

# Math 107 Exam #1

October 12, 2022

**Time:** 1 hour and 25 minutes

**Instructions:** Show all work for full credit.  
No outside materials or calculators allowed.

**Extra Space:** Use the backs of each sheet for extra space. Clearly label when doing so.

**Name:** \_\_\_\_\_

**ID #:** \_\_\_\_\_

**Instructor/Section:** \_\_\_\_\_

*"I pledge by my honor that I have abided by the NJIT Academic Integrity Code."*

\_\_\_\_\_ (Signature)

Problem(s)      Score      Total

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Formulas you may need for this exam:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

1. Find the distance between each pair of points: **(10 points)**:

a.  $(-3, -5), (-4, 2)$

b.  $(5, 9), (-7, -7)$

2. For the function,  $f(x) = x^2 - 5x + 3$  find the following. Be sure to simplify fully when appropriate: **(16 points)**

(a)  $f(x - 2)$

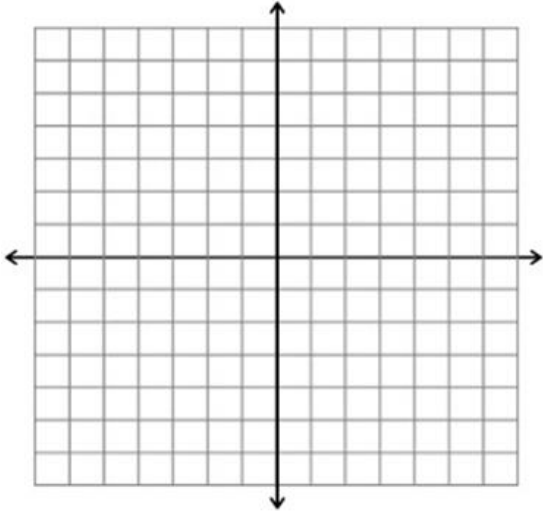
(b)  $5f(x)$

(c)  $f(5x)$

(d)  $f(x) - f(1)$

$$f(x) = \begin{cases} x^2, & x < -3 \\ -x, & -3 \leq x < 2 \\ (x-2), & x \geq 2 \end{cases}$$

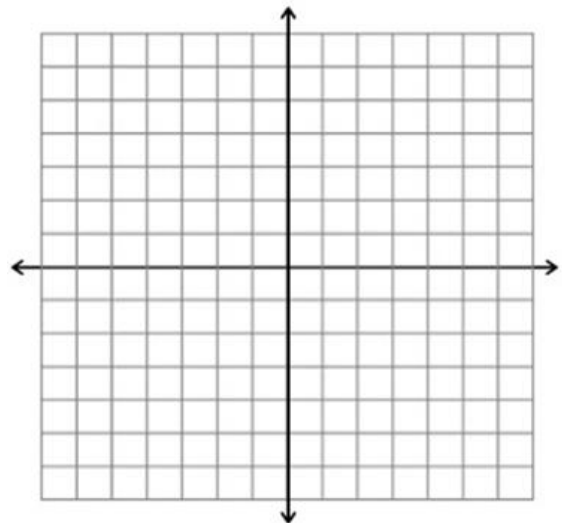
3. (6 points) Graph the following piecewise function.



4. (12 points) Write an equation for the function described by the given characteristics. Then graph the function.

a) The shape of  $f(x) = \sqrt{x}$ , but shifted 1 unit right and one unit down.

Equation: \_\_\_\_\_



5. Find the **equation of the line** with the given conditions. Make sure your final answer is in slope intercept form. **(9 points)**

a. The slope is -3 and contains the point (-1, 4)

a. \_\_\_\_\_

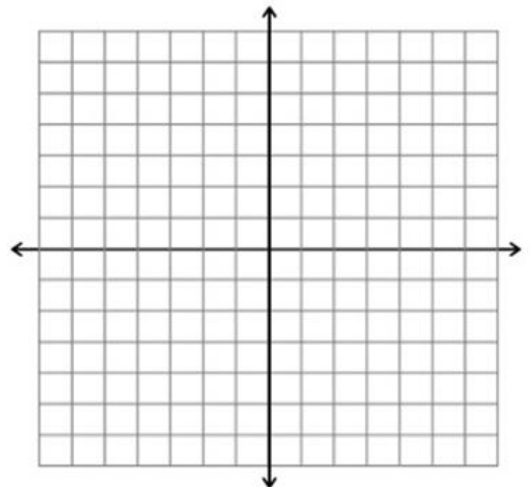
b. x-intercept =  $\frac{7}{3}$  and y-intercept = 7

b. \_\_\_\_\_

c. Contains the points (-2, 5) and perpendicular to the line  $x + 3y = 4$

c. \_\_\_\_\_

6. Sketch the graph of the following equation. Identify the intercepts.  $y = -\frac{1}{2}x + 1$   
**(8 points)**



7. **(9 points)** Evaluate the following  $f(x) = -7x + 4$  and  $g(x) = 4x - 3$

a.  $(fg)(-1)$

a. \_\_\_\_\_

b.  $(f - g)(2)$

b. \_\_\_\_\_

c.  $g(x + 1) - f(x - 1)$

c. \_\_\_\_\_

8. Find the domain of the following functions. You must write your answer in interval notation: **(6 points)**

a.  $f(x) = \frac{x}{x^2 - 1}$

a) \_\_\_\_\_

b.  $h(x) = \sqrt{2x - 3}$

b) \_\_\_\_\_

9. Use the tests for symmetry to determine if the graph(s) are symmetric with respect to the x-axis, y-axis and/or the origin. **(6 points)**

a.  $y = x^4 - 4x^2$

a. \_\_\_\_\_

b.  $x^2 + y^2 = 16$

b. \_\_\_\_\_

c.  $y = 5x - 2$

c. \_\_\_\_\_

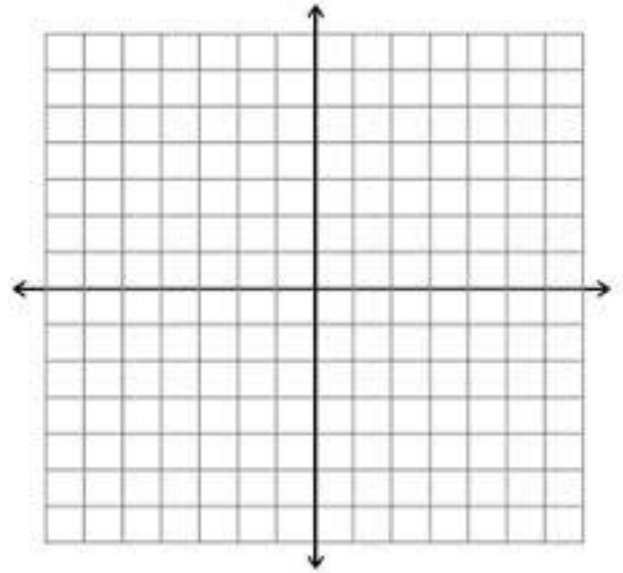
10. **(5 points)** For the following function  $f(x) = 2x^3 - 3x + 1$  find and simplify:

$$\frac{f(x+h) - f(x)}{h}$$

Answer: \_\_\_\_\_

11. Write the equation in slope intercept form and sketch the graph from the information given. (5 points)

$$8x - y = -4$$



12. The cost  $C$ , in dollars, to produce  $x$  number of PlayStation – 5 game systems for a local retailer is given by  $C(x) = 60x + 300$  for  $x \geq 0$ . (8 points)

(a) Find  $C(10)$  and interpret it in this context.

(b) How many PlayStation-5s can be produced for \$ 15,000?