
15. Plot the point (–3, 0).
16. Find the coordinates of the point P.



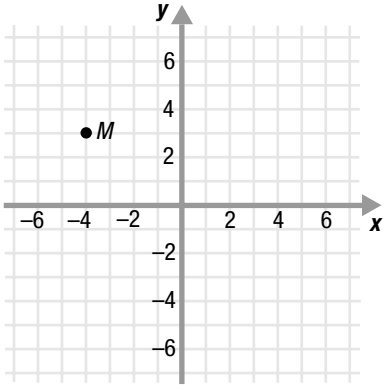
17. Find the coordinates of the point *T*.



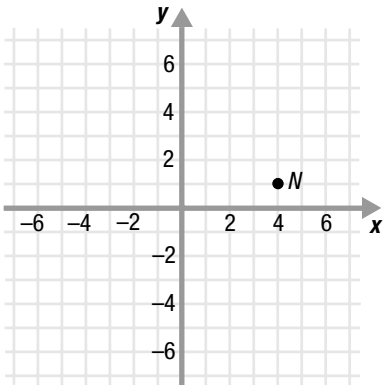
18. Find the coordinates of the point *Q*.



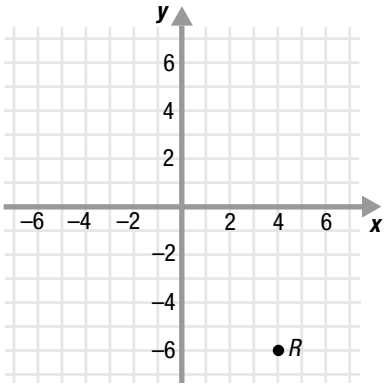
19. Find the coordinates of the point *M*.



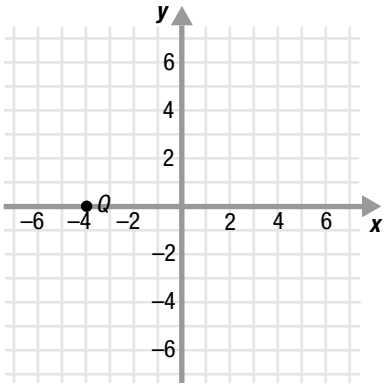
20. Find the coordinates of the point *N*.



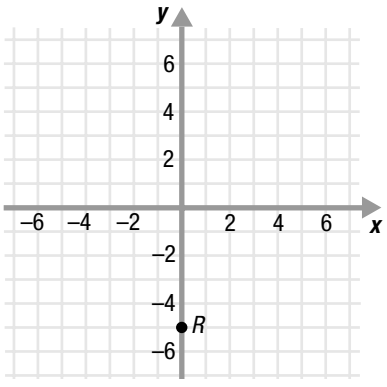
21. Find the coordinates of the point *R*.



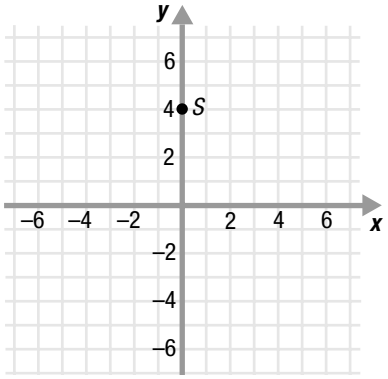
22. Find the coordinates of the point *Q*.



