Vectors – Practice Quiz Name _____ Key

1. Write the vector with initial point (–4, 3) and terminal point (–1, –7) in ...

a. component form $\langle -1-(-4), -7-3\rangle = \boxed{\langle 3, -10\rangle}$

b. sum of unit vectors form $\boxed{3\vec{i} - 10\vec{j}}$

2. In what quadrant does the vector above lie when it is in standard position? $\boxed{\text{Q IV}}$

3. Given $\vec{v} = \langle 3, -5\rangle$ and $\vec{w} = \langle -2, 6\rangle$, find the following:

a. $\vec{v} + \vec{w}$ $\langle 3, -5\rangle + \langle -2, 6\rangle = \boxed{\langle 1, 1\rangle}$

b. $\vec{w} - \vec{v}$ $\langle -2, 6\rangle - \langle 3, -5\rangle = \boxed{\langle -5, 11\rangle}$

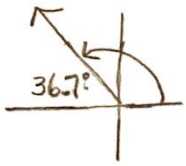
c. $-2\vec{v} + \frac{1}{2}\vec{w}$ $-2\langle 3, -5\rangle + \frac{1}{2}\langle -2, 6\rangle = \langle -6, 10\rangle + \langle -1, 3\rangle = \boxed{\langle -7, 13\rangle}$

4. Given $\vec{v} = \langle -3, \sqrt{5}\rangle$, find the following, to the nearest tenth: (3 points each)

a. the magnitude of $\vec{v}$: $\|\vec{v}\| =$ 3.7 $\sqrt{(-3)^2 + (\sqrt{5})^2} = \sqrt{9+5} = \sqrt{14}$

b. the direction of $\vec{v}$: $\theta =$ 143.3° $\theta' = \tan^{-1}\left(\frac{\sqrt{5}}{-3}\right) = -36.7$

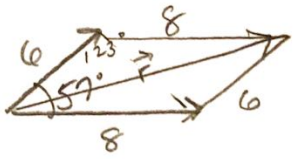
$\theta = 180 - 36.7 = \boxed{143.3°}$



5. Given: $\|\vec{a}\| = 6$, $\|\vec{b}\| = 8$, and the angle between the vectors $\theta = 57°$

a. Draw and label a parallelogram, including the given information and the resultant vector.

$a^2 = b^2 + c^2 - 2bc\cos A$



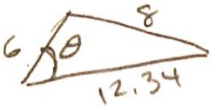
$180° - 57° = 123°$

b. Find the magnitude of the resultant vector to the nearest tenth.

$\|\vec{r}\| = \sqrt{6^2 + 8^2 - 2(6)(8)\cos 123°}$

$= \boxed{12.3}$

b. Find the measure of the angle between the resultant vector and $\vec{a}$ to the nearest tenth.



$8^2 = 6^2 + 12.34^2 - 2(6)(12.34)\cos\theta$

$64 = 188.2756 - 148.08\cos\theta$

$-124.2756 = -148.08\cos\theta$ $\theta = \cos^{-1}\left(\frac{124.2756}{148.08}\right)$ $\boxed{\theta = 32.94°}$

6. Given: $\vec{w} = -2\vec{i} - 6\vec{j}$

a. Write the vector in components form. $\langle -2, -6\rangle$

b. Find the unit vector in the direction of $\vec{w}$. (No decimals in your answer!)

$\|\vec{w}\| = \sqrt{(-2)^2 + (-6)^2} = \sqrt{4+36} = \sqrt{40} = 2\sqrt{10}$

$\boxed{-\frac{\sqrt{10}}{10}\vec{i} - \frac{3\sqrt{10}}{10}\vec{j}}$

$\vec{u} = \frac{\langle -2, -6\rangle}{2\sqrt{10}} = \frac{1}{2\sqrt{10}}\langle -2, -6\rangle = \left\langle -\frac{2}{2\sqrt{10}}, \frac{-6}{2\sqrt{10}}\right\rangle = \left\langle -\frac{1}{\sqrt{10}}, -\frac{3}{\sqrt{10}}\right\rangle = \left\langle -\frac{\sqrt{10}}{10}, -\frac{3\sqrt{10}}{10}\right\rangle$