

# 4.1 Applying the Distance & Midpoint Formulas Homework

p. 195    2 – 20 even



Find the distance between the two points:

2. (2, 7) (5, 6)

$$d = \sqrt{(5-2)^2 + (6-7)^2}$$

$$d = \sqrt{(3)^2 + (-1)^2}$$

$$d = \sqrt{9+1}$$

$$d = \sqrt{10}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

4. (0, 4) (8, -2)

$$d = \sqrt{(8-0)^2 + (-2-4)^2}$$

$$d = \sqrt{(8)^2 + (-6)^2}$$

$$d = \sqrt{64+36}$$

$$d = \sqrt{100} = 10$$



Find the distance between the two points:

6.  $(1, -6)$   $(-2, 4)$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(-2 - 1)^2 + (4 - -6)^2}$$

$$d = \sqrt{(-3)^2 + (10)^2}$$

$$d = \sqrt{9 + 100}$$

$$d = \sqrt{109}$$

8.  $(-10, -2)$   $(6, 5)$

$$d = \sqrt{(6 - -10)^2 + (5 - -2)^2}$$

$$d = \sqrt{(16)^2 + (7)^2}$$

$$d = \sqrt{256 + 49}$$

$$d = \sqrt{305}$$



The distance  $d$  between two points is given. Find  $b$ :

10.  $(b, 4)$   $(2, -1)$   $d = 5$

$$5 = \sqrt{(2-b)^2 + (-1-4)^2}$$

$$5 = \sqrt{(2-b)^2 + (-5)^2}$$

$$5^2 = (2-b)^2 + (-5)^2$$

$$25 = (2-b)(2-b) + 25$$

$$0 = (2-b)(2-b)$$

$$0 = 2-b$$

$$-2 = -b$$

$$2 = b$$

12.  $(3, 2)$   $(b, -9)$   $d = 11$

$$11 = \sqrt{(b-3)^2 + (-9-2)^2}$$

$$11 = \sqrt{(b-3)(b-3) + (-11)^2}$$

$$11^2 = (b-3)(b-3) + (-11)^2$$

$$121 = (b-3)(b-3) + 121$$

$$0 = (b-3)(b-3)$$

$$0 = b-3$$

$$3 = b$$



The distance  $d$  between two points is given. Find  $b$ :

$$14. (b, 2) (3, -1) \quad d = \sqrt{58}$$

$$\sqrt{58} = \sqrt{(b-3)^2 + (2-(-1))^2}$$

$$\pm 7 = b - 3$$

$$\sqrt{58} = \sqrt{(b-3)^2 + (3)^2}$$

$$7 = b - 3$$

$$-7 = b - 3$$

$$(\sqrt{58})^2 = (b-3)^2 + 9$$

$$10 = b$$

$$-4 = b$$

$$58 = (b-3)^2 + 9$$

$$49 = (b-3)^2$$

$$\sqrt{49} = \sqrt{(b-3)^2}$$



Find the midpoint of the line segment with the given endpoints.

16. (2, 5) (4, 12)

$$M = \left( \frac{2+4}{2}, \frac{5+12}{2} \right)$$

$$M = \left( \frac{6}{2}, \frac{17}{2} \right)$$

$$M = \left( 3, \frac{17}{2} \right)$$

$$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

18. (-9, -5) (7, -14)

$$M = \left( \frac{-9+7}{2}, \frac{-5+-14}{2} \right)$$

$$M = \left( \frac{-2}{2}, \frac{-19}{2} \right)$$

$$M = \left( -1, -\frac{19}{2} \right)$$



Find the midpoint of the line segment with the given endpoints.

20.  $(20, 5)$   $(30, -5)$

$$M = \left( \frac{20+30}{2}, \frac{5+(-5)}{2} \right)$$

$$M = \left( \frac{50}{2}, \frac{0}{2} \right)$$

$$M = (5, 0)$$

