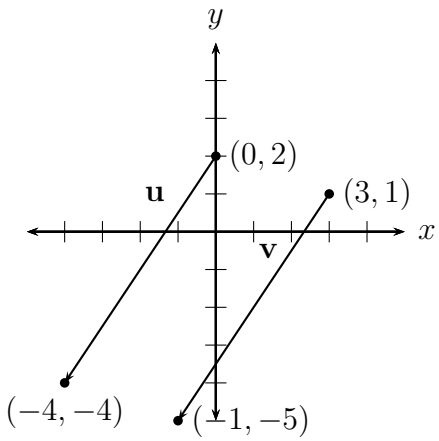
Consumer Math Vectors Unit Re-Test Mr. Aaron Wojahn

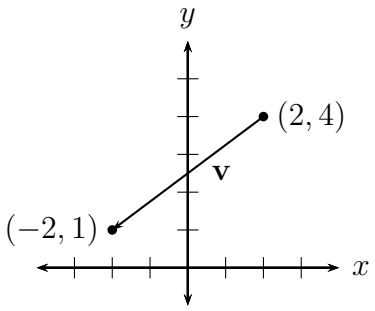
Name and Block: _____

This test includes 11 questions. The total number of points is 100. Answer the questions on the test paper. Show all work for full credit. Scientific calculator is allowed.

1. (5 points) For the diagram below show that **u** and **v** are equivalent.



2. (5 points) Find the component form and the magnitude of the vector below.



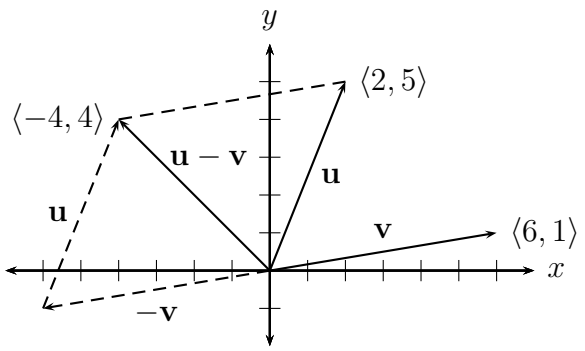
3. (15 points) Find the component form of the vector that represents the velocity of an airplane at the instant its wheels leave the ground, if the plane is going 50 miles per hour and the body of the plane makes a 6 degree angle with the horizontal.

4. Let $\mathbf{u} = \langle -4, 1 \rangle$ and $\mathbf{v} = \langle 2, 2 \rangle$.

   (a) (7 points) Add together $\mathbf{u}$ and $\mathbf{v}$ and then draw a parallelogram representing $\mathbf{u}$ plus $\mathbf{v}$.

   (b) (8 points) Compute both the sum of the magnitudes of $\mathbf{u}$ and $\mathbf{v}$ and the magnitude of $\mathbf{u} + \mathbf{v}$. Are they the same?

5. (5 points) Circle the statements that are true about the following graph representing vector subtraction.



A. $\mathbf{v}$ and $-\mathbf{v}$ have the same direction

B. $\mathbf{u} - \mathbf{v}$ is perpendicular to vector $\mathbf{v}$

C. $\mathbf{v}$ and $-\mathbf{v}$ have the same magnitude

D. The vector $\mathbf{u} - \mathbf{v}$ is equivalent to $\mathbf{u} + (-\mathbf{v})$

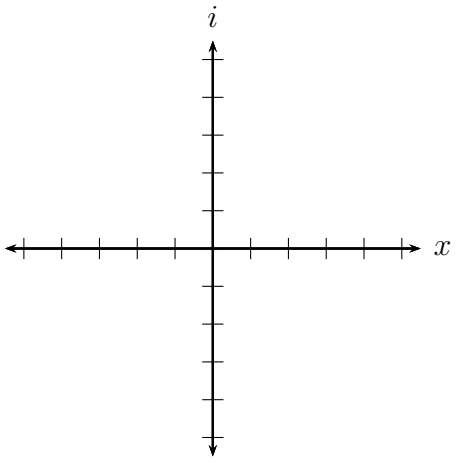
6. (5 points) Let $\mathbf{v} = \langle 4, 3 \rangle$ find the components of $2\mathbf{v}$ and $-3\mathbf{v}$

7. (10 points) Find $z_1 z_2$ when $z_1 = 5\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$ and $z_2 = 2\left(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}\right)$.

8. (10 points) Find $\frac{z_1}{z_2}$ when $z_1 = 7\left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)$ and $z_2 = 4\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$.

9. (10 points) Represent the complex number below graphically.

$$3(\cos 45^\circ + i \sin 45^\circ)$$



10. (10 points) Find the standard form of the complex number $7\left(\cos \frac{5\pi}{12} + i \sin \frac{5\pi}{12}\right)$. Round to the nearest hundredth.

11. (10 points) Multiply the complex numbers below and leave the result in trigonometric form.

$$\left[3\left(\cos \frac{5\pi}{7} + i \sin \frac{5\pi}{7}\right)\right]\left[11\left(\cos \frac{8\pi}{9} + i \sin \frac{8\pi}{9}\right)\right]$$