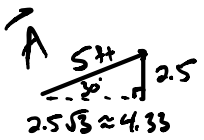
V7 - Find Resultant Vectors (More difficult problems)

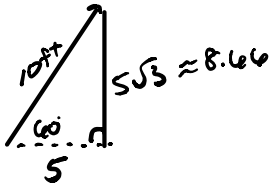
Given two vectors acting upon the same object, find the resultant vector.

1. Trying to calm his spirit from recent unmentionable traumatic events, George decides to chill with some Netflix. Before firing up *Tiger King*, George goes snack hunting. George walks 30° (standard position) for 5 feet. He then skips at 60° for 10 feet. What is the resulting course of the snacking George? (Magnitude and direction)

$\vec{R} = \vec{A} + \vec{B}$



$2.5\sqrt{3} \approx 4.33$

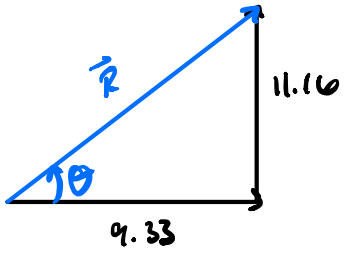


$\vec{A} = \langle 4.33, 2.5 \rangle$

$\vec{B} = \langle 5, 8.66 \rangle$

$$\vec{R} = \vec{A} + \vec{B} = \langle 4.33, 2.5 \rangle + \langle 5, 8.66 \rangle$$

$$\vec{R} = \langle 9.33, 11.16 \rangle$$



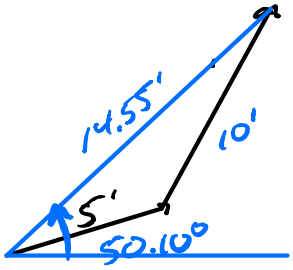
$\theta = \tan^{-1}\left(\frac{11.16}{9.33}\right)$

$\theta = 50.10°$

$\|\vec{R}\| = \sqrt{x^2 + y^2}$

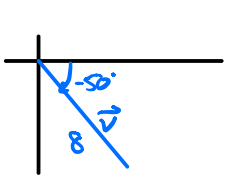
$= \sqrt{(9.33)^2 + (11.16)^2}$

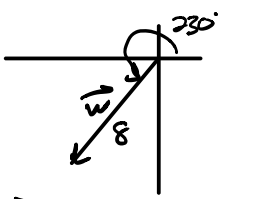
$\|\vec{R}\| = 14.55$



$\vec{R} = (14.55, 50.10°)$

2. After devouring a metric ton of Cheesy Poofs and Jolt Cola, George needs a nap. George slumbers at -50° for 8 feet and then crawls at 230° for 8 feet. What is the resulting vector?





$\vec{v} = \langle r\cos\theta, r\sin\theta \rangle$

$= \langle 8\cos(-50°), 8\sin(-50°) \rangle$

$\vec{v} = \langle 5.14, -6.13 \rangle$

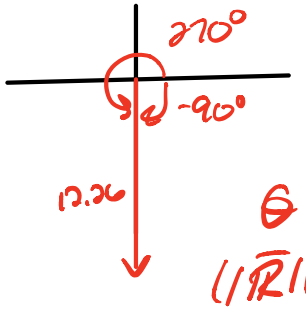
$\vec{w} = \langle r\cos\theta, r\sin\theta \rangle$

$= \langle 8\cos 230°, 8\sin 230° \rangle$

$\vec{w} = \langle -5.14, -6.13 \rangle$

$$\vec{R} = \vec{v} + \vec{w} = \langle 5.14, -6.13 \rangle + \langle -5.14, -6.13 \rangle$$

$$\vec{R} = \langle 0, -12.26 \rangle$$



$\theta = 270°$

$\|\vec{R}\| = 12.26$

$\vec{R} = (12.26, 270°)$