23. Find the coordinates of the point *R*.



24. Find the coordinates of the point *S*.



25. In what quadrant does the point (–4, 3) lie?

26. In what quadrant does the point (–2, –3) lie?

27. In what quadrant does the point (1, –3) lie?

28. In what quadrant does the point (4, 2) lie?

Rise and Run

29. Find the rise and the run in moving from the point (1, 5) to the point (9, 7).

30. Find the rise and the run in moving from the point (12, 8) to the point (25, 17).

31. Find the rise and the run in moving from the point (11, 5) to the point (2, 9).

32. Find the rise and the run in moving from the point (4, 3) to the point (2, –7).

33. Find the rise and the run in moving from the point (0, –6) to the point (8, 5).

34. Find the rise and the run in moving from the point (2, 5) to the point (11, 9).

35. Find the rise and the run in moving from the point (3, –10) to the point (0, –4).

36. Find the rise and the run in moving from the point (–21, –16) to the point (–19, –13).

37. Find the rise and the run in moving from the point (–2, –5) to the point (4, –2).

38. Find the rise and the run in moving from the point (4, 0) to the point (9, 5).

39. Find the rise and the run in moving from the point (8, –1) to the point (0, –7).

40. Find the rise and the run in moving from the point (2, 0) to the point (–5, 2).

41. Find the rise and the run in moving from the point (–5, –9) to the point (8, 2).

42. Find the rise and the run in moving from the point (–10, –4) to the point (1, 8).

43. Find the rise and the run in moving from the point (–4, –4) to the point (6, 3).

44. Find the rise and the run in moving from the point (23, 17) to the point (1, –3).

45. Find the rise and the run in moving from the point (15, –16) to the point (43, 31).

46. Find the rise and the run in moving from the point (11, –7) to the point (35, 24).

47. Find the rise and the run in moving from the point (–13, –29) to the point (0, –7).

48. Find the rise and the run in moving from the point (–85, –57) to the point (0, 3).

49. Find the rise and the run in moving from the point (–27, –14) to the point (0, 12).

50. Which is greater, the rise from $P_1(9, 13)$ to $P_2(21, 17)$ or the rise from $Q_1(-3, -5)$ to $Q_2(4, 16)$

51. Which is greater, the run from $P_1(7, 12)$ to $P_2(19, 13)$ or the run from $Q_1(-1, 5)$ to $Q_2(3, 39)$?

52. Given $P_1(11, 14)$, find the coordinates of P_2 if the rise from P_1 to P_2 is 3 and the run is 9.

53. Given $P_1(8, 9)$, find the coordinates of P_2 if the rise from P_1 to P_2 is 4 and the run is 7.

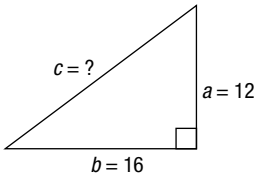
54. Given $P_1(-4, -7)$, find the coordinates of P_2 if the rise from P_1 to P_2 is 6 and the run is 2.

55. Given $P_1(-16, 7)$, find the coordinates of P_2 if the rise from P_1 to P_2 is 13 and the run is 17.

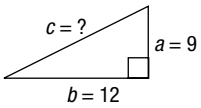
56. Given $P_1(-3, -6)$, find the coordinates of P_2 if the rise from P_1 to P_2 is 6 and the run is 8.

The Distance Formula

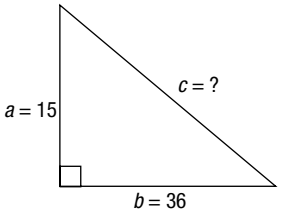
57. If $a = 12$ and $b = 16$, use the Pythagorean Theorem to find c, the length of the hypotenuse of the right triangle shown below.



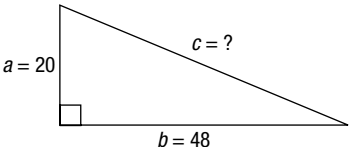
58. If $a = 9$ and $b = 12$, use the Pythagorean Theorem to find c, the length of the hypotenuse of the right triangle shown below.



59. If $a = 15$ and $b = 36$, use the Pythagorean Theorem to find c, the length of the hypotenuse of the right triangle shown below.



60. If $a = 20$ and $b = 48$, use the Pythagorean Theorem to find c, the length of the hypotenuse of the right triangle shown below.



