Name: **Date:** **Quiz 6** **Precalculus - Hargus**

Instructions: Please **show all work** (partial credit will be given for correct work, even if your answer is wrong).

1. (15 points) Below are the matrices A and B. Solve the questions below, **showing how you got each element in the answer matrix without a calculator**:

$$A = \begin{bmatrix} 1 & -1 & 2 \end{bmatrix} \quad B = \begin{bmatrix} 1 \\ 3 \\ 1 \end{bmatrix}$$

a) $2A =$

b) $AB =$

c) $BA =$

2. (10 points) Solve the following system of equations **using substitution** (show all work):

$$3x + 6y = 9$$

$$2x + 5y = 3$$

$x =$ _____

$y =$ _____

3. (10 points) Solve the following system of equations **using an inverse matrix** (you can use a calculator to find the inverse, but show other work):

$$3x + 6y + 2z = 9$$

$$3x + 6y + 1z = 10$$

$$2x + 5y + 7z = 3$$

$x =$ _____

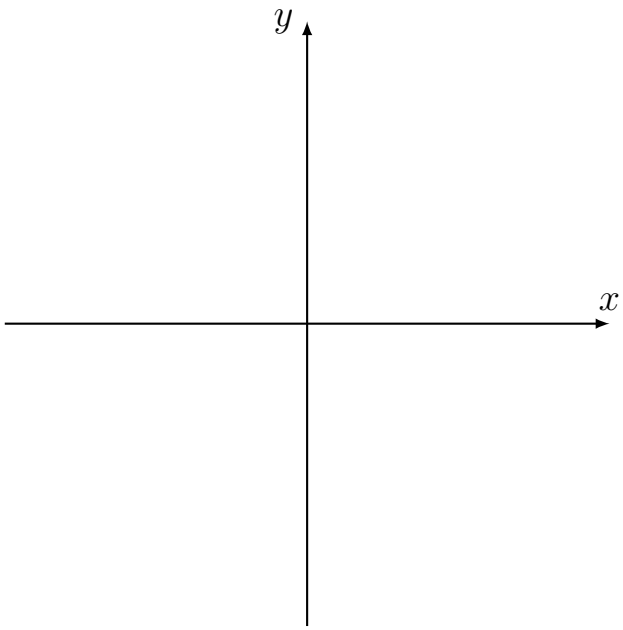
$y =$ _____

$z =$ _____

4. (5 points) Find an equation (in standard form) for the ellipse with center $(0, 0)$, foci $(\pm 4, 0)$, and vertices $(\pm 5, 0)$.

Ellipse equation: _____

5. (5 points) Draw the graph of the hyperbola $\dfrac{(y-2)^2}{25} - \dfrac{x^2}{9} = 1$.



6. (5 points) What is the eccentricity of the ellipse with equation $\frac{x^2}{16} + \frac{y^2}{25} = 1$ (hint: remember that eccentricity $e = \frac{c}{a}$)?

Eccentricity $e =$ _____

7. (20 points) Let $A = (1, 2, 0)$, $B = (3, 0, 1)$, and $C = (-1, 2, 0)$.

a) What is the distance between points A and B?

Distance: _____

b) What is the midpoint between A and C.

Midpoint: _____

c) Find the dot product $\overrightarrow{AB} \cdot \overrightarrow{BC}$?

$\overrightarrow{AB} \cdot \overrightarrow{BC} =$ _____

d) What is the equation for a sphere with center A with a radius of 3?

Sphere equation: _____

8. (10 points) Draw a graph showing the solutions of the following system of inequalities:

$$6x + 3y \leq 9$$

$$y > 0$$

$$x \geq 0$$

$$x \leq 4$$