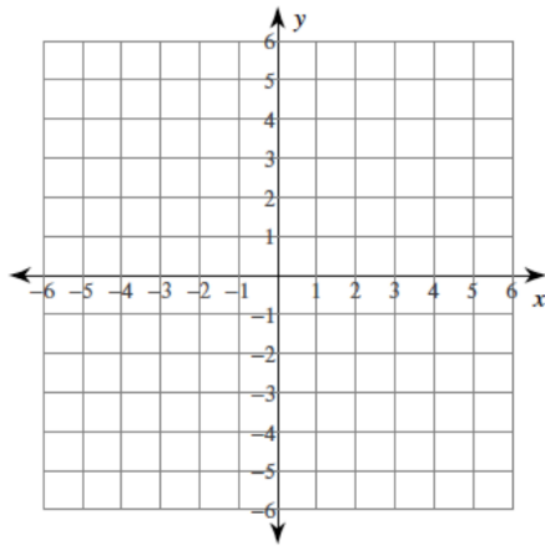# Midterm Review - Honors Algebra 2

Part 1: No Graphing Calculator

1. Line 1 contains $(2, -4)$ and $(0, 2)$. Line 2 contains $(-4, 5)$ and $(-1, 6)$. Are the lines parallel, perpendicular, or neither?
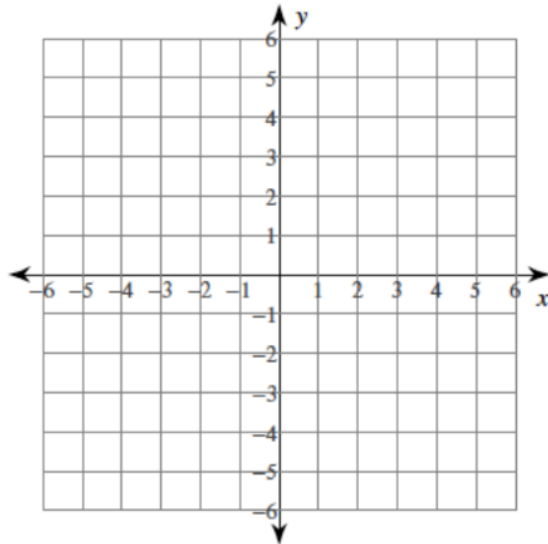
2. Graph each line. Determine the slope, and x- and y-intercepts for each function. Determine the solution to the system.

$$y = -x$$
$$y = 2x + 3$$

3. Graph each line. Determine the slope, and x- and y-intercepts for each function. Determine the solution to the system.

$$-x + y = -2$$
$$2x - 2y = 4$$

4. Solve the system using any algebraic method:
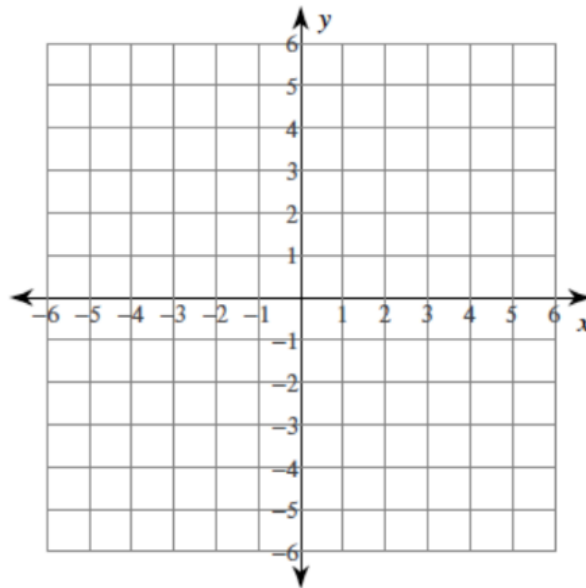
a)
$$5x-2y=-7$$
$$-3x+2y=5$$

b)
$$6x+3y=-3$$
$$4x-4y=-8$$

5. Graph the system of inequalities:

$$x-2y\le-2$$
$$2x-4y<2$$

6. Write an inequality represented by the graph.
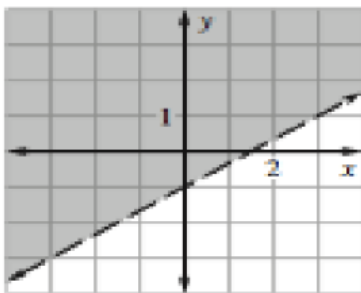
Perform the indicated

7)

$$\begin{bmatrix} -2 & 0 & 7 \\ 11 & -3 & -5 \end{bmatrix} + \begin{bmatrix} -10 & 4 & 8 \\ 1 & -6 & 6 \end{bmatrix}$$