61. What is the equation of the circle whose center is at (2, –3) and whose radius is 4?

62. What is the equation of the circle whose center is at (–4, –5) and whose radius is 7?

63. What is the equation of the circle whose center is at (–3, 1) and has radius 5?

64. Write the equation of the circle whose center is at (1, 6) and has radius 10.

65. Write the equation of the circle whose center is at (–3, 7) and has radius 8.

66. Write the equation of the circle whose center is at (3, 10) and has radius 8.

67. Use the distance formula to find the distance between the points (3, 6) and (9, 13).

68. Use the distance formula to find the distance between the points (4, –7) and (–2, 3).

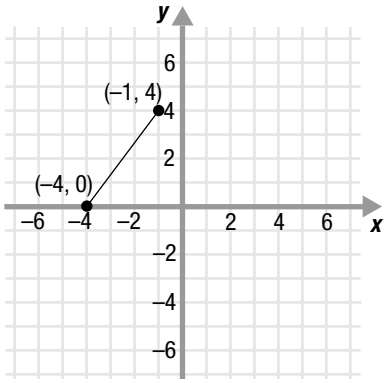
69. Use the distance formula to find the distance between the points (7, 2) and (–8, 3).

70. Use the distance formula to find the distance between the points (–11, –5) and (4, –7).

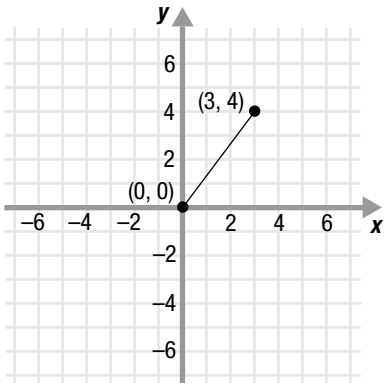
71. Use the distance formula to find the distance between the points (–1, 7) and (–10, –2).

72. Use the distance formula to find the distance between the points (–10, –3) and (4, –2).

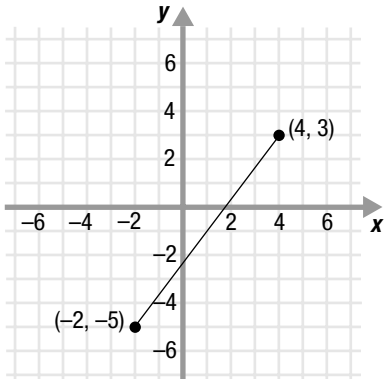
73. Use the Pythagorean Theorem to find the distance between (–4, 0) and (–1, 4).



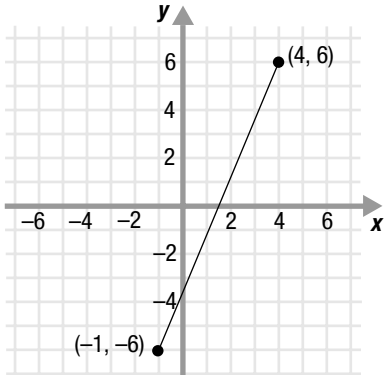
74. Use the Pythagorean Theorem to find the distance between (0, 0) and (3, 4).



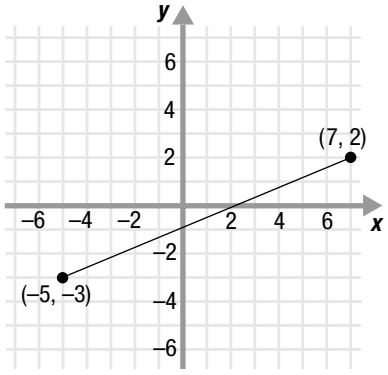
75. Use the Pythagorean Theorem to find the distance between (–2, –5) and (4, 3).



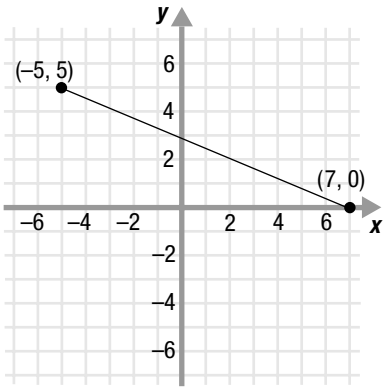
76. Use the Pythagorean Theorem to find the distance between (–1, –6) and (4, 6).



