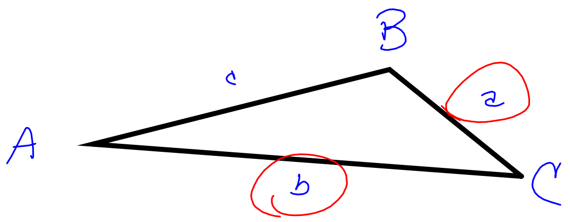
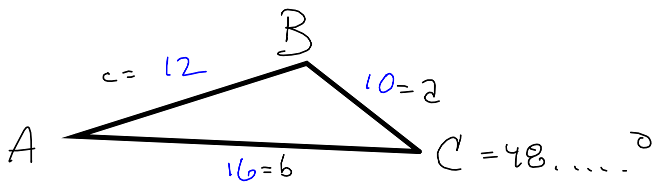


$$c^2 = a^2 + b^2 - 2ab\cos C$$

5



$$c^2 = a^2 + b^2 - 2ab\cos C$$

$$12^2 = 10^2 + 16^2 - 2(10)(16)\cos C$$

$$2(10)(16)\cos C = 10^2 + 16^2 - 12^2 = 100 + 256 - 144$$

$$320\cos C = 212$$

cos⁻¹(53/80)
48.50918314

$$\cos C = \frac{212}{320} = \frac{106}{160} = \frac{53}{80}$$

$$C = \arccos\left(\frac{53}{380}\right) \approx \boxed{48.50918314^\circ \approx C}$$

$$\frac{\sin B}{16} = \frac{\sin C}{12} \Rightarrow \sin B = \frac{16\sin C}{12} = \frac{4\sin C}{3} = \frac{4}{3}\sin(48.....^\circ)$$

$$\Rightarrow B = \sin^{-1}(\text{previous}) \approx \boxed{87.13401602^\circ \approx B}$$

cos⁻¹(53/80)
48.50918314
sin(Ans)*4/3
.9987492178
sin⁻¹(Ans)
87.13401602

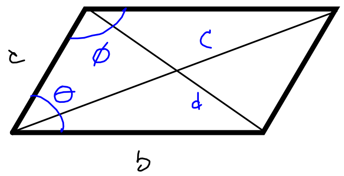
$$\Rightarrow A = 180^\circ - B - C = 180^\circ - 87...^\circ - 48...^\circ$$

$$\approx \boxed{44.35680084^\circ \approx A}$$

$$\boxed{\begin{aligned} A &\approx 44.36^\circ \\ B &\approx 87.13^\circ \\ C &\approx 48.51^\circ \end{aligned}}$$

sin(Ans)*4/3
.9987492178
sin⁻¹(Ans)
87.13401602
180-Ans-48.50918314
44.35680084

The diagonals meet at their midpoints,
because of CONGRUENT triangles.



