

Math 1050 Section 4 Midterm 1

Name _____

Please complete 10 of the following 12 problems. Clearly mark the two problems you would like to omit. I will grade the first ten attempted problems unless they are clearly marked otherwise. Each problem is worth 5 points.

1. Perform the following operations

$$(a) \frac{5}{8} - \frac{5}{12} + \frac{1}{6}$$

$$(b) \frac{3}{2} \cdot \frac{1}{4}$$

$$(c) \frac{3}{2} \div \frac{1}{4}$$

2. (a) Simplify. You do not need to specify domain restrictions.

$$\frac{12(x + y)^3}{8x(x + y)^2}$$

(b) Rationalize the denominator

$$\frac{3}{3 - \sqrt{6x}}$$

3. (a) Perform the multiplication

$$(3x - 1)(x + 2)$$

(b) Simplify. Include domain restrictions.

$$\frac{15x^3 - 5x^2 + 6x - 2}{3x^2 + 5x - 2}$$

4. (a) Solve and check your answer(s)

$$|2x - 3| = 7 - 3x$$

(b) Solve and plot your solution on the real number line

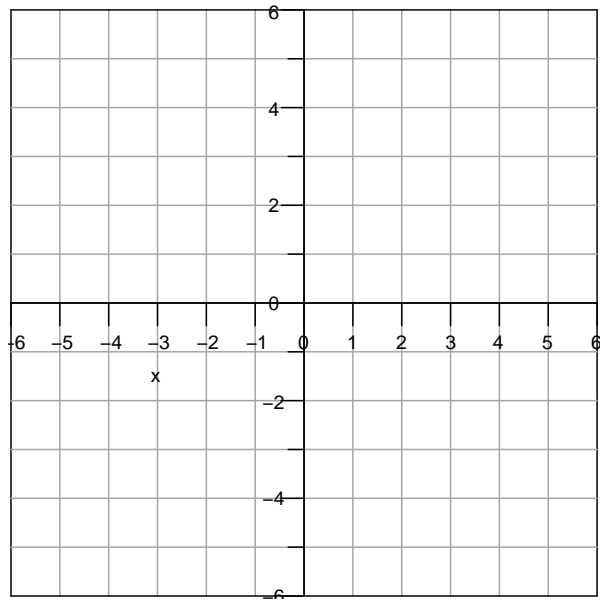
$$-7 \leq -6x - 1 < 5$$

5. Solve (Hint: Complete the square or use the quadratic formula). Simplify any radicals or fractions in your answer.

$$x^2 + 2x - 6 = 0$$

6. Given the points $A = (1,2)$ and $B = (5,-1)$

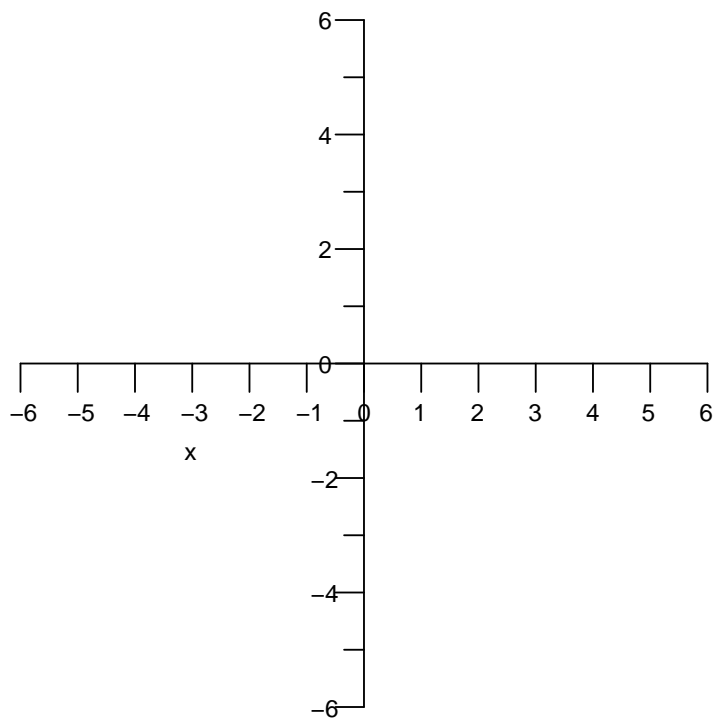
(a) Plot the points A and B in the Cartesian plane.



(b) Find the distance between points A and B.

7. (a) Find the equation in slope intercept form of the line passing through the points $(1,1)$ and $(-1,-3)$.

(b) Plot the line found in part (a).

