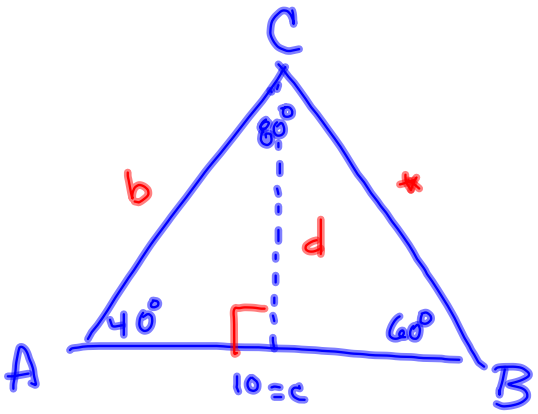


$\frac{d}{b} = \sin 40^\circ$

$d = b \sin 40^\circ \approx 5.65279$

$\approx$ 6 MILES

$\frac{b}{\sin 60^\circ} = \frac{10}{\sin 80^\circ}$

$b = \frac{10 \sin 60^\circ}{\sin 80^\circ}$

≈ 8.793852416

60°

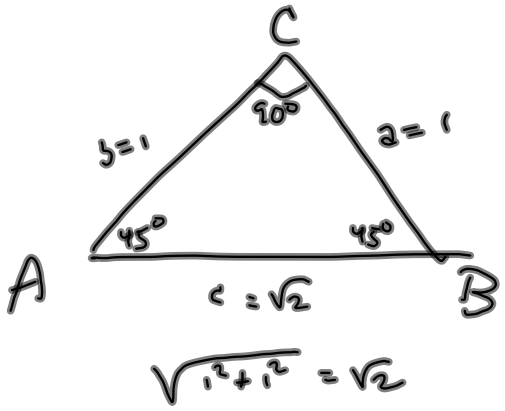
$\frac{d}{b} =$

I used $d = b \sin 60^\circ$

and the 60° should be 40°. My solutions are off.

~~Quiz~~ Homework 6 #1f

$A = 45^\circ$, $a = b = 1$



$\sqrt{1^2 + 1^2} = \sqrt{2}$

ASS with unique sol'n

$$\frac{\sin B}{1} = \frac{\sin 45^\circ}{1}$$

$$\sin B = \sin 45^\circ$$

$$c = \sqrt{2}$$

Homework 7

5. **3.3** Find the component form of the vector of magnitude 3 with direction angle 83^0. Round to 3 decimal places, if necessary.
6. **3.3** Find the angle between 2 force vectors if the magnitude of one is 3,000 pounds, the magnitude of the other is 1,000 pounds and the resultant force is 3750 pounds. This is a nice puzzle.
7. **3.3** #102 in the text. Keep in mind "bearing" is measured clockwise from due North.
   A commercial jet is flying on a bearing of 332°. Its airspeed is 580 miles per hour. The wind is blowing from the southwest with a speed of 60 miles per hour.
   a. Draw a figure that gives a visual representation of the situation.
   b. Write the velocity of the wind as a vector in component form (Leave it in terms of sines and cosines.)
   c. Write the velocity of the plane as a vector in component form (Leave it in terms of sines and cosines.)
   d. What is the speed of the jet with respect to the ground?
   e. What is the true direction of the jet?

Like #5- $\theta = 75^\circ$, $\|\bar{v}\| = 7$

$\bar{v} = \langle 7\cos 75^\circ, 7\sin 75^\circ \rangle$

$= 7\langle \cos 75^\circ, \sin 75^\circ \rangle$

$= \|\bar{v}\| \langle \cos\theta, \sin\theta \rangle$

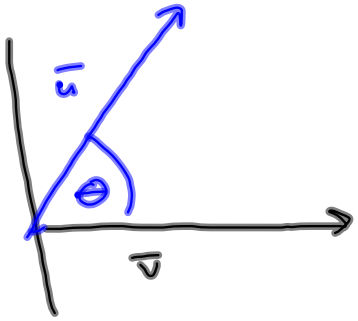
Like #6 Magnitude of resultant is 40

$\|\bar{u}\| = 20$

$\|\bar{v}\| = 30$

What's the angle between them?

$\|\bar{w}\| = \|\bar{u} + \bar{v}\| = 40$



$\bar{u} = 20\langle \cos\theta, \sin\theta \rangle$

$\bar{v} = 30\langle \cos 0^\circ, \sin 0^\circ \rangle = 30\langle 1, 0 \rangle = \langle 30, 0 \rangle$

$\bar{u} + \bar{v} = \bar{w} = \langle 20\cos\theta + 30, 20\sin\theta \rangle$

Couple ideas:

We know $\|\bar{w}\| = 40$

gives

$400(\cos^2\theta + \sin^2\theta)$ → 900 !

$(20\cos\theta + 30)^2 = 400\cos^2\theta + 1200\cos\theta + 400\sin^2\theta$ Dummy!

