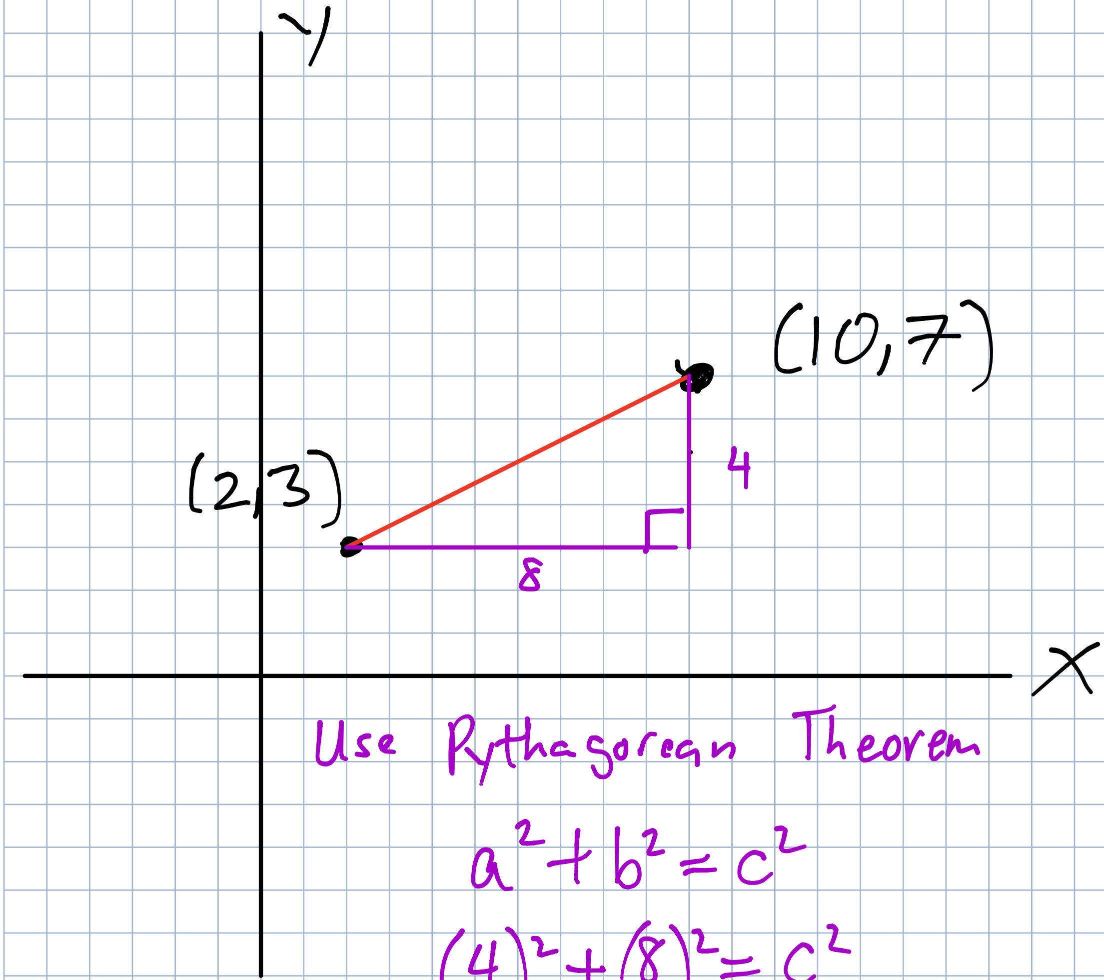


Use Pythagorean Theorem

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

$$(4)^2+(8)^2=c^2$$

$$16+64=c^2$$

$$80=c^2$$

$$\pm\sqrt{80}=\sqrt{c^2}$$

$$\pm\sqrt{80}=c$$

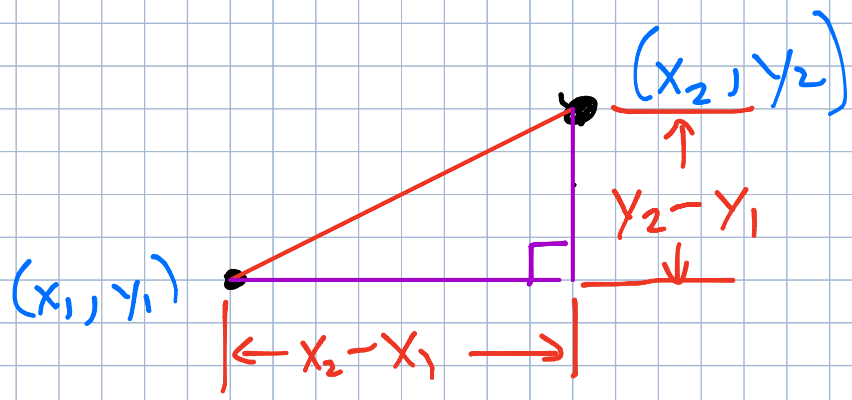
$$\pm\sqrt{16}\sqrt{5}=c$$

$$\pm 4\sqrt{5}=c$$

$$c=4\sqrt{5}$$

Reject

$c=-4\sqrt{5}$ cannot have negative length



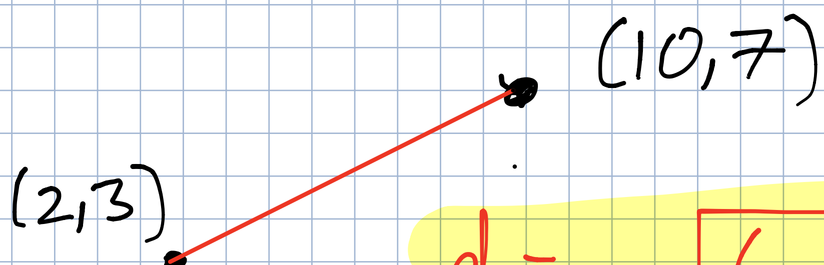
Let d = distance between (x_1, y_1) and (x_2, y_2)

$$d^2 = a^2 + b^2$$

$$d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$$

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

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



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

$$d = \sqrt{((10)-(2))^2 + ((7)-(3))^2}$$

$$d = \sqrt{(8)^2 + (4)^2}$$

$$d = \sqrt{64+16}$$

$$d = \sqrt{80}$$

