

I'm Gone Friday the 4th

Final Test + Wednesday, May 9th, 8:10-10:00 am

Quiz on Friday the 4th

Please Do teacher evals online
Check your e-mail

Finishing this semester: Conic Sections

Parabolas ✓

Ellipses

Hyperbolas

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$



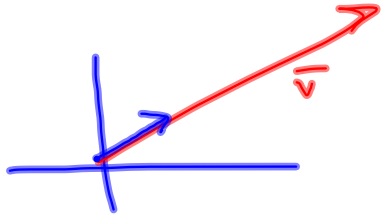
$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1, \quad \frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$$

Circles?

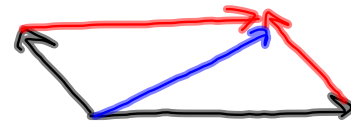
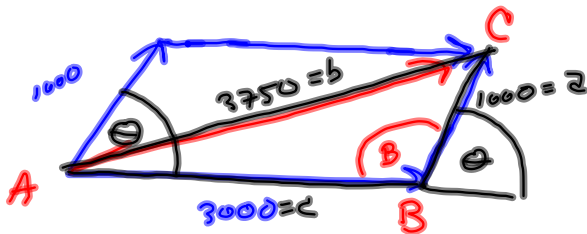
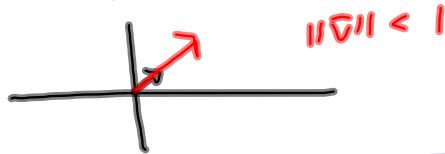
$$x^2 + y^2 = r^2$$

$$\frac{x^2}{r^2} + \frac{y^2}{r^2} = 1$$

unit vector $\frac{1}{\|\vec{v}\|} \vec{v} = \frac{1}{\|\vec{v}\|} \langle v_1, v_2 \rangle$
 in the direction of \vec{v} . $= \langle \frac{v_1}{\|\vec{v}\|}, \frac{v_2}{\|\vec{v}\|} \rangle$



$$\#2 \frac{1}{\sqrt{50}} \langle 3, 7 \rangle$$



$$\theta = 180^\circ - B$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$2ac \cos B = a^2 + c^2 - b^2$$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

$$= \frac{1000^2 + 3000^2 - 3750^2}{2(1000)(3000)}$$

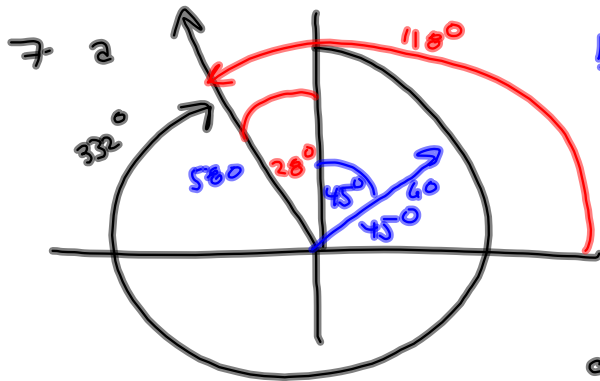
$$= -.67708\bar{3} = \cos B \Rightarrow$$

$$B = \cos^{-1}(\bar{3})$$

$$\approx 132.6161427^\circ$$

$$\Rightarrow \theta \approx 180^\circ - 132.6161427^\circ$$

$$\approx 47.384^\circ$$



$$b. \vec{w} = 60 \langle \cos 45^\circ, \sin 45^\circ \rangle$$

$$c. \vec{p} = 580 \langle \cos 118^\circ, \sin 118^\circ \rangle \\ = 580 \langle p_1, p_2 \rangle$$

is the ai

$$d. \|\vec{p}\| = \sqrt{(580 p_1)^2 + (580 p_2)^2} \\ = \sqrt{(580 \cos 118^\circ)^2 + (580 \sin 118^\circ)^2} \\ = \sqrt{580^2 (\cos^2 118^\circ + \sin^2 118^\circ)} \\ = 580, \text{ silly boy!}$$

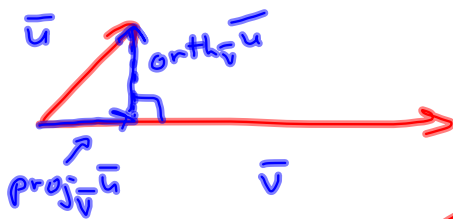
In direction:

$$\vec{w} + \vec{p} = \langle 60 \cos 45^\circ + 580 \cos 118^\circ, 60 \sin 45^\circ + 580 \sin 118^\circ \rangle \\ = \vec{u} = u_1 + u_2$$

$$\|\vec{u}\| = \sqrt{u_1^2 + u_2^2}$$

$$\approx 600.2908219$$

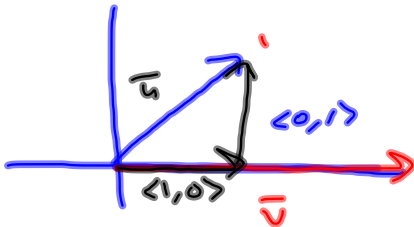
$$\approx 600 \text{ mph}$$



$$\bar{u} = \underbrace{\text{proj}_{\bar{v}} \bar{u}} + \underbrace{\text{orth}_{\bar{v}} \bar{u}} \rightarrow \bar{u} - \text{proj}_{\bar{v}} \bar{u}$$

$$= \frac{\bar{u} \cdot \bar{v}}{\|\bar{v}\|^2} \bar{v}$$

#12 on the homework was awful
I chose $\bar{u} \perp \bar{v}$

Example

$$\vec{u} = \langle 1, 1 \rangle$$

$$\vec{v} = \langle 5, 0 \rangle$$

is

$$\text{proj}_{\vec{v}} \vec{u} = \frac{\vec{u} \cdot \vec{v}}{\|\vec{v}\|^2} \vec{v} = \frac{\langle 1, 1 \rangle \cdot \langle 5, 0 \rangle}{5^2} \langle 5, 0 \rangle$$

$$= \left(\frac{5}{5^2} \right) \langle 5, 0 \rangle$$

$$= \frac{1}{5} \langle 5, 0 \rangle = \langle 1, 0 \rangle$$

Find him
Subtract
him from
 \vec{u}

$$\text{And } \text{orth}_{\vec{v}} \vec{u} = \vec{u} - \text{proj}_{\vec{v}} \vec{u} = \langle 1, 1 \rangle - \langle 1, 0 \rangle = \langle 0, 1 \rangle$$

$\text{orth}_{\vec{v}} \vec{u}$

$$\text{So } \vec{u} = \langle 1, 0 \rangle + \langle 0, 1 \rangle$$

Read ellipses & hyperbolas,

work odd problems

I'll have a worksheet for you today
or tomorrow morning