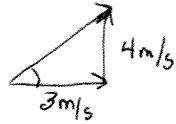


Adding Perpendicular Vectors

Name: Key
 Period: _____

- 1) Draw a model of each vector addition problem.
- 2) Label the model correctly
- 3) Using Pythagorean Theorem, find the resultant of the two (or more) vectors.
- 4) Using $\tan \theta = y/x$ find the angle measure of the resultant. $\theta = \tan^{-1} y/x$

- 1) Vector \vec{A} 3m/s @ 0°
 Vector \vec{B} 4m/s @ 90°



$$a^2 + b^2 = c^2$$

$$3^2 + 4^2 = c^2$$

$$9 + 16 = c^2$$

$$25 = c^2$$

$$5 \text{ m/s} = c$$

$$\tan \theta = \frac{y}{x}$$

$$\theta = \tan^{-1} \frac{4}{3}$$

$$\theta = \tan^{-1} \frac{4}{3}$$

$$\theta =$$

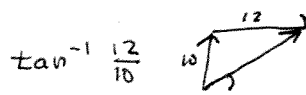
$\vec{R} = 5 \text{ m/s}$
 $\theta = 53.13^\circ$

- 2) Vector \vec{A} 10m/s @ 90°
 Vector \vec{B} 12m/s @ 0°

$$10^2 + 12^2 = c^2$$

$$100 + 144 = c^2$$

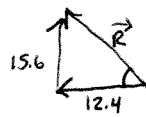
$$15.62 \text{ m/s}^2$$



$$\tan^{-1} \frac{12}{10}$$

$\vec{R} = 15.62 \text{ m/s}$
 $\theta = \cancel{90.19^\circ} 39.8^\circ$

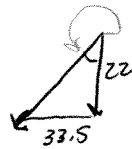
- 3) Vector \vec{A} 12.4m/s @ 180°
 Vector \vec{B} 15.6m/s @ 90°



$$(12.4)^2 + (15.6)^2 = c^2$$

$\vec{R} = 19.93 \text{ m/s}$
 $\theta = 128.48^\circ$

- 4) Vector \vec{A} 22 N @ 270°
 Vector \vec{B} 33.5 N @ 180°



$$22^2 + 33.5^2 = c^2$$

$$\theta = \tan^{-1} \frac{33.5}{22} = 56.71^\circ$$

$$270^\circ - 56.71^\circ$$

$\vec{R} = 40.08 \text{ N}$
 $\theta = 213.29^\circ$

- 5) Vector \vec{A} 46 N @ 45°
 Vector \vec{B} 30 N @ 135°

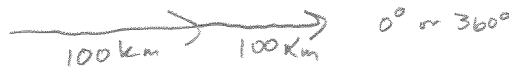


$$46^2 + 30^2 = 54.92 \text{ N}$$

$$45^\circ + 33^\circ =$$

$\vec{R} = 54.92 \text{ N}$
 $\theta = 78.11^\circ$

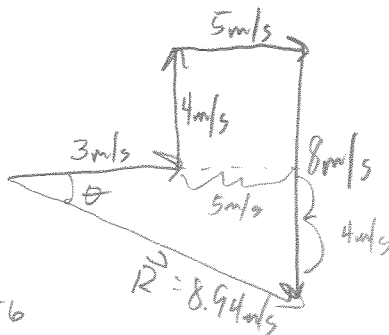
- 6) Vector \vec{A} 100 km @ 0°
 Vector \vec{B} 100km @ 360°



0° or 360°

$\vec{R} = 200 \text{ km}$
 $\theta = 360^\circ$ or 0°

- 7) Vector \vec{A} 3m/s @ 0°
 Vector \vec{B} 4m/s @ 90°
 Vector \vec{C} 5m/s @ 360°
 Vector \vec{D} 8m/s @ 270°



$$8^2 + 4^2 = 8.94 \text{ m/s}$$

$$\theta = \tan^{-1} \left(\frac{4}{8} \right) = 26.56$$

$\vec{R} = 8.94 \text{ m/s}$
 $\theta = -333.43$

$360 - 26.56 =$