8)

$$2\begin{bmatrix} -1 & 2 & 3 \\ 3 & 0 & -4 \end{bmatrix}$$

9)

$$\begin{bmatrix} 2 & 1 \end{bmatrix}\begin{bmatrix} 3 & -2 & 0 \\ 1 & -4 & -1 \end{bmatrix}$$

10)

$$\begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}\begin{bmatrix} 1 & 2 & 3 \\ -1 & -1 & 0 \end{bmatrix}$$
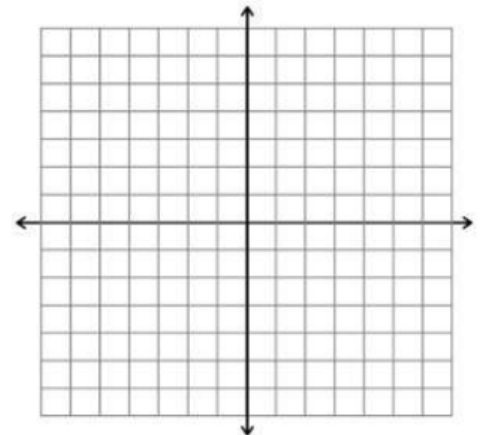
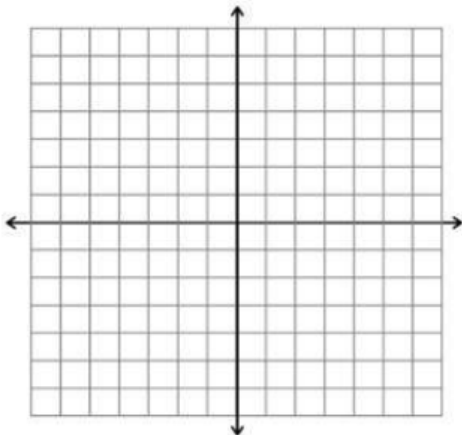Evaluate the determinant of the matrix

11)

$$\begin{bmatrix} 2 & 4 \\ -1 & -2 \end{bmatrix}$$

12)

$$\begin{bmatrix} 1 & 3 & -2 \\ 3 & -1 & -6 \\ 4 & 2 & -8 \end{bmatrix}$$
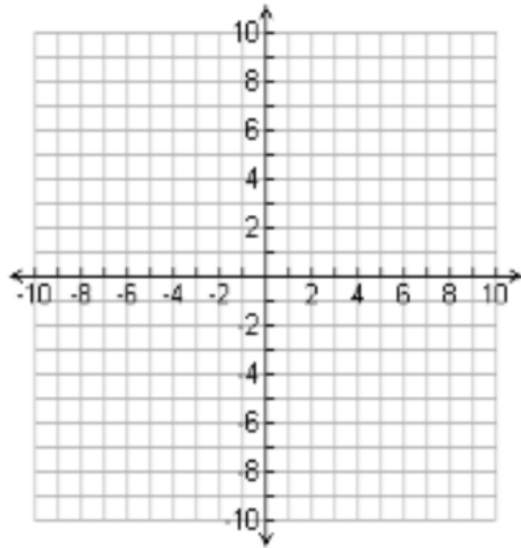
13. Graph the function:

a. $f(x) = |2x + 2| - 6$

b. $y = -4|x + 2| - 3$

14. Tell whether the function opens up or down. Whether it has a maximum or a minimum value. What the maximum/minimum value. The coordinates of the vertex. The equation of the axis of symmetry. Write the equation in vertex form. Graph the parabola, be sure to plot five or more points.
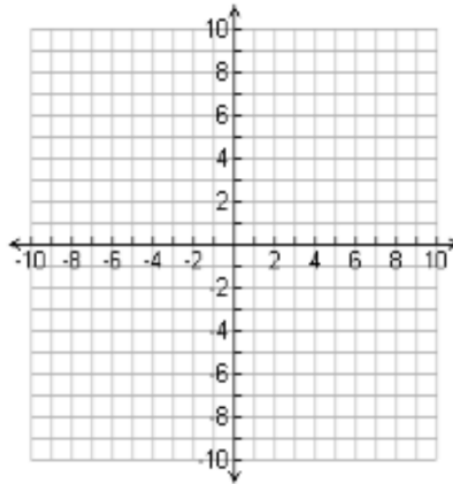
$$y = x^2 - 6x + 7$$

