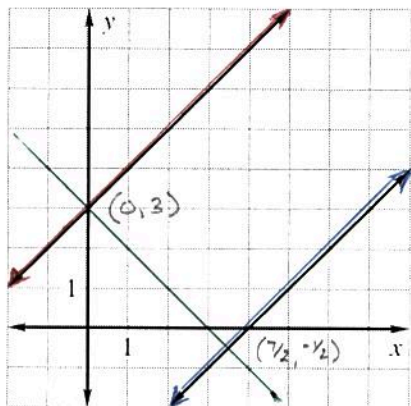


SHOW ALL WORK!

Find the distance between the two parallel lines *algebraically*. Find the distance exactly then round answers to the nearest tenth.

1.



$$y = x + 3 \quad y = x - 4$$

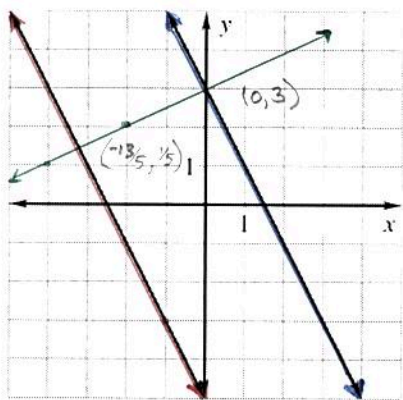
$$m_{\perp} = -1 \quad y = -x + 3$$

$$\begin{aligned} y &= -x + 3 & y &= x - 4 \\ \underbrace{-x + 3} &= x - 4 \\ -2x &= -7 \\ x &= 7/2 \end{aligned}$$

$$\begin{aligned} y &= -7/2 + 3 & (7/2, -1/2) \\ y &= -7/2 + 7/2 \\ y &= -1/2 \end{aligned}$$

$$\begin{aligned} d &= \sqrt{(7/2 - 0)^2 + (-1/2 - 3)^2} \\ d &= \sqrt{\frac{49}{4} + (-7/2)^2} & \begin{matrix} 49 \\ \wedge \\ + 49 \end{matrix} \\ d &= \sqrt{\frac{49}{4} + \frac{49}{4}} \\ d &= \sqrt{\frac{98}{4}} = \frac{7\sqrt{2}}{2} \approx 4.9 \end{aligned}$$

2.



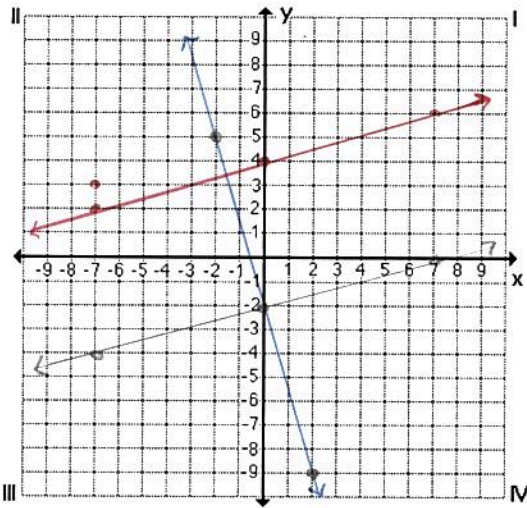
$$y = -2x - 5 \quad y = -2x + 3$$

$$m_{\perp} = \frac{1}{2} \quad y = \frac{1}{2}x + 3$$

$$\begin{aligned} y &= \frac{1}{2}x + 3 & y &= -2x - 5 \\ \underbrace{\frac{1}{2}x + 3} &= -2x - 5 \\ x + 6 &= -4x - 10 \\ 5x &= -16 \\ x &= -16/5 \\ y &= -2(-16/5) - 5 & (-16/5, 7/5) \\ y &= 32/5 - 25/5 \\ y &= 7/5 \end{aligned}$$

$$\begin{aligned} d &= \sqrt{(0 + 16/5)^2 + (3 - 7/5)^2} \\ d &= \sqrt{\frac{256}{25} + (\frac{8}{5})^2} & \begin{matrix} 256 \\ \wedge \\ + 64 \end{matrix} \\ d &= \sqrt{\frac{256}{25} + \frac{64}{25}} \\ d &= \sqrt{\frac{320}{25}} = \frac{\sqrt{320}}{5} \approx 3.6 \end{aligned}$$

3. $y = \frac{2}{7}x + 4$ and $y = \frac{2}{7}x - 2$



$$\begin{array}{r} 49492 \\ \wedge \\ 4 \quad 12373 \end{array}$$

$$m_{\perp} = -\frac{7}{2} \quad (0, -2)$$

$$y + 2 = -\frac{7}{2}(x - 0)$$

$$y = -\frac{7}{2}x - 2 \quad y = \frac{2}{7}x + 4$$

$$\left(-\frac{7}{2}x - 2 = \frac{2}{7}x + 4 \right) \quad | \cdot 14$$

$$-49x - 28 = 4x + 56$$

$$-53x = 84$$

$$x = \frac{84}{-53}$$

$$y = -\frac{7}{2} \left(\frac{84}{-53} \right) - 2$$

$$y = \frac{294}{53} - \frac{106}{53}$$

$$y = \frac{188}{53}$$

$$\left(\frac{84}{-53}, \frac{188}{53} \right)$$

$$d = \sqrt{\left(0 + \frac{84}{53} \right)^2 + \left(-2 - \frac{188}{53} \right)^2}$$

$$d = \sqrt{\frac{7056}{2809} + \frac{86436}{2809}}$$

$$d = \sqrt{\frac{93492}{2809}}$$

$$d = \sqrt{\frac{1764}{53}} \approx 5.8$$