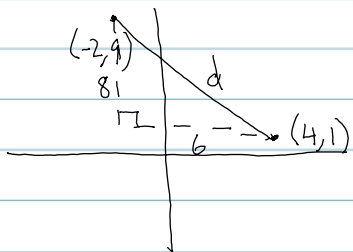
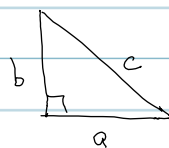


Lines and Distance

- a) Find the distance between $(-2, 9)$ and $(4, 1)$.



The Pythagorean Theorem



$$c^2 = a^2 + b^2$$

$$4 - (-2) = 6$$

$$9 - 1 = 8$$

$$d^2 = 6^2 + 8^2$$

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

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

$$= \sqrt{100}$$

$$d = 10$$

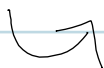
- b) Find the equation of the straight line running through both points.

$$m = \frac{y_B - y_A}{x_B - x_A} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$$

$$A: (-2, 9) \quad x_A = -2 \quad y_A = 9$$

$$B: (4, 1) \quad x_B = 4 \quad y_B = 1$$

$$m = \frac{1 - 9}{4 - (-2)} = \frac{-8}{6} = -\frac{4}{3}$$



point-slope: $y - y_0 = m(x - x_0)$ (4, 1)

~~$y = x$~~
 $y - 1 = -\frac{4}{3}(x - 4)$

slope-intercept: $y = mx + b$ (4, 1)
 $1 = -\frac{4}{3}(4) + b$

$$1 = -\frac{16}{3} + b$$

$$b = 1 + \frac{16}{3}$$

$$= \frac{19}{3}$$

$$y = -\frac{4}{3}x + \frac{19}{3}$$

$$\begin{aligned} y - 1 &= -\frac{4}{3}(x - 4) \\ y &= -\frac{4}{3}x + \frac{16}{3} + 1 \\ &= -\frac{4}{3}x + \frac{19}{3} \end{aligned}$$

← point-slope

← slope-intercept