Please take out the
1-19 odd that we did
in class one day from the
identity worksheet.

12. going over conic review

$$4x^2 - 40x \qquad 14y^2 + 140y = -394$$

$$4(x^2 - 10x + 25) + 14(y^2 + 10x + 25) = -394$$

$+100$

$+350$

$$\frac{4(x-5)^2}{56} + \frac{14(y+5)^2}{56} = \frac{56}{56}$$

$$\frac{(x-5)^2}{14} + \frac{(y+5)^2}{4} = 1$$

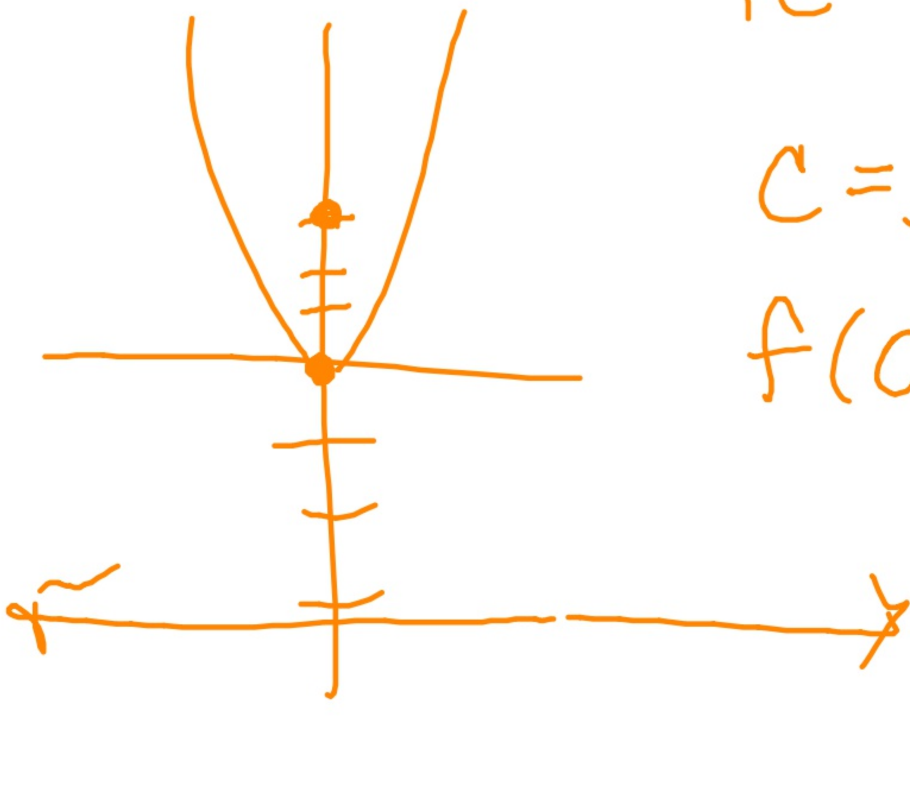
$C(5, -5)$

$$c^2 = a^2 - b^2$$

$$c^2 = 14 - 4$$

$$c = \sqrt{10}$$

2. $y = \frac{1}{12}x^2$



$\frac{1}{4c} = \frac{1}{12}$

$c = 3$

$f(0,3)$

$y = -3$

12. $4x^2-40x+14y^2+140y=-394$

$$4(x^2-10x+25)+14(y^2+10y+25)=-394$$

$+100$

$+350$

$$\frac{4(x-5)^2}{56}+\frac{14(y+5)^2}{56}=\frac{56}{56}$$

$$\frac{(x-5)^2}{14}+\frac{(y+5)^2}{4}=1$$

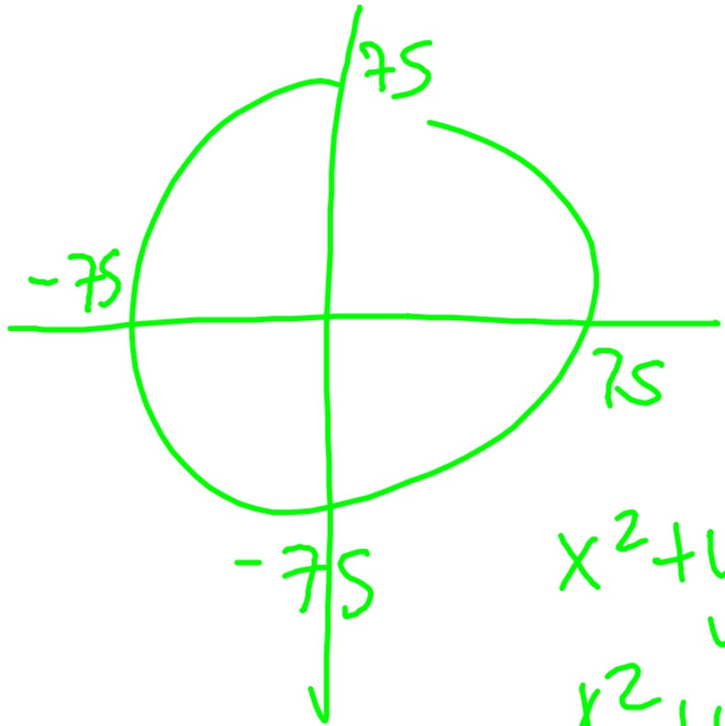
$c^2=a^2-b^2$

$c^2=14-4$

$c^2=10$

$c=\sqrt{10}$

14.



$A = \pi r^2$

$A = \pi(5625)$

A

$x^2 + y^2 = 5625$

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

14.

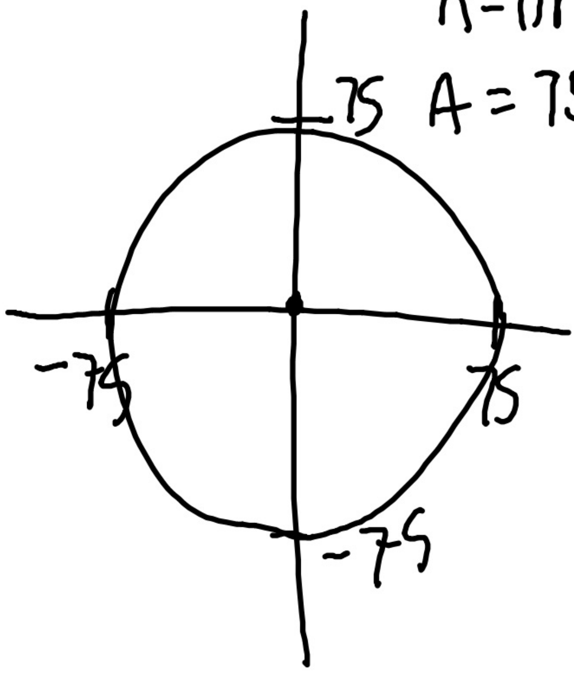
$x^2+y^2=5625$

$r^2=5625$

$r=75$

$A=\pi r^2$

$A=75^2\pi$



Vectors: Day 1 5-2-14

