

① Solve for  $x$  and  $y$ :

$$\begin{cases} (x-2)^2 + (y-1)^2 = 20 \\ y = 2x-3 \end{cases}$$

$$(x-2)^2 + (2x-3-1)^2 = 20$$

$$(x-2)^2 + (2x-4)^2 = 20$$

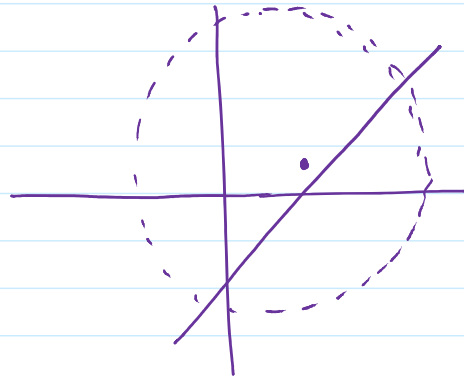
$$x^2 - 4x + 4 + 4x^2 - 16x + 16 = 20$$

$$5x^2 - 20x + 20 = 20$$

$$5x^2 - 20x = 0$$

$$5x(x-4) = 0$$

$$x = 0, 4$$



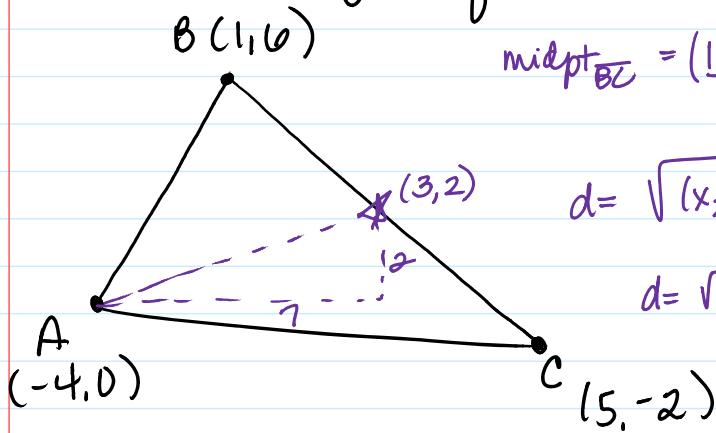
SQUARE  
DOUBLE  
SQUARE

$$\begin{pmatrix} 0 \\ -3 \end{pmatrix}, \begin{pmatrix} 4 \\ 5 \end{pmatrix}$$

② solve for  $x$  and  $y$ .

$$\begin{cases} (x+4)^2 + (y+6)^2 = 40 \\ y = -3x-18 \end{cases}$$

③ Find the length of the median from A.

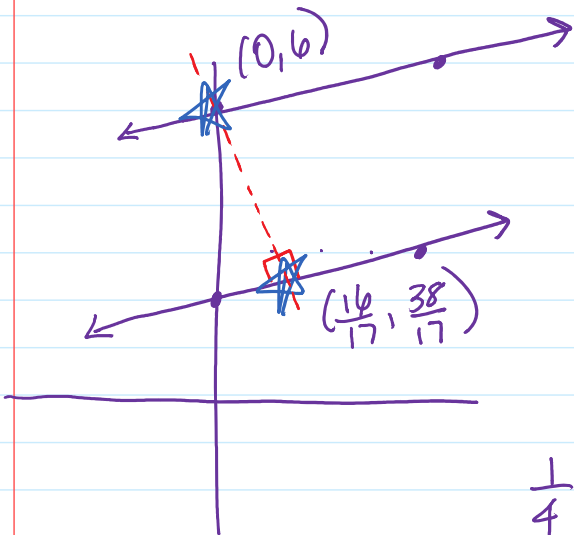


$$\text{midpt}_{BC} = \left( \frac{1+5}{2}, \frac{6+(-2)}{2} \right) = (3, 2)$$

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

$$d = \sqrt{53}$$

④ Find the distance between  $y = \frac{1}{4}x + 6$  and  $y = \frac{1}{4}x + 2$ .



- ① write a system
- ② solve system
- ③ find distance

$$\begin{cases} y = \frac{1}{4}x + 2 \\ y = -4x + 6 \end{cases}$$

$$\frac{1}{4}x + 2 = -4x + 6$$

$$x + 8 = -16x + 24$$

$$17x = 16$$

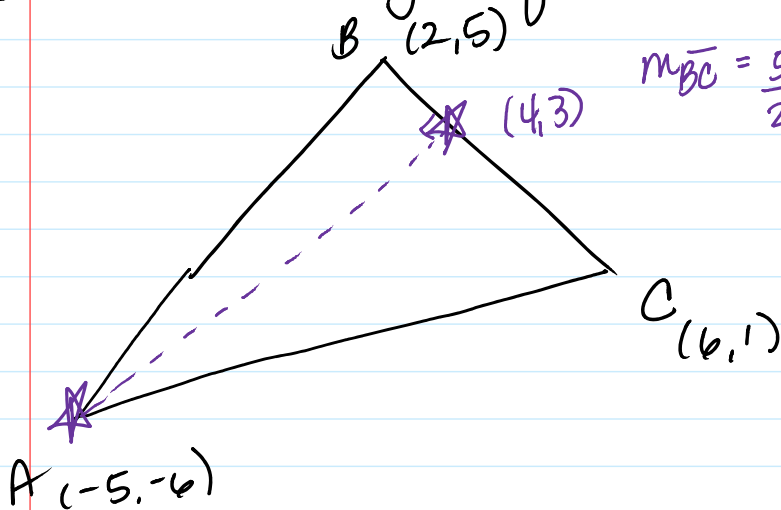
$$x = \frac{16}{17} \quad y = -4 \cdot \frac{16}{17} + 6 = \frac{-64}{17} + \frac{102}{17} = \frac{38}{17}$$

$$d = \sqrt{\left(0 - \frac{16}{17}\right)^2 + \left(6 - \frac{38}{17}\right)^2}$$

$$= \sqrt{\frac{256}{289} + \frac{4096}{289}} = \sqrt{\frac{4352}{289}} = \frac{\sqrt{4352}}{17}$$

$$= \frac{\sqrt{256 \cdot 17}}{17} = \frac{16\sqrt{17}}{17}$$

⑤ Find the length of the altitude from A.



$$m_{\overline{BC}} = \frac{5-1}{2-6} = -1$$

$$\begin{cases} y-5 = -1(x-2) \\ y+6 = 1(x+5) \end{cases}$$

$$\begin{cases} y = -x + 7 \\ y = x - 1 \end{cases}$$

$$\begin{aligned} -x + 7 &= x - 1 \\ 8 &= 2x \\ 4 &= x \\ y &= 3 \end{aligned}$$

$$\begin{aligned} d &= \sqrt{9^2 + 9^2} \\ &= 9\sqrt{2} \end{aligned}$$

