Review2 Section 6.3 Precalculus w/ Trig Name KEY
Period _____

1. Find the component form and magnitude of the vector **v** that has initial point $(-5,-1)$ and terminal point $(1,-6)$.

component form $\langle 6,-5\rangle$ magnitude $\sqrt{61}$

TERMINAL − INITIAL

2. Let $\mathbf{v}=\langle -1,4\rangle$ and $\mathbf{w}=\langle -3,5\rangle$, and find each of the following vectors.

a) $2\mathbf{v}$

$2\langle -1,4\rangle$

$\langle -2,8\rangle$

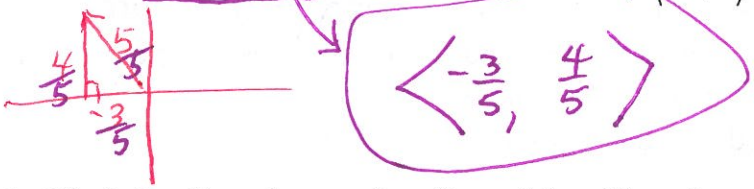
b) $2\mathbf{w}-\mathbf{v}$

$2\langle -3,5\rangle - \langle -1,4\rangle$

$\langle -6,10\rangle + \langle 1,-4\rangle$

$\langle -5,6\rangle$

3. Find a unit vector in the direction of $\mathbf{v}=\langle -3,4\rangle$.



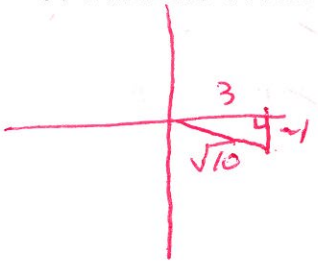
4. Find the direction angle of $\mathbf{v}=2\mathbf{i}-5\mathbf{j}$ to the nearest thousandth of a degree.

$v=\langle 2,-5\rangle$

$\theta=\tan^{-1}\left(\frac{-5}{2}\right)+180^\circ$ if $x<0$

$\theta=-68.199^\circ$ OR -68.198°

5. Find the vector **v** with $\|v\|=5$ and in the same direction as $\langle 3,-1\rangle$.



UNIT VECTOR $\left\langle \frac{3}{\sqrt{10}}, \frac{-1}{\sqrt{10}} \right\rangle$

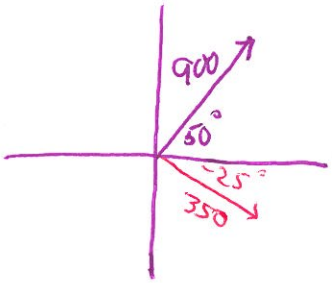
$5\cdot\left\langle \frac{3}{\sqrt{10}}, \frac{-1}{\sqrt{10}} \right\rangle = \left\langle \frac{15}{\sqrt{10}}, \frac{-5}{\sqrt{10}} \right\rangle$

OR $\left\langle \frac{3\sqrt{10}}{2}, \frac{-\sqrt{10}}{2} \right\rangle$

6. Find the component form of the vector that represents a ball thrown with an initial velocity of 100 feet per second, at an angle of 40° with the horizontal.

$\langle 100\cos 40^\circ, 100\sin 40^\circ\rangle$

7. Forces with magnitudes of 900 newtons and 350 newtons act on a machine part at angles of 50° and −25°, respectively, with the positive x-axis. Find the direction and magnitude of the resultant of these forces. Round both answers to the nearest thousandth.



$\langle 900\cos 50^\circ, 900\sin 50^\circ \rangle$

$+ \langle 350\cos(-25^\circ), 350\sin(-25^\circ) \rangle$

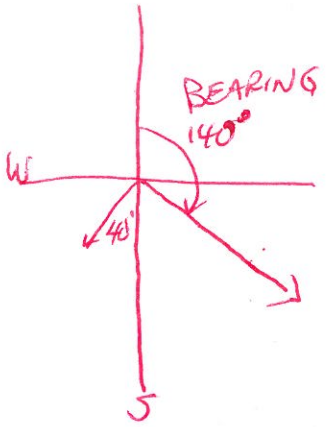
STORE IN $\langle x, y \rangle$

$\langle 895.7165742, 541.5236872 \rangle$

MAGNITUDE $= \sqrt{x^2+y^2} =$ 1046.668 NEWTONS

DIRECTION $\theta = \tan^{-1}\left(\frac{y}{x}\right) + 180^\circ$ if $x<0$ → 31.155° OR 31.156°

8. An airplane is traveling at a speed of 550 miles per hour with a bearing of 140° at a fixed altitude with a negligible wind velocity. As the airplane reaches a certain point, it encounters a wind blowing with a velocity of 70 miles per hour in the direction of S40°W. What are the resultant speed and direction of the airplane? Round both answers to the nearest thousandth.



STANDARD POSITION for AIRPLANE = −50° OR 310°

STANDARD POSITION for WIND = 180° + 50° = 230° OR −130°

$\langle 550\cos 310^\circ, 550\sin 310^\circ \rangle$ AIRPLANE

$+ \langle 70\cos 230^\circ, 70\sin 230^\circ \rangle$ WIND

$\langle x, y \rangle$

$\langle 308.338, -474.9755 \rangle$

RESULTANT SPEED $= \sqrt{x^2+y^2} = 566.366 \frac{mi}{hr}$

DIRECTION $\theta = \tan^{-1}\left(\frac{y}{x}\right) + 180^\circ$ if $x<0$

$\theta =$ −56.991° in standard position OR BEARING 146.991°