77. Use the Pythagorean Theorem to find the distance between (7, 2) and (–5, –3).



78. Use the Pythagorean Theorem to find the distance between (–5, 5) and (7, 0).



79. Find the center and the radius of the circle whose equation is $(x + 5)^2 + (y + 2)^2 = 3^2$.

80. Find the center and the radius of the circle whose equation is $(x - 10)^2 + (y - 1)^2 = 7^2$.

81. Find the center and the radius of the circle whose equation is $(x + 9)^2 + (y - 12)^2 = 6^2$.

82. Find the center and the radius of the circle whose equation is $(x - 8)^2 + (y + 2)^2 = 25$.

83. Find the center and the radius of the circle whose equation is $(x + 9)^2 + (y - 3)^2 = 121$.

84. Find the center and the radius of the circle whose equation is $(x - 3)^2 + (y + 15)^2 = 144$.

EVALUATE

Practice Test

Take this practice test to be sure that you are prepared for the final quiz in Evaluate.

Use Figure 3.1.19 to answer questions (1) – (3).

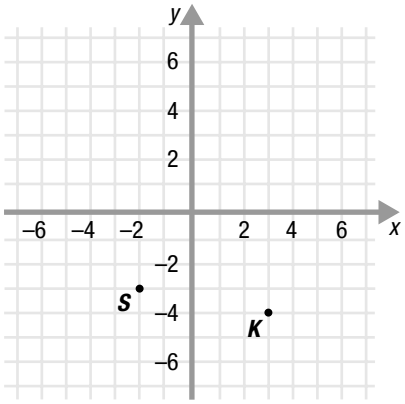


Figure 3.1.19

1. Find the coordinates of point *K*.
2. Plot the point *P*(5, 2.5).
3. In what quadrant does the point *S*(–2, –3) lie?
4. For selected years, average gas mileage for American cars is listed in the table below (rounded to the nearest whole number). Plot the ordered pairs (year, mileage) on the set of axes provided in Figure 3.1.20.

Year	Average Gas Mileage (mpg)
1970	14
1975	15
1980	23
1985	26
1990	27

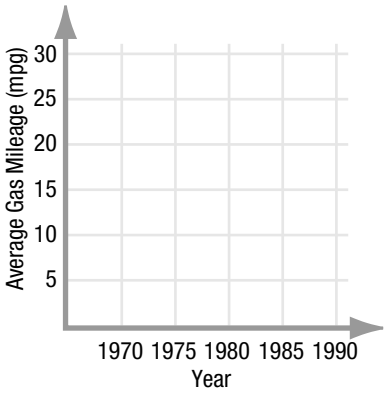


Figure 3.1.20

5. Find the rise and the run in moving from point $P_1(1, -5)$ to $P_2(7, 5)$ by drawing one vertical and one horizontal line on the grid in Figure 3.1.21.

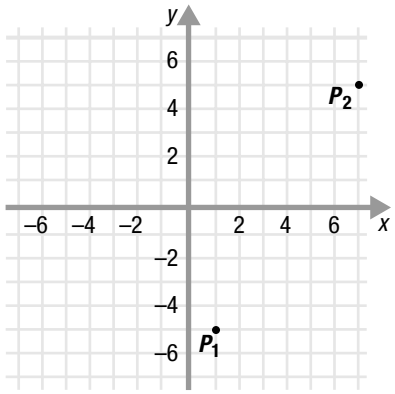


Figure 3.1.21

6. Find the rise and the run from $P_1(-7, -8)$ to $P_2(0, 4)$ by subtracting the appropriate coordinates.
7. Find the rise and the run from $P_1(-12, 7)$ to $P_2(24, 16)$ by subtracting the appropriate coordinates.

8. The average price for a gallon of gasoline is plotted in Figure 3.1.22 for selected years. Use this information to determine which five-year period had the greatest rise in gas prices.

