

The Distance Formula

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

Date

Period

Find the distance between each pair of points.

1) (7, 3), (-1, -4)

$$d = \sqrt{(7+1)^2 + (3+4)^2}$$

$$d = \sqrt{8^2 + 7^2}$$

$$d = \sqrt{64+49} = \sqrt{113}$$

3) (6, -7), (3, -5)

$$d = \sqrt{(6-3)^2 + (-7+5)^2}$$

$$d = \sqrt{9^2 + (-2)^2}$$

$$d = \sqrt{81+4} = \sqrt{85}$$

5) (5, -8), (-8, 6)

$$d = \sqrt{(5+8)^2 + (-8-6)^2}$$

$$d = \sqrt{13^2 + (-14)^2}$$

$$d = \sqrt{169+196} = \sqrt{365}$$

7) (-7, 0), (-2, -4)

$$d = \sqrt{(-7+2)^2 + (0+4)^2}$$

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

$$d = \sqrt{25+16} = \sqrt{41}$$

9) (-2, 2), (-6, -8)

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

$$d = \sqrt{4^2 + 10^2}$$

$$d = \sqrt{16+100} = \sqrt{116}$$

11) (-3, -1), (-4, 0)

$$d = \sqrt{(-3+4)^2 + (-1-0)^2}$$

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

$$d = \sqrt{1+1} = \sqrt{2}$$

13) (-2, 3), (-1, 7)

$$d = \sqrt{(-2+1)^2 + (3-7)^2}$$

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

$$d = \sqrt{1+16} = \sqrt{17}$$

2) (3, -5), (-3, 0)

$$d = \sqrt{(3+3)^2 + (-5-0)^2}$$

$$d = \sqrt{9^2 + 5^2}$$

$$d = \sqrt{81+25} = \sqrt{106}$$

4) (5, 1), (5, -6)

$$d = \sqrt{(5-5)^2 + (1+6)^2}$$

$$d = \sqrt{0^2 + 7^2}$$

$$d = \sqrt{49} = 7$$

6) (4, 6), (-4, -3)

$$d = \sqrt{(4+4)^2 + (6+3)^2}$$

$$d = \sqrt{8^2 + 9^2}$$

$$d = \sqrt{64+81} = \sqrt{145}$$

8) (-4, -3), (1, 4)

$$d = \sqrt{(-4-1)^2 + (-3-4)^2}$$

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

$$d = \sqrt{25+49} = \sqrt{74}$$

10) (6, 2), (0, -6)

$$d = \sqrt{(6-0)^2 + (2+6)^2}$$

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

$$d = \sqrt{36+64} = \sqrt{100}$$

12) (-5, 4), (3, 1)

$$d = \sqrt{(-5-3)^2 + (4-1)^2}$$

$$d = \sqrt{(-8)^2 + (3)^2}$$

$$d = \sqrt{64+9} = \sqrt{73}$$

14) (8, -5), (-1, -3)

$$d = \sqrt{(8+1)^2 + (-5+3)^2}$$

$$d = \sqrt{9^2 + (-2)^2}$$

$$d = \sqrt{81+4} = \sqrt{85}$$

Midpoint Formula

Find the midpoint between each pair of points.

$$\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}$$

$$17) \left(\frac{2}{5}, -\frac{2}{5}\right), \left(-\frac{7}{8}, -\frac{3}{5}\right) \rightarrow \frac{\frac{2}{5} - \frac{7}{8}}{2}, \frac{-\frac{2}{5} - \frac{3}{5}}{2}$$

$$\frac{6 - 35}{40}, \frac{-2 - 3}{5} \rightarrow \frac{19}{80}, -\frac{1}{2}$$

$$18) (6.6, 8.52), (-5.5, 4.07)$$

$$\frac{6.6 - 5.5}{2}, \frac{8.52 + 4.07}{2}$$

$$1.55, 6.295$$

$$19) (-2.9, -2.958), (8.6, 5)$$

$$\frac{-2.9 + 8.6}{2}, \frac{-2.958 + 5}{2}$$

$$2.85, 1.021$$

$$20) (9.3, 9.4), (8.3, -8.7)$$

$$\frac{9.3 + 8.3}{2}, \frac{9.4 - 8.7}{2}$$

$$8.8, .35$$

Given the midpoint and one endpoint of a line segment, find the other endpoint.

$$21) \text{Endpoint: } (-9, -1), \text{midpoint: } (8, 14)$$

$$8 = \frac{x - 9}{2}, 14 = \frac{y - 1}{2}$$

$$16 = x - 9, 28 = y - 1$$

$$x = 25, y = 29$$

$$22) \text{Endpoint: } (10, 12), \text{midpoint: } (6, 9)$$

$$6 = \frac{x + 10}{2}, 9 = \frac{y + 12}{2}$$

$$12 = x + 10, 18 = y + 12$$

$$x = 2, y = 6$$

$$23) \text{Endpoint: } (-8, -10), \text{midpoint: } (10, -7)$$

$$10 = \frac{x - 8}{2}, -7 = \frac{y - 10}{2}$$

$$20 = x - 8, -14 = y - 10$$

$$x = 28, y = 4$$

$$24) \text{Endpoint: } (-11, 9), \text{midpoint: } (3, -11)$$

$$3 = \frac{x - 11}{2}, -11 = \frac{y + 9}{2}$$

$$6 = x - 11, -22 = y + 9$$

$$x = 17, y = -31$$

$$25) \text{Endpoint: } (-2, 7), \text{midpoint: } (12, -10)$$

$$12 = \frac{x - 2}{2}, -10 = \frac{y + 7}{2}$$

$$24 = x - 2, -20 = y + 7$$

$$x = 26, y = -27$$

$$26) \text{Endpoint: } (11, 14), \text{midpoint: } (10, 14)$$

$$10 = \frac{x + 11}{2}, 14 = \frac{y + 14}{2}$$

$$20 = x + 11, 28 = y + 14$$

$$x = 9, y = 14$$

$$27) \text{Endpoint: } (14, -8), \text{midpoint: } (5, 8)$$

$$5 = \frac{x + 14}{2}, 8 = \frac{y - 8}{2}$$

$$10 = x + 14, 16 = y - 8$$

$$x = -4, y = 24$$

$$28) \text{Endpoint: } (-9, 0), \text{midpoint: } (10, -7)$$

$$10 = \frac{x - 9}{2}, -7 = \frac{y}{2}$$

$$20 = x - 9, y = -14$$

$$x = 29, y = -14$$

$$29) \text{Endpoint: } \left(-\frac{5}{6}, -\frac{1}{3}\right), \text{midpoint: } \left(\frac{1}{2}, -1\right)$$

$$\frac{1}{2} = \frac{x - \frac{5}{6}}{2}, -1 = \frac{y - \frac{1}{3}}{2}$$

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$$2\left(\frac{1}{2} + \frac{5}{12}\right) = x, -1 = \frac{y - \frac{1}{3}}{2}$$

$$x = \frac{11}{6}, y = -\frac{5}{3}$$

$$30) \text{Endpoint: } \left(2, \frac{12}{7}\right), \text{midpoint: } \left(\frac{1}{3}, -\frac{8}{5}\right)$$

$$\frac{1}{3} = \frac{x + 2}{2}, -\frac{8}{5} = \frac{y + \frac{12}{7}}{2}$$

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$$x = \frac{2}{3} - 2 = -\frac{4}{3}, y = -\frac{17}{35}$$