

Name \_\_\_\_\_

Honors Pre Calculus  
Solving word problems using vectors

Ex. 1 Find the component form of the vector that represents the velocity of an airplane descending at a speed of 100 miles per hour at a bearing of  $240^\circ$ .

Ex. 2 A motorboat traveling across a wide river is headed 50 degrees north of west at a constant speed of 10 miles per hour. The river current is 7 miles per hour due west. How far west does the motorboat travel in three minutes? How far north does it travel in three minutes?

Ex. 3 A plane traveling at 400 mph is flying with a bearing of  $40^\circ$ . There is a wind speed of 50 mph from the South. If no correction is made for the wind, what are the final bearing and ground speed of the plane?

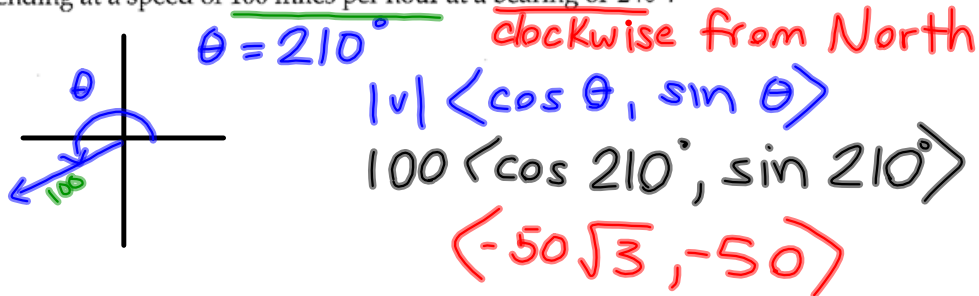
Ex. 4 A force of 600 pounds is required to pull a boat and trailer up a ramp inclined at  $15^\circ$  from the horizontal. Find the combined weight of the boat and the trailer.

Ex. 5 An airplane is traveling at a speed of 500 mph with a bearing of  $330^\circ$  at a fixed altitude with negligible wind velocity. As the airplane reaches a certain point, it encounters a wind blowing with a velocity of 70 mph in the direction N  $45^\circ$  E. What are the resultant speed and direction of the airplane?

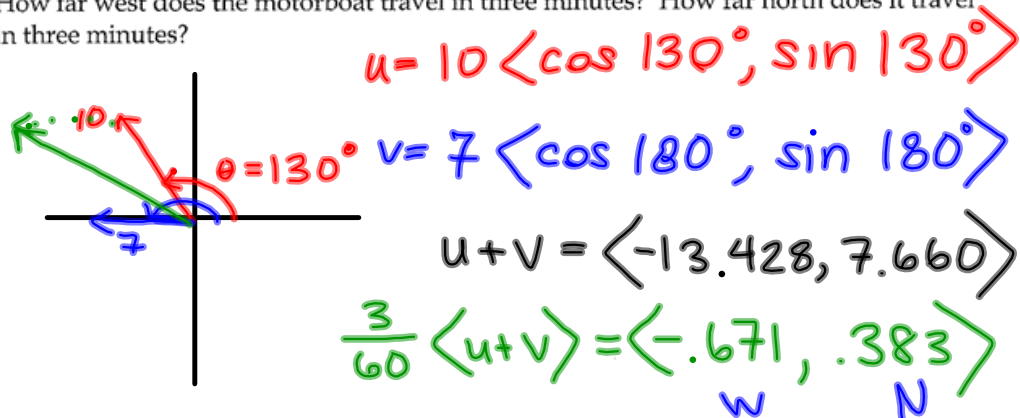
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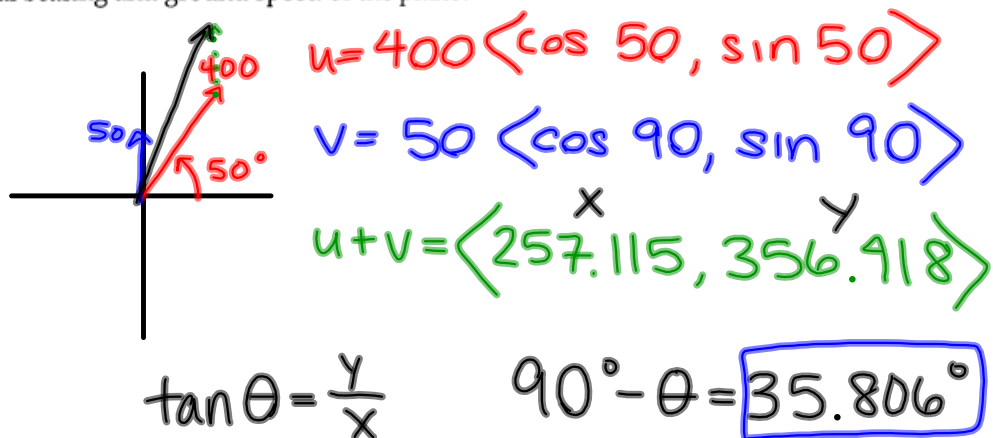
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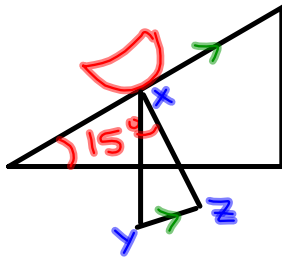


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$$|u + v| = \sqrt{x^2 + y^2} = \boxed{439.479 \text{ mph}}$$

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$\vec{xy}$  = weight of boat

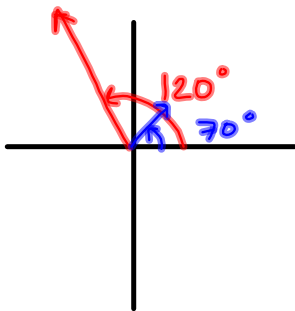
$\vec{xz}$  = force against ramp

$\vec{yz}$  = 600 lbs

$$\sin 15^\circ = \frac{600}{xy}$$

$$\vec{xy} = 2,318.222 \text{ lbs}$$

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$$500 \langle \cos 120^\circ, \sin 120^\circ \rangle$$

$$70 \langle \cos 45^\circ, \sin 45^\circ \rangle$$

$$u + v = \langle -200.503, 482.510 \rangle$$

Speed: 522.511 mph

bearing:  $337.435^\circ$