Year	Price (cents)
1950	26.8
1955	29.1
1960	31.1
1965	31.2
1970	35.7
1975	56.7
1980	119.1
1985	111.5
1990	114.9

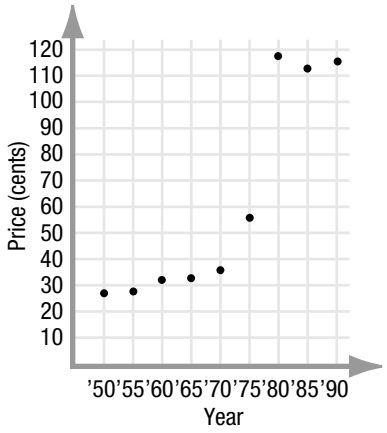


Figure 3.1.22

9. If $a = 9$ and $b = 12$, use the Pythagorean Theorem to find c, the length of the hypotenuse of the right triangle shown in Figure 3.1.23.

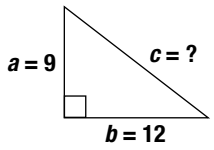


Figure 3.1.23

10. Use the Pythagorean Theorem to find the distance between the points (–3, 1) and (1, –2). See Figure 3.1.24.

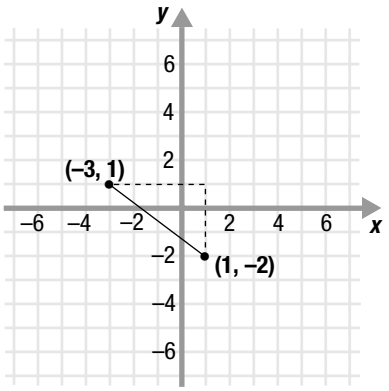


Figure 3.1.24

11. Use the distance formula to find the distance between the points (10, 2) and (–2, –7).

12. Find the radius and the center of the circle whose equation is below.

$$(x - 1)^2 + [y - (-5)]^2 = 2^2$$

13. A point with a negative x-coordinate and a positive y-coordinate lies in which quadrant?

Use Figure 3.1.25 to answer questions (14) – (16).

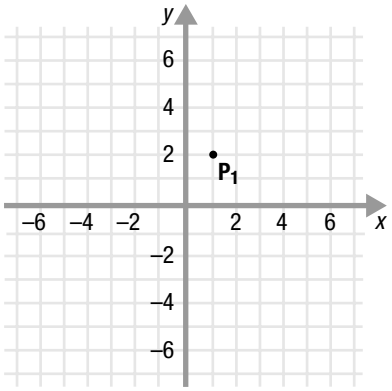


Figure 3.1.25

14. Plot a point in Quadrant III whose x-coordinate is –4.

15. Starting at the point $P_1(1, 2)$, find the coordinates of P_2 if the rise from P_1 to P_2 is 5 and the run is 1.

16. Plot a point, (x, y), where $y = x - 1$.

TOPIC 3 CUMULATIVE ACTIVITIES

CUMULATIVE REVIEW PROBLEMS

These problems combine all of the material you have covered so far in this course. You may want to test your understanding of this material before you move on to the next topic. Or you may wish to do these problems to review for a test.

1. Write in lowest terms: $\frac{12}{36}$
2. Evaluate the expression $2xy - 6y + 12$ when $x = -2$ and $y = 4$.
3. Simplify the expression $3(x - 7) + 2(9 - x)$.
4. Plot the points $P_1(1, 2)$ and $P_2(6, 4)$. Draw one vertical and one horizontal line to find the rise and the run from P_1 to P_2.
5. Plot the points $Q_1(-4, -3)$ and $Q_2(-1, 5)$. Draw one vertical and one horizontal line to find the rise and the run from Q_1 to Q_2.
6. Plot three points, (x, y), in Quadrant III where $x = y$. Use the grid in Figure 3.2.
7. Seven years ago, Raoul was as old as Christine is now. If the sum of their ages is 63, how old is each person?
8. Find the rise and the run from $V_1(-54, -37)$ to $V_2(-8, 63)$ by subtracting the appropriate coordinates.
9. Solve for x: $4x + 9 < 13$. Then graph its solution on the number line below.

