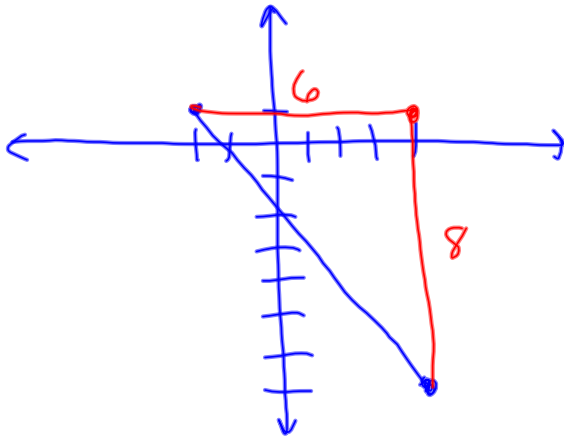
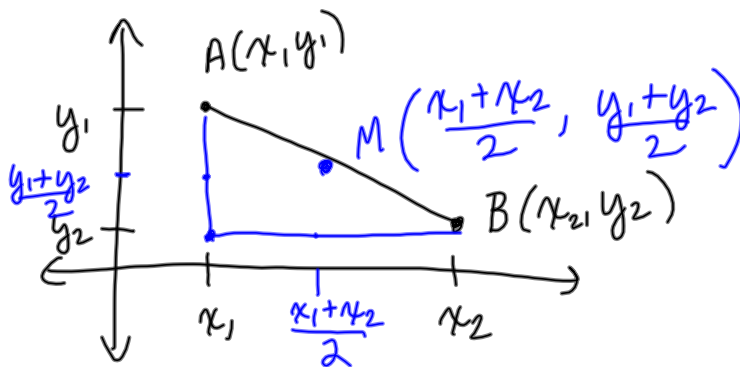


What is the distance between
 $(-2, 1)$ and $(4, -7)$?



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 6^2 + 8^2 &= d^2 \\ 36 + 64 &= d^2 \\ 100 &= d^2 \\ \boxed{10 = d} \end{aligned}$$

Midpoint



Find the midpoint of the segment joining
 a. $A(5, 4)$ and $B(-1, 6)$.

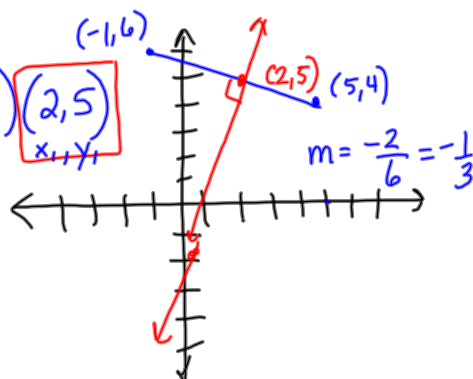
$$\left(\frac{5 + (-1)}{2}, \frac{4 + 6}{2} \right) = \left(\frac{4}{2}, \frac{10}{2} \right) = (2, 5)$$

b. $(3, 8), (-5, -10)$

$$\left(\frac{3 + (-5)}{2}, \frac{8 + (-10)}{2} \right) = \left(\frac{-2}{2}, \frac{-2}{2} \right) = (-1, -1)$$

Write an equation for the perpendicular bisector of the line segment joining
a. $A(5,4)$ and $B(-1,6)$.

midpt: $\left(\frac{5+(-1)}{2}, \frac{4+6}{2}\right) = \left(\frac{4}{2}, \frac{10}{2}\right) = (2,5)$



$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6-4}{-1-5} = \frac{2}{-6} = -\frac{1}{3}$

$m_{\perp} = +\frac{3}{1} = 3$
(switch + flip)

equation: point-slope form

$$y - y_1 = m(x - x_1)$$

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$$\begin{aligned} y - 5 &= 3(x - 2) \\ y - 5 &= 3x - 6 \\ y + 5 & \quad \quad + 5 \\ \hline y &= 3x - 1 \end{aligned}$$

b. $(-2,1)$ $(4,-7)$

midpt:

$$\left(\frac{-2+4}{2}, \frac{1+(-7)}{2}\right) = \left(\frac{2}{2}, \frac{-6}{2}\right) = (1, -3)$$

slope:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-7-1}{4-(-2)} = \frac{-8}{6} = -\frac{4}{3}$$

perp. slope
(switch + flip):

$$m_{\perp} = +\frac{3}{4}$$

equation:

$$y - y_1 = m(x - x_1) = y - (-3) = \frac{3}{4}(x - 1)$$

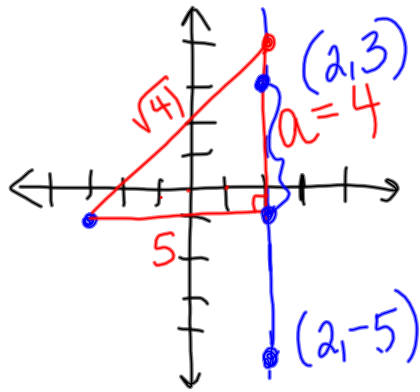
$$y + 3 = \frac{3}{4}x - \frac{3}{4}$$

$$-3 \quad \quad -3 \cdot \frac{4}{4} = -\frac{12}{4}$$

$$y = \frac{3}{4}x - \frac{15}{4}$$

Use the given distance d between the two points to find x or y .

a. $(-3, -1)$, $(2, y)$ $d = \sqrt{41}$



$$a^2 + 5^2 = (\sqrt{41})^2$$

$$a^2 + 25 = 41$$

$$\begin{array}{r} -25 \\ -25 \end{array}$$

$$a^2 = 16$$

$$a = \pm 4$$

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

$$\sqrt{41} = \sqrt{(2 - (-3))^2 + (y - (-1))^2}$$

$$41 = (2 - (-3))^2 + (y - (-1))^2$$

$$41 = (5)^2 + (y + 1)^2$$

$$41 = 25 + (y + 1)^2$$

$$\begin{array}{r} -25 \\ -25 \end{array}$$

$$16 = (y + 1)^2$$

$$\pm\sqrt{16} = \sqrt{(y + 1)^2}$$

$$\begin{array}{r} \pm 4 = y + 1 \\ +1 \quad +1 \end{array}$$

$$4 + 1, -4 + 1 = y$$

$$y = 5, -3$$

p. 493 (3, 11, 15, 33, 35, 43)