a) up or down: _____

b) max or min: _____

c) max or min value: _____

d) vertex: _____

e) axis of symmetry: _____

f) Vertex form: _____

15. Graph the function. Label the vertex and axis of symmetry. Then write in Standard form.
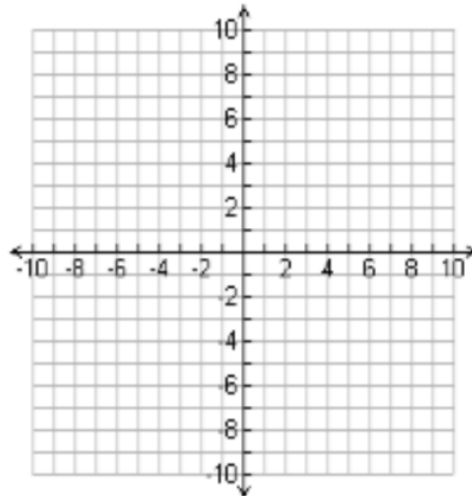
$$y=2(x-1)^2-4$$

d)

a) vertex: _____

b) axis of symmetry: _____

d) Standard form: _____

16. For the parabola, tell where it crosses the x-axis; find the coordinates of the vertex; find the axis of symmetry; and write the equation in standard form. Then graph the parabola.

$$y=-2(x-4)(x-2)$$

e)

a) Intercepts: _____

b) vertex: _____

c) axis of symmetry: _____

d) Standard form: _____

17. Write a quadratic function whose graph has the given characteristics. Vertex: (2, 3); point on graph: (0, – 1)

18. Write a quadratic function whose graph has the given characteristics. x-intercepts: – 3 & 1; point on graph: (2, 20)

19. Simplify:

c) $(-2+14i)-(6-2i)$

d) $(4-i)(8+3i)$ e) $\dfrac{4i}{1-3i}$ f) $\dfrac{7-4i}{2+3i}$

20. Factor completely:

a) $2x^2+5x-12$ b) $4x^2-20x+25$ c) $16a^2-81$

h) $x^4 - 7x^2 + 10$ i) $5x^4 - 9x^2 + 4$

j) $x^6 - 9x^3 + 8$ k) $x^6 - 81$

21. Determine the discriminant. Then use it to determine the nature and number of solutions, then use the quadratic formula to solve the equation. Be sure to show ALL your work.

   a) $x^2 + 6x = -15$ b) $25x^2 - 17x = 13x - 9$

22. Solve by factoring
   a) $3a^2 + 5a - 28 = 0$ b) $3x(x^2 - 4) = 0$
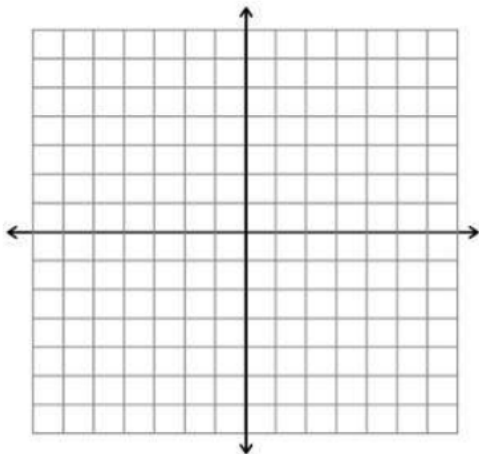
23. Solve by using square roots.

    a) $3(x-3)^2+2=26$ b) $5(r-2)^2=35$

24. Solve the inequality $x^2 - 2x - 15 > 0$.

25. Find the solution set of the inequality $x^2 - 36 \leq 0$

26. Graph the function $f(x) = (x + 2)(x - 1)^2$

27. Solve the system using matrices

$$2x - y + z = -5$$
$$5x + 2y - 2z = 19$$
$$x - 3y + z = -5$$

28. Solve

a) $\frac{1}{4}(\frac{4}{3}x + 16) = 2(x + 3)$

b) $3x + 7 = 2(x + 5) - (3 - x)$

29. Solve the formula for the indicated variable. Show your work.

$5x - 3xy = 8$ For x

30. Solve

a) $|2x + 3| < 2$

b) $|12x + 4| \geq 8$