

Exam 4 Study Guide

Name _____

Answer the questions in the spaces provided. Feel free to use another piece of paper for your work

1. Solve the problems below given the following two vectors:

$$\mathbf{u} = \langle 2, 3 \rangle$$

$$\mathbf{v} = \langle -9, 6 \rangle$$

(a) $\mathbf{u} - 2\mathbf{v}$

$$\mathbf{u} \cdot \mathbf{v}$$

2. Find unit vectors in the direction of the provided vectors:

(a) $\mathbf{u} = \langle 4, 3 \rangle$

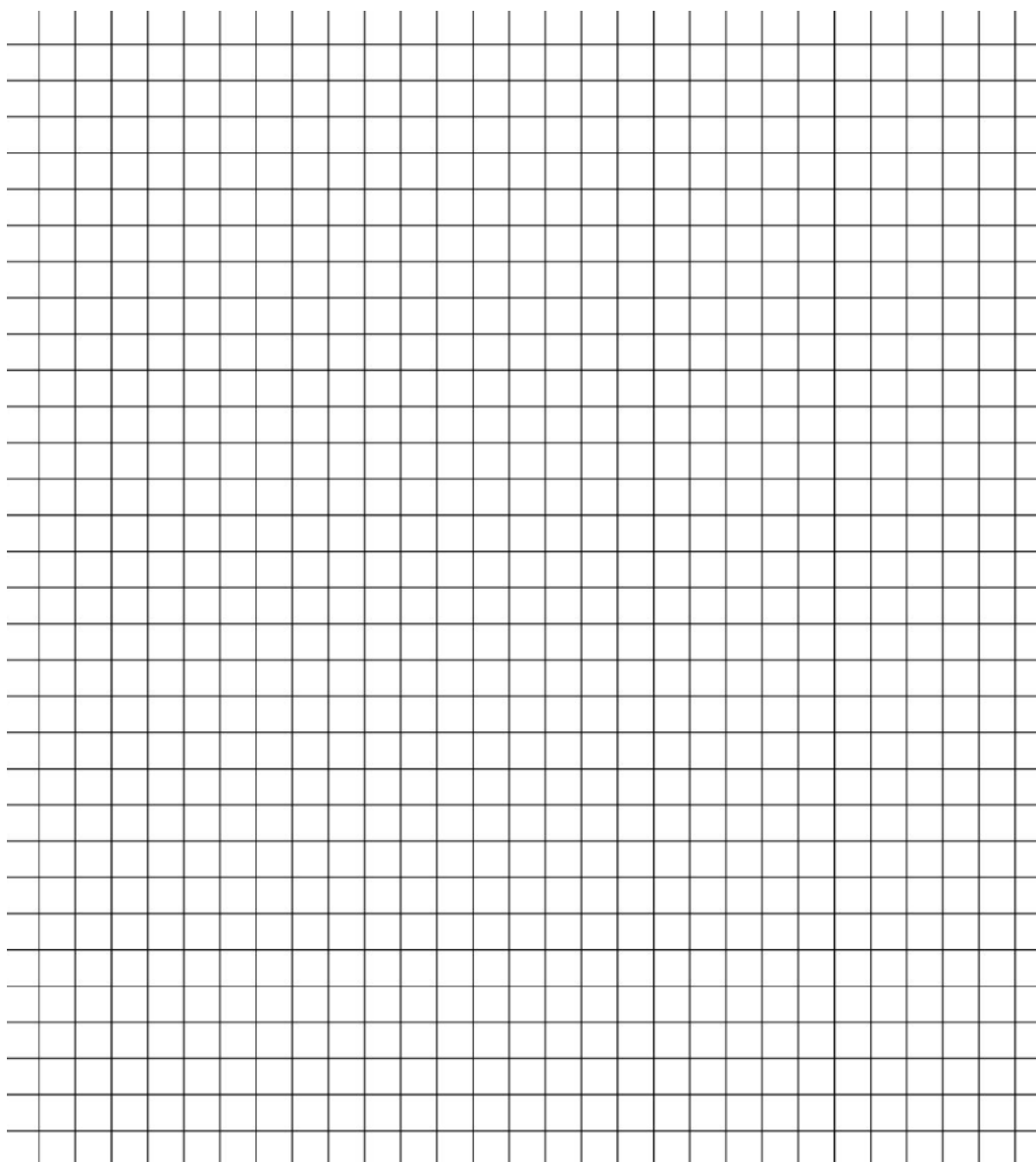
$$\mathbf{v} = \langle 2, -9 \rangle$$

3. Write the following vectors as a linear combination of the unit vectors \hat{i} and \hat{j} then graph $2\mathbf{u} - \mathbf{v}$:

$$\mathbf{u} = \langle 4, 1 \rangle$$

$$\mathbf{v} = \langle -3, 2 \rangle$$

(a)