29

$a = 15$

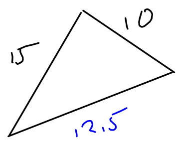
$c = 25$

$d = 20$

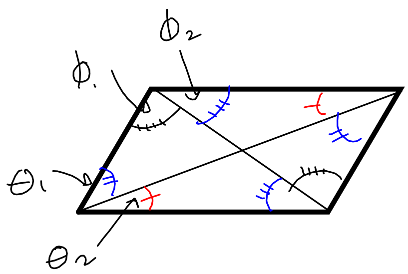
$b = ?$

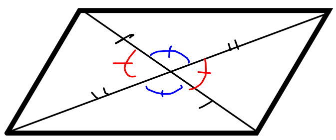
$\theta = ?$

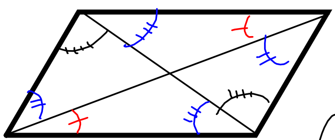
$\phi = ?$

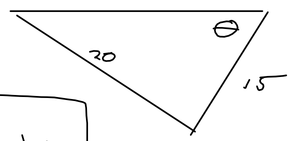


Definitely





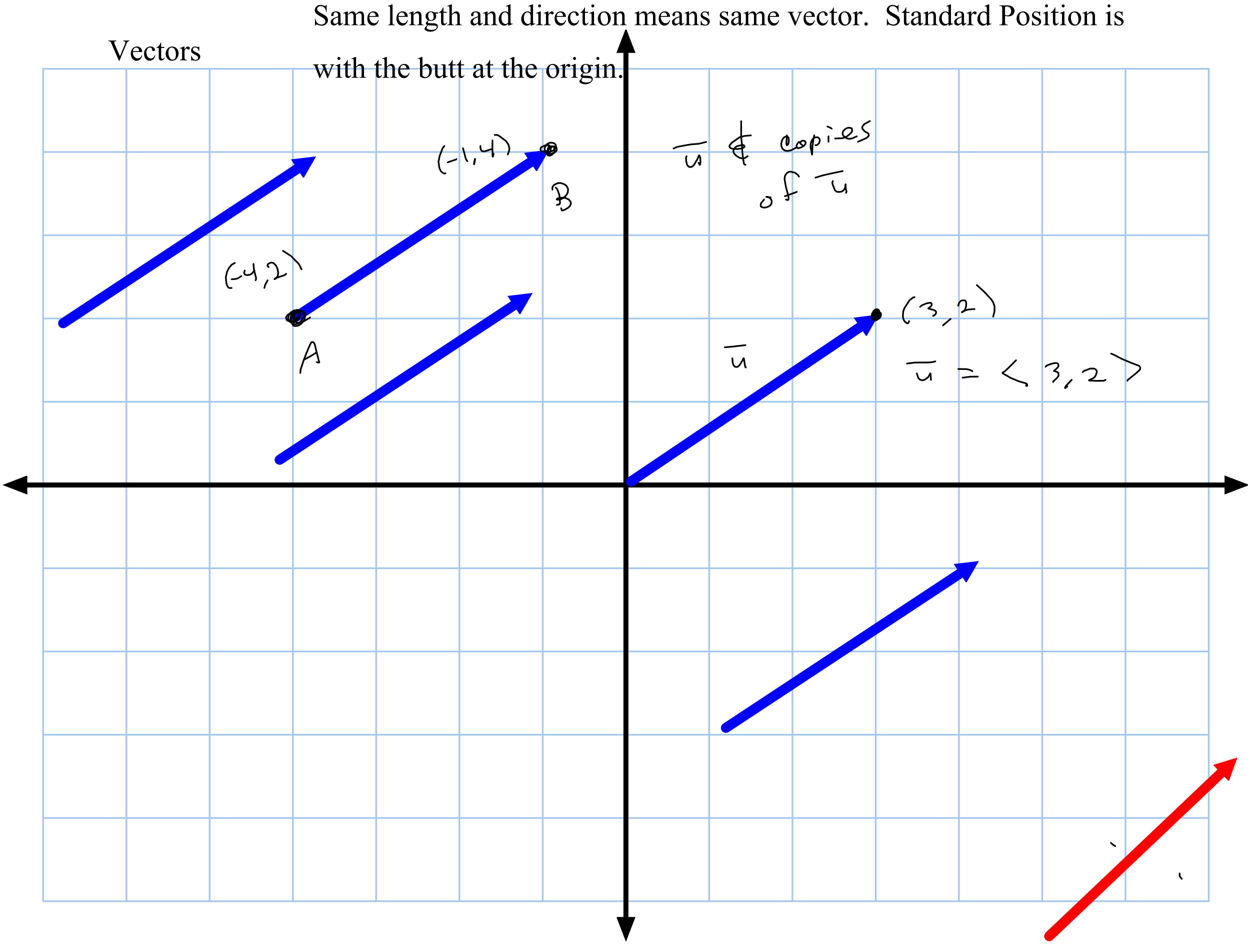




#4 Heron's

Vectors

Same length and direction means same vector. Standard Position is with the butt at the origin.