$(20\sin\theta)^2 = 400\sin^2\theta$ $\quad a^2+b^2=c^2$

So $\|\bar{w}\|^2 = \underbrace{400 + 1200\cos\theta + 400\sin^2\theta}_{+900} = 40^2 = 1600$

$\Rightarrow 4\sin^2\theta + 12\cos\theta + 4 = 16$

$\Rightarrow \sin^2\theta + 3\cos\theta + 1 = 4$ 900

$\Rightarrow 1 - \cos^2\theta + 3\cos\theta - 3 = 0$

$\Rightarrow -\cos^2\theta + 3\cos\theta - 2 = 0$

$\Rightarrow \cos^2\theta - 3\cos\theta + 2 = 0$

$\Rightarrow (\cos\theta - 2)(\cos\theta - 1) = 0 \Rightarrow$ ——

$\cos\theta = 2$ OR $\cos\theta = 1 \Rightarrow$

Never

$\theta = 0$!?

This is wrong.

Another approach to this one:

$$\cos\Theta = \frac{\bar{u}\cdot\bar{v}}{\|\bar{u}\|\,\|\bar{v}\|}$$

I don't see this leading anywhere, so 1st approach was OK, except for Brain flatulating.

Given $\|\bar{w}\| = \|\bar{u}+\bar{v}\| = 40$

$\|\bar{u}\| = 20$

$\|\bar{v}\| = 30$

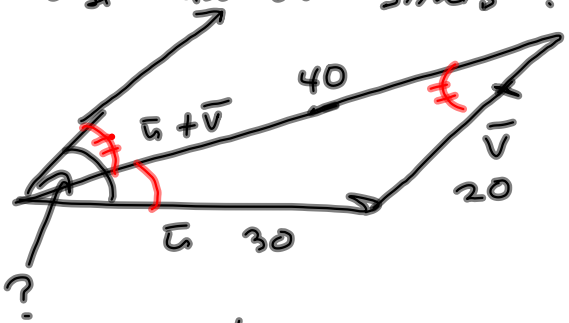
$$\|\bar{w}\| = \|\bar{u}+\bar{v}\| = \sqrt{(\bar{u}+\bar{v})\cdot(\bar{u}+\bar{v})}$$

$$= \sqrt{\bar{u}\cdot\bar{u} + \bar{u}\cdot\bar{v} + \bar{v}\cdot\bar{u} + \bar{v}\cdot\bar{v}}$$

$$= \sqrt{\bar{u}\cdot\bar{u} + 2\bar{u}\cdot\bar{v} + \bar{v}\cdot\bar{v}}$$

Karla's idea is better yet.

Use Law of Sines!

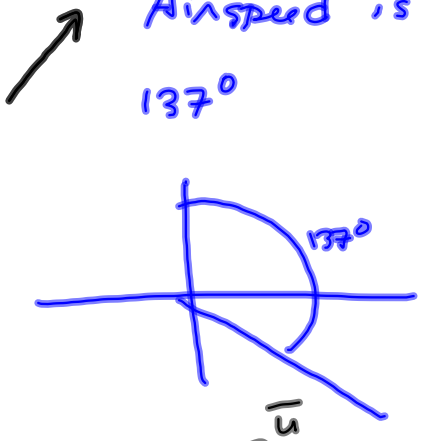


I like that! Score one for Karla!

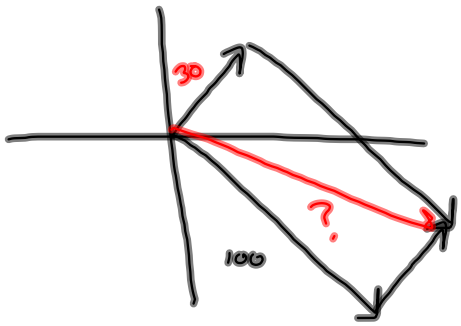
Homework Due Wed

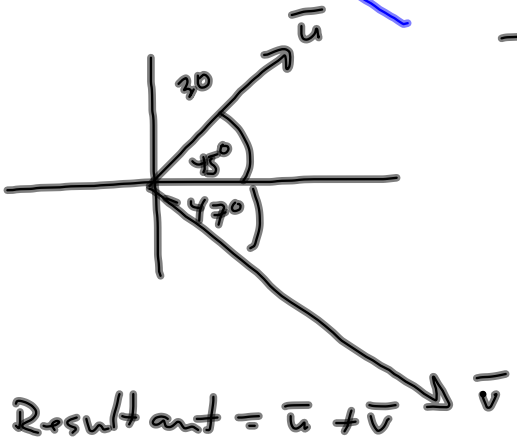
Airspeed is 100 mph on a bearing of 137°

North, 137° East.



wind from SW @ 30 mph





$\bar{u}$

$\bar{v}$

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

$= 30\langle \cos 45^\circ, \sin 45^\circ \rangle + 100\langle \cos(-47^\circ), \sin(-47^\circ) \rangle$

$\approx$ etc.