$$d = \sqrt{16}\sqrt{5}$$

$$\boxed{d = 4\sqrt{5}}$$

Find the distance between $(-2,3)$ and $(4,-1)$

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

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

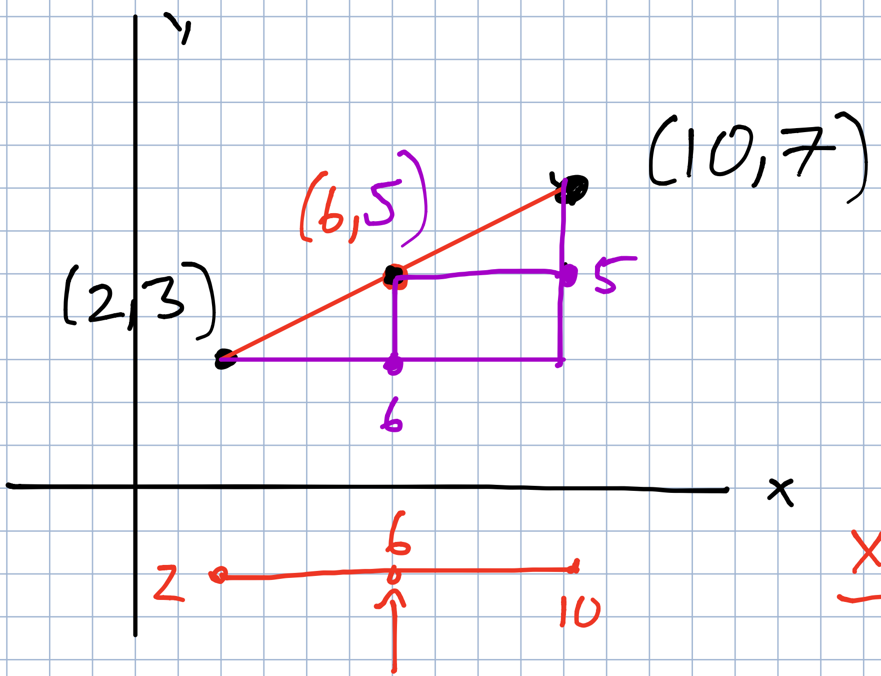
$$= \sqrt{36+16}$$

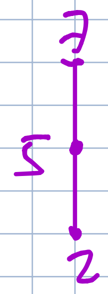
$$= \sqrt{52}$$

$$= \sqrt{4}\sqrt{13}$$

$$\boxed{d = 2\sqrt{13}}$$

Find the midpoint





$$\frac{y_1+y_2}{2} = \frac{3+7}{2} = 5$$

$$\frac{x_1+x_2}{2}$$

$$\frac{2+10}{2} = 6$$

Mid point $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

Find the midpoint $A(-11, -2)$ $B(13, -12)$

x_1 y_1 x_2 y_2

$$\text{midpoint} = \left(\frac{(-11)+(13)}{2}, \frac{(-2)+(-12)}{2}\right)$$

$$= \left(\frac{2}{2}, \frac{-14}{2}\right)$$

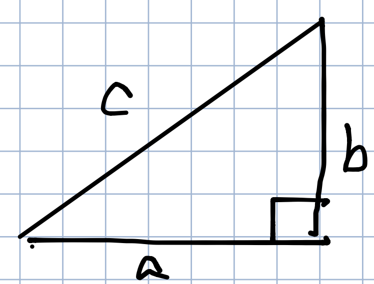
$$= (1, -7)$$

Consider Pythagorean Theorem.