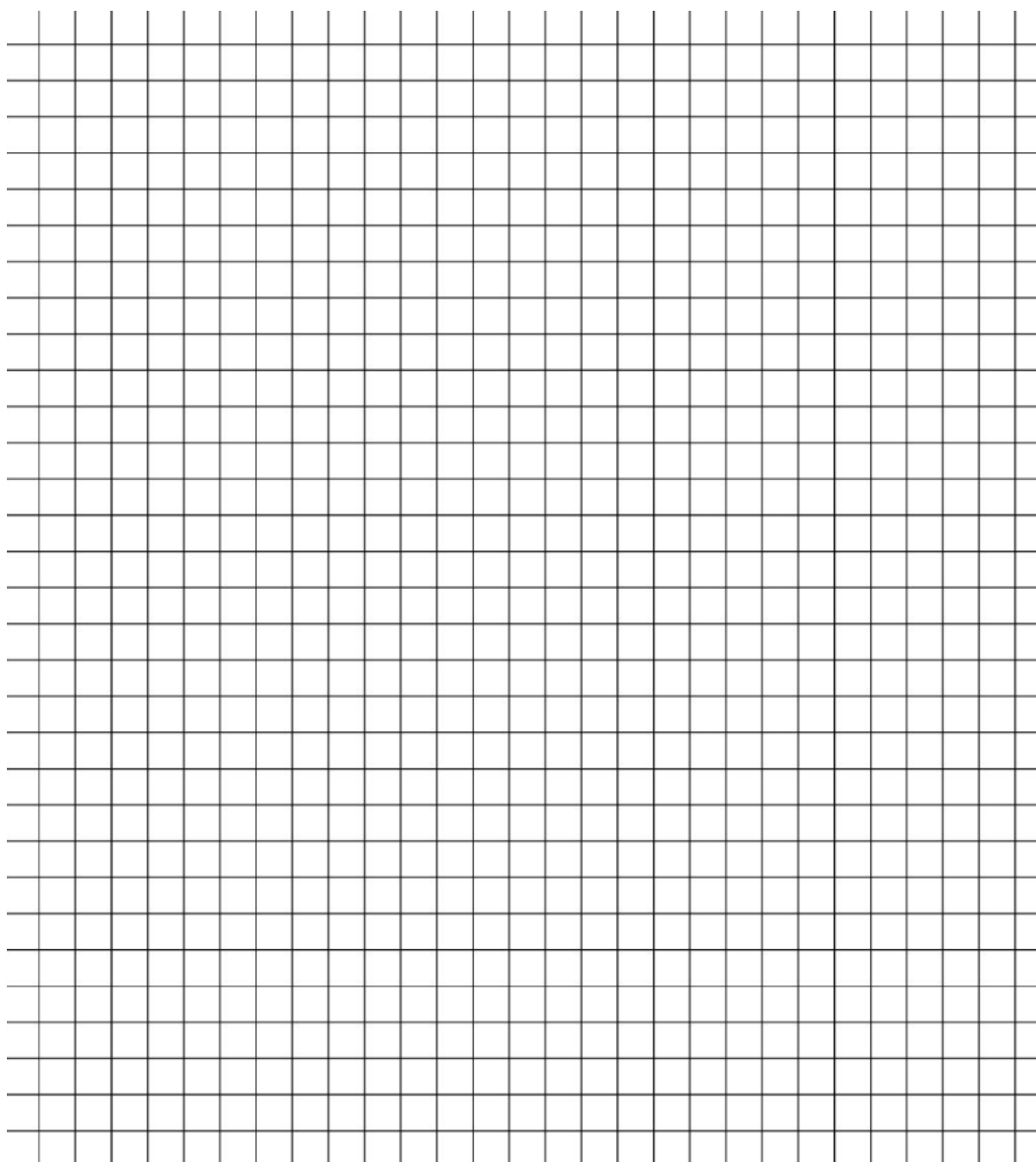


4. Find, and graph, the projection of \mathbf{u} onto \mathbf{v} ($\mathbf{w}_1 = \text{proj}_{\mathbf{v}}(\mathbf{u})$):

$$\mathbf{u} = \langle 2, 3 \rangle$$

$$\mathbf{v} = \langle 3, -5 \rangle$$

(a)



5. Solve the problems below given the following two vectors:

$$\mathbf{u} = \langle 4, 1 \rangle$$

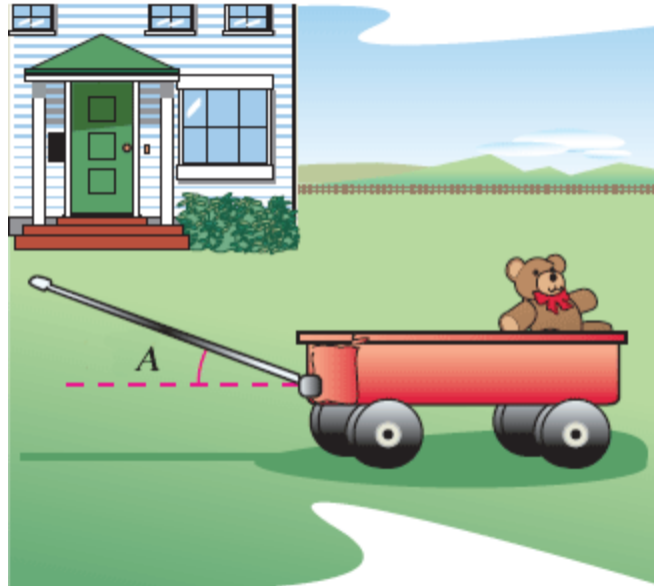
$$\mathbf{v} = \langle -3, 2 \rangle$$

(a) Find the angle between \mathbf{u} and \mathbf{v}

(b) Find the magnitude \mathbf{u} and \mathbf{v}

(c) Find the component of \mathbf{u} orthogonal/normal to \mathbf{v}

6. A child pulls a toy wagon by exerting a constant force of 27 pounds on a handle that makes a 34° angle with the horizontal (see figure). Determine the work done in pulling the wagon 62 feet.
- (a)



7. Find two vectors, in opposite directions, that are orthognal/normal to $\mathbf{u} = \langle -2, -3 \rangle$:

(a)

8. Simplify the following:

(a)

$$\frac{2}{4-i}$$

$$(12+i) - (1+i)12$$

(b)

$$\frac{4-i}{5} - \frac{i}{3-4i}$$

$$(4i)(3+5i)$$

9. Find each function given the constant a and the function's zeros/roots and their multiplicity:

- (a) $f(x)$ has the zeros-
2 with a multiplicity of 1
-3 with a multiplicity of 3,
and $a = 2$

10. Solve the following:

(a) $\sqrt[4]{81 \left(\cos\left(\frac{\pi}{6}\right) + i \sin\left(\frac{\pi}{6}\right) \right)}$

(b) $(1 - i4)^3$