

Test #3

Directions: Please show all your work since partial credit is given. Answers without the necessary work will receive no credit. And remember to have fun!

1. Solve the following equations on the interval $[0, 2\pi]$.

a) $\sin\left(x + \frac{\pi}{4}\right) + \sin\left(x - \frac{\pi}{4}\right) = -1$

b) $\cos 2x = -\sin x$ _____

2. Write the complex number $z = -2 - 2\sqrt{3}i$ in trigonometric form, $r(\cos\theta + i\sin\theta)$.

3. Let $\mathbf{u} = \langle 5, -12 \rangle$.

a) Find $\|\mathbf{u}\|$ and its direction angle θ .

b) Graph \mathbf{u} in standard position.

4. Find the component form of a vector $\mathbf{v} = \langle v_1, v_2 \rangle$ with magnitude $\|\mathbf{v}\| = 2$ and in the direction of $\langle -6, -4 \rangle$. Please give exact values.

5. Find the angle θ between the vectors $\mathbf{u} = -6\mathbf{i} - 3\mathbf{j}$ and $\mathbf{v} = -8\mathbf{i} + 4\mathbf{j}$.

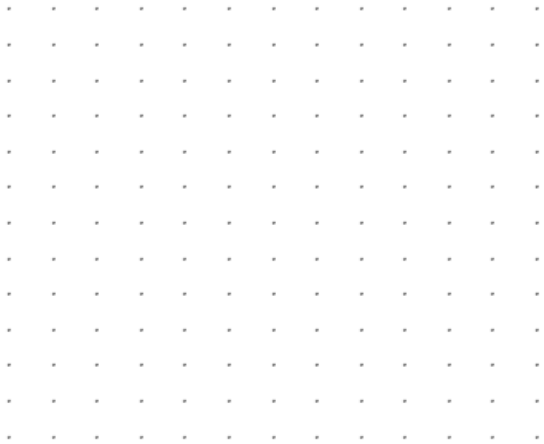
6. The following questions are regarding the following system of inequalities:

$$x^2 - y \leq 1$$

$$-x + y < 1$$

a) Find the vertices of the solution set of the above system.

b) Sketch the graph of the solution set of the system of inequalities. Make sure to label your graphs.



7. The following questions are with regards to the system

$$\begin{cases} 5x - 5y = -5 \\ -2x - 3y = 7 \end{cases}$$

a) Write the augmented matrix for the system of linear equations above, and then use row operations to write the matrix in row-echelon form.

b) Use your answer from part a) and back substitution to solve the system of equations.

8. Let $A = \begin{bmatrix} -1 & 3 \\ 4 & -5 \\ 0 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 0 & 7 \end{bmatrix}$.

a) The size of A is _____ and the size of B is _____.

b) Which of the following is defined, AB or BA ? Explain.

c) Now find the defined product from part b) above. _____