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

a, b = legs of right $\triangle$

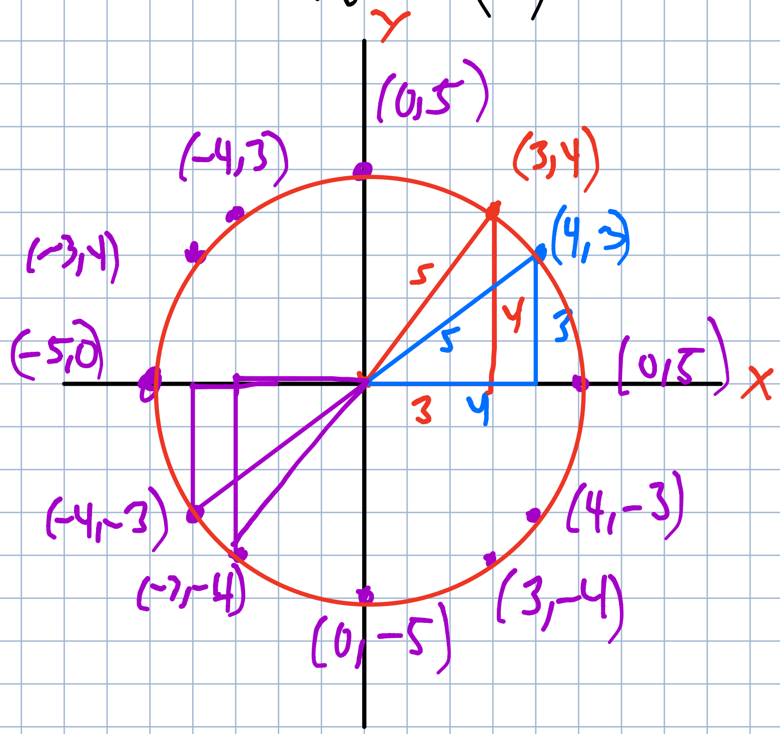
c = hypotenuse of right $\triangle$



hypotenuse = longest side
= opposite right angle

Modification: $x^2 + y^2 = r^2$

$(3)^2+(4)^2=(5)^2$



$x^2+y^2=(5)^2$

$x^2+y^2=25$

$(4)^2+(3)^2=(5)^2$

$(0)^2+(5)^2=(5)^2$

$x^2+y^2=(5)^2$

is a circle

radius is 5

center is $(0,0)$

(x,y) is a point on the circle

that has a distance of 5 from center $(0,0)$

$x^2+y^2=36$

$r=\sqrt{36}=6$ center $(0,0)$

The case of $(x-h)^2+(y-k)^2=r^2$

Recall

$(h,k) \rightarrow$ vertex of parabola

$\rightarrow$ horizontal and vertical shift of parabola

$(x-7)^2+y^2=5^2$

circle radius 5

shifted right 7

center $(7,0)$

$(x+7)^2+y^2=5^2$

circle radius 5

shifted $\leftarrow$ 7

center $(-7,0)$

$(x+10)^2+y^2=5^2$

center: $(-10,0)$

opposite sign next to h

$x^2+(y-9)^2=5^2$

radius: 5

center: (0,9)

$x^2+(y+8)^2=5^2$

radius: 5

center: (0,-8)

$(x-3)^2+(y+5)^2=5^2$

radius: 5

center: (3,-5)

$(x+2)^2+(y-1)^2=64$

Center: (-2,1)

Radius: $\sqrt{64}=8$

$$x^2+8x+y^2-2y+1=0$$

We need to write this in standard form.

$$(x-h)^2+(y-k)^2=r^2$$

$$x^2+8x+y^2-2y+1=0$$
$$\qquad\qquad\qquad\qquad -1 \quad -1$$

$$(x^2+8x)+(y^2-2y)=-1$$

$$\left(x^2+8x+\left(\underline{\underline{\tfrac{8}{2}}}\right)^2\right)+\left(y^2-2y+\left(\underline{\underline{-\tfrac{2}{2}}}\right)^2\right)=-1+\left(\tfrac{8}{2}\right)^2+\left(-\tfrac{2}{2}\right)^2$$

$$(x+\underline{\underline{4}})^2+(y\underline{\underline{-1}})^2=-1+16+1$$

$$(x+4)^2+(y-1)^2=16$$

$$(x+4)^2+(y-1)^2=(4)^2$$

Center $(-4,1)$

radius: $\sqrt{16}=4$