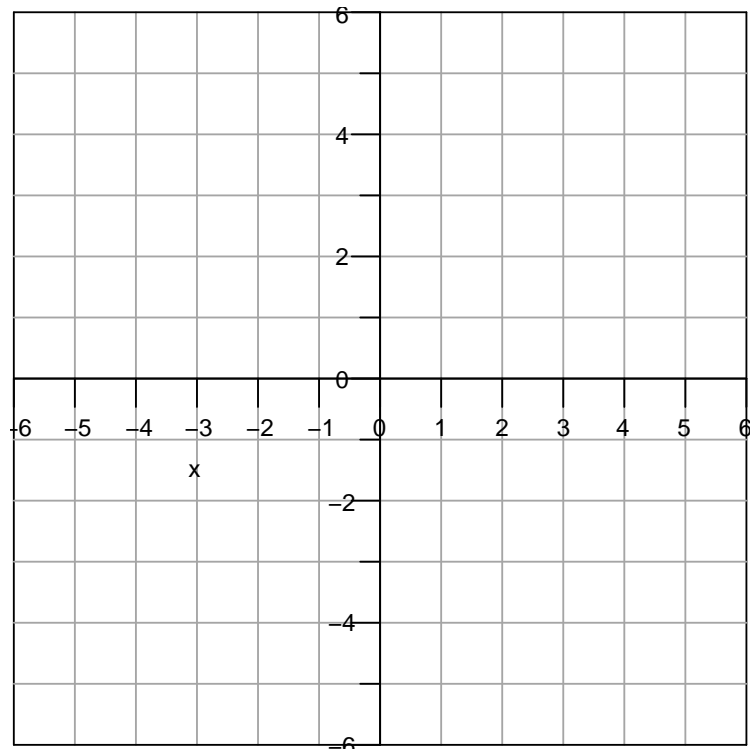


8. The area of a circle is given by $A(r) = \pi r^2$. This circumference of a circle is given by $C(r) = 2\pi r$.

(a) Express the area A of a circle as a function of its circumference C .

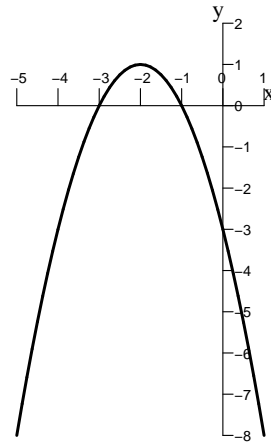
(b) Use part (a) to find the area of a circle that has a circumference of 4. Leave your answer in terms of π .

9. (a) Plot the circle $(x + 1)^2 + (y - 3)^2 = 9$.



(b) Does the graph above represent y as a function of x ? Why or why not?

10. Answer the following questions using the given graph:



(a) What is the parent function?

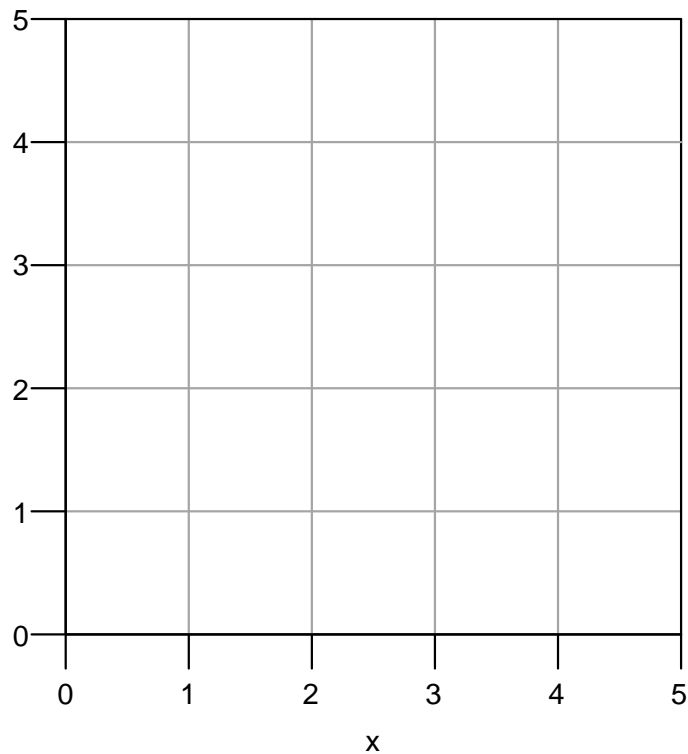
(b) Write the equation of the function represented in the graph.

11. Let $f(x) = \sqrt{x}$.

(a) What is the domain of f ?

(b) Does the function f have an inverse? Why or why not?

(c) If f has an inverse, carefully plot f and f^{-1} . If not, plot f by itself.



12. Little Harold gets a base allowance of \$1 a day, but he loses \$0.10 (one tenth of a dollar) from his allowance for each time he disobeys his mom. Thus Little Harold's total allowance per day is given by the function

$$A(d) = 1 - \frac{d}{10} = \frac{10 - d}{10} \quad 0 \leq d \leq 10$$

where d is the number of times Little Harold disobeyed that day. Like most boys, Little Harold is better behaved when he is well rested. The number of times Little Harold disobeys his mom in a day is given by the function

$$d(x) = 10 - x, \quad 0 \leq x \leq 10$$

where x is the number of hours Little Harold slept the night before.

- (a) Find $(A \circ d)(x)$. This gives Little Harold's daily allowance as a function of the number of hours he slept the night before.
- (b) What is Little Harold's allowance that day if he only slept for 5 hours the night before?