_____. (p. A14)

4. Use the converse of the Pythagorean Theorem to show that a triangle whose sides are of lengths 11, 60, and 61 is a right triangle. (pp. A14–A15)

Concepts and Vocabulary

7. If (x, y) are the coordinates of a point P in the xy-plane, then x is called the _____ of P and y is the _____ of P.
8. The coordinate axes divide the xy-plane into four sections called _____.
9. If three distinct points P, Q, and R all lie on a line and if $d(P, Q) = d(Q, R)$, then Q is called the _____ of the line segment from P to R.
10. ***True or False*** The distance between two points is sometimes a negative number.
11. ***True or False*** The point $(-1, 4)$ lies in quadrant IV of the Cartesian plane.
12. ***True or False*** The midpoint of a line segment is found by averaging the x-coordinates and averaging the y-coordinates of the endpoints.

Skill Building

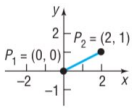
In Problems 13 and 14, plot each point in the xy-plane. Tell in which quadrant or on what coordinate axis each point lies.

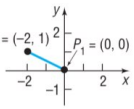
13. (a) $A = (-3, 2)$ (b) $B = (6, 0)$ (c) $C = (-2, -2)$ (d) $D = (6, 5)$ (e) $E = (0, -3)$ (f) $F = (6, -3)$

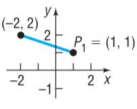
14. (a) $A = (1, 4)$ (b) $B = (-3, -4)$ (c) $C = (-3, 4)$ (d) $D = (4, 1)$ (e) $E = (0, 1)$ (f) $F = (-3, 0)$

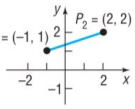
15. Plot the points $(2, 0)$, $(2, -3)$, $(2, 4)$, $(2, 1)$, and $(2, -1)$. Describe the set of all points of the form $(2, y)$, where y is a real number.
16. Plot the points $(0, 3)$, $(1, 3)$, $(-2, 3)$, $(5, 3)$, and $(-4, 3)$. Describe the set of all points of the form $(x, 3)$, where x is a real number.

In Problems 17–28, find the distance $d(P_1, P_2)$ between the points P_1 and P_2.

17. 

18. 

19. 

20. 

21. $P_1 = (3, -4)$; $P_2 = (5, 4)$
23. $P_1 = (-3, 2)$; $P_2 = (6, 0)$
25. $P_1 = (4, -3)$; $P_2 = (6, 4)$
27. $P_1 = (a, b)$; $P_2 = (0, 0)$
22. $P_1 = (-1, 0)$; $P_2 = (2, 4)$
24. $P_1 = (2, -3)$; $P_2 = (4, 2)$
26. $P_1 = (-4, -3)$; $P_2 = (6, 2)$
28. $P_1 = (a, a)$; $P_2 = (0, 0)$

In Problems 29–34, plot each point and form the triangle ABC. Verify that the triangle is a right triangle. Find its area.

29. $A = (-2, 5)$; $B = (1, 3)$; $C = (-1, 0)$
31. $A = (-5, 3)$; $B = (6, 0)$; $C = (5, 5)$
33. $A = (4, -3)$; $B = (0, -3)$; $C = (4, 2)$
30. $A = (-2, 5)$; $B = (12, 3)$; $C = (10, -11)$
32. $A = (-6, 3)$; $B = (3, -5)$; $C = (-1, 5)$
34. $A = (4, -3)$; $B = (4, 1)$; $C = (2, 1)$

In Problems 35–42, find the midpoint of the line segment joining the points P_1 and P_2.

35. $P_1 = (3, -4)$; $P_2 = (5, 4)$
37. $P_1 = (-3, 2)$; $P_2 = (6, 0)$
39. $P_1 = (4, -3)$; $P_2 = (6, 1)$
41. $P_1 = (a, b)$; $P_2 = (0, 0)$
36. $P_1 = (-2, 0)$; $P_2 = (2, 4)$
38. $P_1 = (2, -3)$; $P_2 = (4, 2)$
40. $P_1 = (-4, -3)$; $P_2 = (2, 2)$
42. $P_1 = (a, a)$; $P_2 = (0, 0)$

Applications and Extensions

43. If the point $(2, 5)$ is shifted 3 units to the right and 2 units down, what are its new coordinates?
44. If the point $(-1, 6)$ is shifted 2 units to the left and 4 units up, what are its new coordinates?
45. Find all points having an x-coordinate of 3 whose distance