A vector is a directed line segment;

- know where it starts: initial point
- know where it ends: terminal point
- Name: int. pt to terminal pt

$\overrightarrow{PQ}$ vector PQ

$\mathbf{u}$ vector u

- magnitude length of a vector

$\|\overrightarrow{PQ}\|$ mag. of vector PQ

Ex. Let **u** represent the directed line segment from $P(0,0)$ to $Q(3,2)$ & **v** be represented by $R(1,2)$ & $S(4,4)$

A. Find $\|\overrightarrow{RS}\|$

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

☆ always terminal − initial

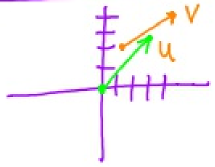
$$\|\overrightarrow{RS}\| = \sqrt{(4-1)^2+(4-2)^2}$$

$$= \sqrt{13}$$

B. $\|u\| = \sqrt{(3-0)^2+(2-0)^2}$

$\|u\| = \sqrt{13}$

C. Graph.



D. Are vector u & vector v in the same direction?

If 2 vectors have the same slope & arrow head going same way, they are in the same direction.

$$m = \frac{y_2-y_1}{x_2-x_1}$$

$$m_u = \frac{2-0}{3-0} = \frac{2}{3}$$

$$m_v = \frac{4-2}{4-1}$$

$$m_v = \frac{2}{3}$$

Yes

Two vectors are equal iff they have the same direction and same magnitude.