10. Find: $\frac{3}{4} + \frac{9}{10}$
11. Einstein's famous formula, $E = mc^2$, shows the amount of energy, E, which can be obtained from a particle of mass m. Solve this formula for c.
12. Circle the true statements.

    The equation $x + 3 = x - 7$ has no solution.

    $\frac{5}{6} \neq \frac{2}{4} + \frac{3}{2}$

    $5 \cdot 5 \cdot 5 = 3^5$

    $-3 < -2$

    $|-3| < |-2|$

13. Find: $7[2 - 3(5 - 4) + 1]$
14. Solve for z: $2 < z - 4 \leq 7$. Circle the number below that is not a solution.

    11
    2
    6.1
    7

15. Plot four points, (x, y), where $y = x - 3$. Use the grid in Figure 3.3.
16. One number is 3 more than twice another number. If the sum of the two numbers is –33, what are the two numbers?

17. Circle the true statements.

$\left|-\frac{1}{2}\right| = -\left|\frac{1}{2}\right|$

$16 \div (-2) = (-16) \div 2$

every value of y is a solution of the equation $4y = 8(y - 2)$

$2^3 \cdot 5^2 = 5^2 \cdot 2^3$

$\frac{6}{9} = \frac{2}{3}$

18. Write the coordinates of the point on the grid in Figure 3.1 that:

a. has an x-value more than -2.

b. has a y-value twice its x-value.

c. has a y-value less than 1.

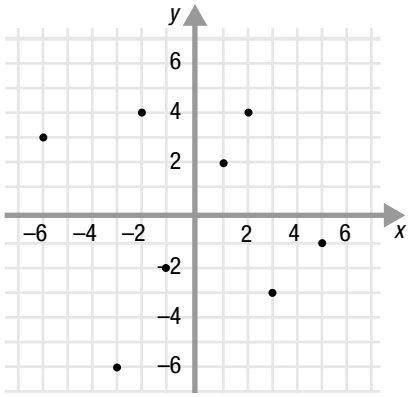


Figure 3.1

19. Find: $\frac{7}{12} - \frac{3}{8}$

20. Find the rise and the run from $T_1(-29, -31)$ to $T_2(14, 26)$ by subtracting the appropriate coordinates.

21. Solve for x: $-5 \leq 8 - 3x < 2$

22. Solve for z: $\frac{2}{5}(4z - 1) = \frac{1}{10}(8z + 20)$

23. Plot the point $P(3, -5)$.

24. Plot the point $Q(-4, -6.5)$.

25. Plot the point $R(0, 6)$.

26. Shade in Quadrant I.

27. Solve for x: $7x + 3 = 38$

28. Use the fact that R = {1, 2, 3, 4, 5} and S = {2, 4, 6, 8, 10} to determine if each statement below is true.

a. $2 \in R$

b. $2 \in S$

c. $3 \in R$

d. $3 \in S$

29. Write the equation of the circle with radius 4 whose center is at (2, 3).

30. Use the Pythagorean Theorem to find the distance between the points (–1, –4) and (4, 8).

31. Find: $\frac{18}{25} \div \frac{6}{5}$

32. Circle the true statements.

a. $z = 3$ is a solution of the inequality $2z - 5 < 3$

b. $|0| > |-5|$

c. $0 > -5$

d. $7^4 = 7 \cdot 7 \cdot 7 \cdot 7$

e. $\frac{5}{10} = \frac{1}{2} = \frac{4}{8}$

33. Solve for y: $-3(y + 2) = 6(4 - \frac{1}{2}y)$

34. Use the distance formula to find the distance between the points (–6, 3) and (9, –5).

35. Find the radius and the center of the circle whose equation is $(x + 5)^2 + (y - 1)^2 = 49$.

36. If $R = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $S = \{2, 4, 6, 8, 10\}$, and $T = \{1, 3, 5, 7, 9\}$, then which of the statements below are true?

    a. $S \subset R$

    b. $R \subset S$

    c. $T \subset R$

    d. $R \subset T$

    e. $S \subset T$

    f. $T \subset S$