Math 4
Exam 2
September 15, 1998

Name _____ Instructor _____

Class Time _____

Show all work for partial credit.

1. (10 pts) Given that $p_1 = (5,-2)$ and $p_2 = (-1,6)$ find each of the following:

   (a) The distance from p_1 to p_2.

   (b) The coordinates of the midpoint of the line segment connecting p_1 to p_2.

   (c) The slope-intercept form of the equation of the line passing through p_1 and p_2.

(a) _____

(b) _____

(c) _____

2. (6 pts) Given that $f(x) = 5x^2 - x$, find $f(1)$ and $f(x-1)$.

$f(1)$ = _____

$f(x-1)$ = _____

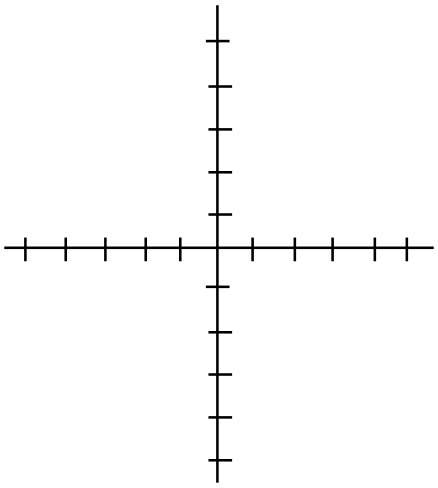
3. (6 pts) Given that $f(x) = \begin{cases} 4+5x & \text{if } x \le 1 \\ 1-x^2 & \text{if } x > 1 \end{cases}$, find $f(-2)$ and $f(3)$.

$f(-2) =$ ____________________

$f(3) =$ ____________________

4. (10 pts) Find the center and the radius of the following circle. Then sketch the graph of the circle.

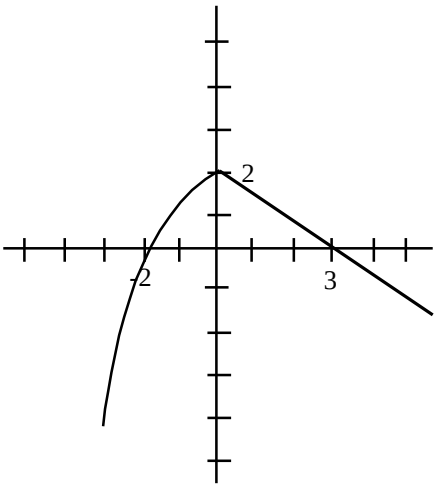
$$x^2 + y^2 - 6x + 4y = -4$$

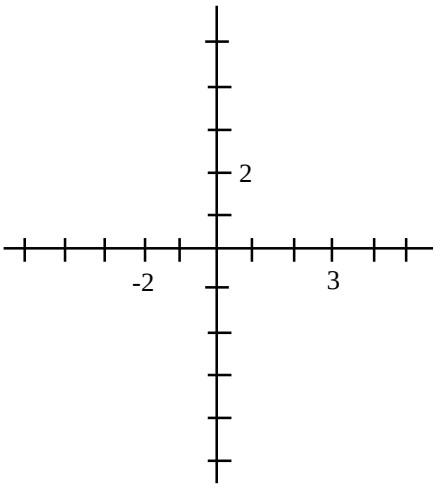


center = _____

radius = _____

5. (6 pts) Given that $y = f(x)$ has the graph below, draw the graph of $y = -f(x-2)$.



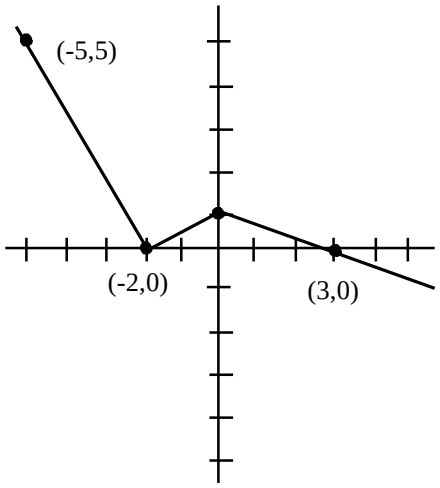


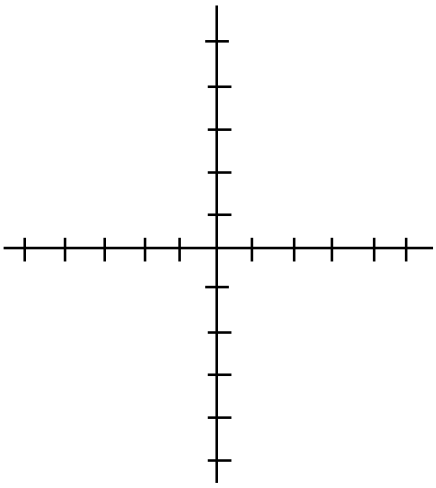
6. (6 pts) Find the inverse, if it exists, of the function

$$f(x) = x^2 - 4,\ x \geq 0$$

$f^{-1}(x) =$ _____

7. (6 pts) Given that $y = f(x)$ has the graph below, sketch the graph of $f^{-1}(x)$.





8. (6 pts) Determine the types of symmetry the following equation has (if any). That is, does it have symmetry with respect to the *x*-axis, *y*-axis and/or the origin? Support your answer.

$$y = \pm\sqrt{5x^2 + 4}$$

(a) *x*-axis

(a) _____

(b) *y*-axis

(b) _____

(c) origin

(c) _____

9. (6 pts) Find the *x* and *y*-intercepts of the following equation. If there does not exist an intercept say so. Note that intercepts are points.

$$y = \sqrt{x^2 + 4}$$

x-intercepts _____

y-intercepts _____

10. (15 pts) Given that $f(x) = x + 5$, $g(x) = x^2 + 1$ and $h(x) = \sqrt{4 - x^2}$, evaluate each of the following.

(a) $g(2) - f(2) =$ _____

(b) $\frac{f(4)}{g(4)} =$ _____

(c) $g(3) * f(3) =$ _____

(d) $g(f(x)) =$ _____

(e) $h(f(-4)) =$ _____

11. (12 pts) If $f(x) = -x^2 - 4x + 1$, identify the vertex and the equation of the axis of symmetry.

vertex _____

axis of symmetry _____

12. (11 pts) Find a mathematical model representing the following statement. In addition, determine the constant of proportionality.

- z is jointly proportional to x and y. $(z = 10$ when $x = 20$ and $y = 4)$

Model: ______________________

constant: ______________________