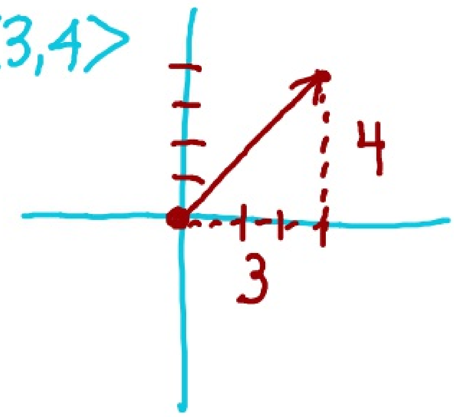
Component form

- forces the origin to be the initial pt.
- indicates only the terminal pt.
- uses triangular parenthesis. $\langle\ ,\ \rangle$
- preserves a vectors direction & magnitude

Ex $v = \langle v_1, v_2 \rangle$

- magnitude: $\|v\| = \sqrt{v_1^2 + v_2^2}$

Ex $v\langle 3,4 \rangle$



pythagorean Thm

Ex Given: vector w

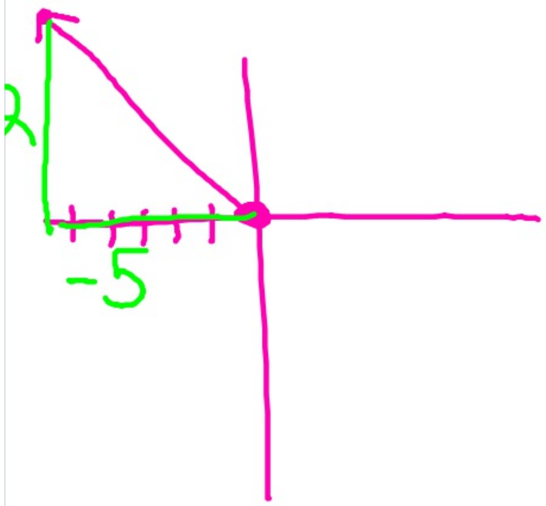
initial pt $(4,-7)$, terminal pt $(-1,5)$

A. find component form

$\langle \text{term} - \text{init}, \text{term} - \text{init} \rangle = \langle -5, 12 \rangle$

~~$x_2 - x_1$, $y_2 - y_1$~~

B. Draw



C. state magnitude

$\|w\| = \sqrt{25+144}$

$\|w\| = \sqrt{169}$

$\|w\| = 13$

Vector Operations

- add $u+v=\langle u_1+v_1, u_2+v_2\rangle$
- subtract $u-v=\langle u_1-v_1, u_2-v_2\rangle$
- scalar multiplication: $k\mathbf{u}=\langle ku_1, ku_2\rangle$

Ex Let $u = \langle -2, 5 \rangle$, $v = \langle -1, 0 \rangle$, $w = \langle 3, 7 \rangle$

A. $u - v$

$\langle -1, 5 \rangle$

B. $w + u$

$\langle 1, 12 \rangle$

C. $2v$

$\langle -2, 0 \rangle$

D. $3v - 2w$

$\langle -3, 0 \rangle - \langle 6, 14 \rangle$

$\langle -9, -14 \rangle$

$\langle -3, 0 \rangle + \langle -6, -14 \rangle$

The Unit Vector

- A unit vector has a magnitude of 1.
- To make a unit vector:

$$\frac{\mathbf{u}}{\|u\|}$$

Ex: $u = \langle -1, 7 \rangle$

$\|u\| = \sqrt{1+49}$

$= \sqrt{50}$

$= 5\sqrt{2}$

$$\frac{\langle -1, 7 \rangle}{5\sqrt{2}}$$

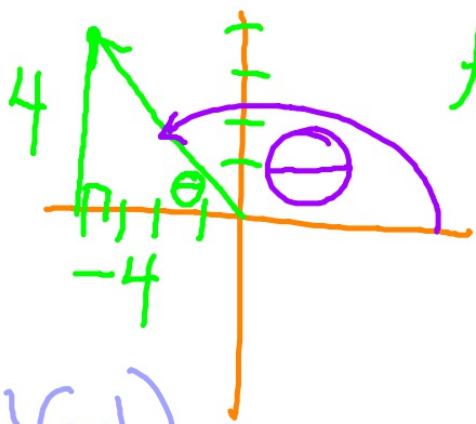
$$\left\langle -\frac{1}{5\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}, \frac{7}{5\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \right\rangle$$

$$\left\langle -\frac{\sqrt{2}}{10}, \frac{7\sqrt{2}}{10} \right\rangle$$

Direction Angle of u

$$\tan\theta = \frac{u_2}{u_1}$$

Ex $v = \langle -4, 4 \rangle$ find direction $\angle$ (degrees)



$\tan\theta = \frac{4}{-4}$

$\tan\theta = -1$

$\boxed{\theta = 135^\circ}$

$\tan\theta = -1$

$\theta = \tan^{-1}(-1)$

Angle must be in the same quadrant as the vector. That means the calculator will not always give you the correct answer.