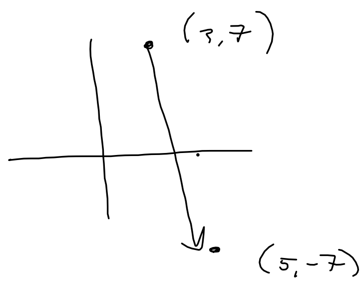
$\overrightarrow{AB}$ = Directed line segment from A to B is equivalent to $\bar{u}$

$A=(-4,2), B=(-1,4)$

$\overrightarrow{AB} = \langle -1-(-4), 4-2 \rangle = \langle 3,2 \rangle = \bar{u}$! See?

Subtract the "from" from the "to" to write the vector from A to B

$A = (3,7), \quad B = (5,-7)$



$\Rightarrow \bar{u} = \overrightarrow{AB} = \langle 2,-14 \rangle$

$= \langle 5-3, -7-7 \rangle$

Adding Vectors

$\bar{u} = \langle u_1, u_2 \rangle$

$\bar{v} = \langle v_1, v_2 \rangle$ $\Longrightarrow$ $\bar{v} + \bar{v} = \langle u_1 + v_1, u_2 + v_2 \rangle$

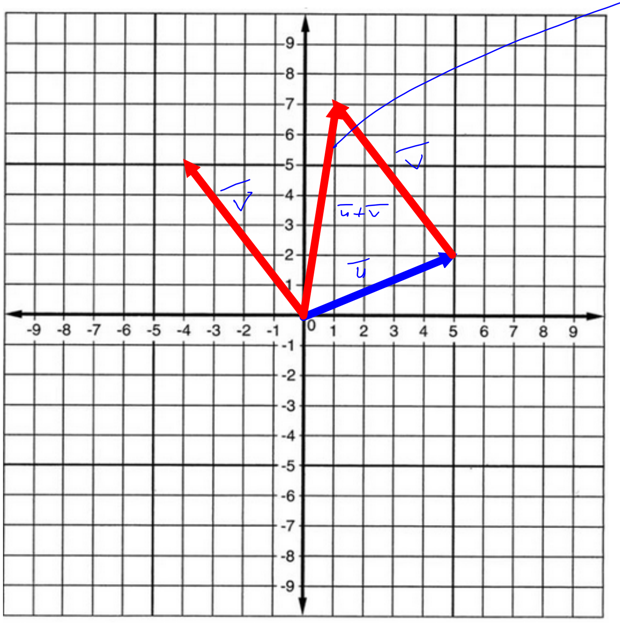
1st component/entry

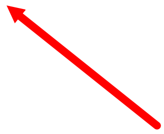
2nd component

Geometric Addition:

Nose to Tail

$\bar{w} = \bar{u} + \bar{v}$





$\bar{u} + \bar{v}$

$= \langle 5, 2 \rangle + \langle -4, 5 \rangle$

$= \boxed{\langle 1, 7 \rangle = \bar{w}}$

$\bar{u} \bullet \bar{v}$ = DOT PRODUCT

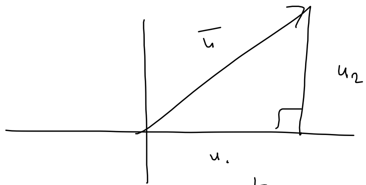
$\bar{u} \cdot \bar{v} = \langle 5, 2 \rangle \bullet \langle -4, 5 \rangle = (5)(-4) + (2)(5) = -10$

$= u_1 v_1 + u_2 v_2$

$\bar{u} \cdot \bar{u} = 5^2 + 2^2 = 25 + 4 = 29 = \|\bar{u}\|^2$

= Square of the length/magnitude of $\bar{u}$.

Length $= \sqrt{\bar{u} \cdot \bar{u}}$



Pythagorus!

$\sqrt{u_1^2 + u_2^2}$ = Length!