

Name \_\_\_\_\_

22M:002

November 9, 2005

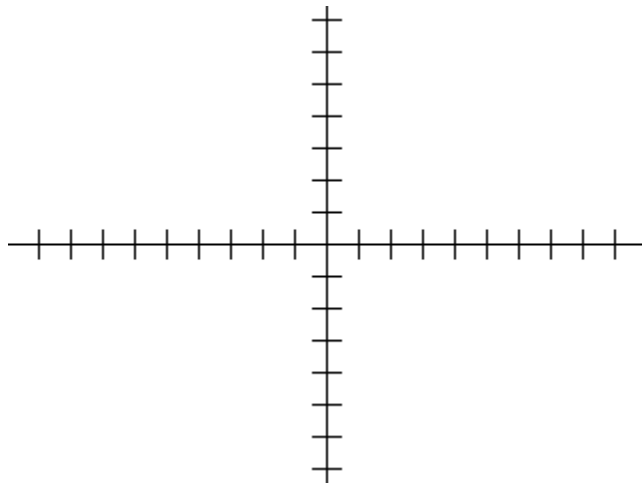
Score (100 possible) \_\_\_\_\_

Exam #2

Answer each question to the best of your ability. Show all of your work.

1. Suppose the points  $(3, 1)$  and  $(-1, 5)$  lie on the diameter of a circle. Find the center-radius equation for the circle. (Hint: what can two points tell you about the length of the diameter and the location of the center?)

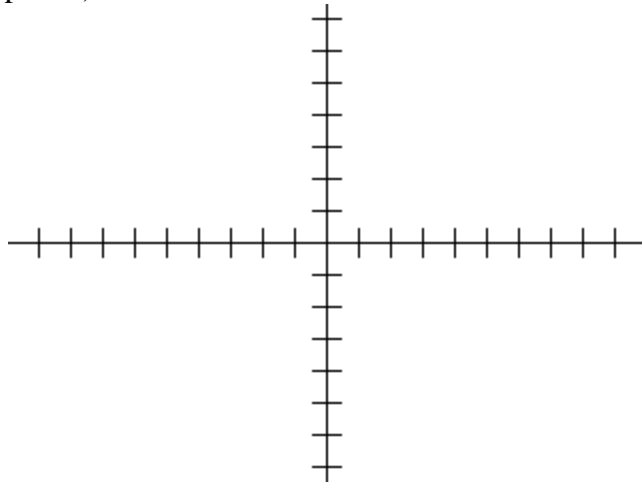
2.
  - a) Graph the line  $3x - 2y = 6$ . (3 points)
  - b) Find the equation of a line parallel to  $3x - 2y = 6$  through the point  $(2, 2)$ . Graph this line with the graph of (a). (6 points)
  - c) Find the equation of a line perpendicular to  $3x - 2y = 6$  through the point  $(2, 2)$ . Graph this line with the graph of (a) and (b). (6 points)Label each line with its equation.



3. Given the function  $f(x) = x^4 - 3x^3 - 15x^2 + 19x + 30$

- a. The order of this polynomial is \_\_\_\_\_. (1 point)
- b. We should be looking for \_\_\_\_\_ zeros. (how many?) (1 point)
- c. What is the end behavior of the function? (2 point)
  
- d. Find all of the factors of the function. (4 points)

e. Graph the function. (5 points)



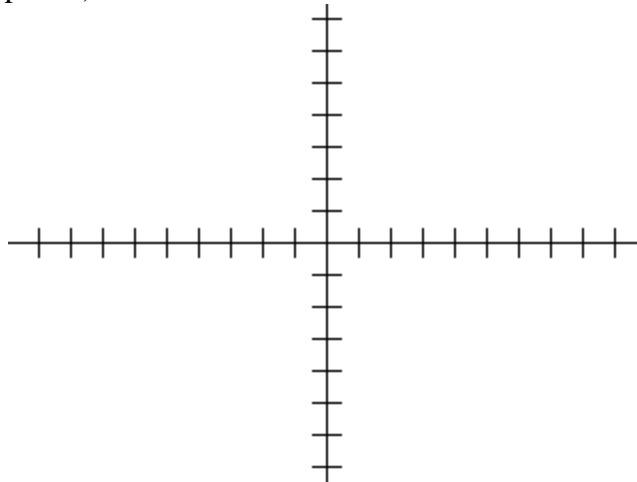
f. Use synthetic division to find  $f(3)$ . (3 points)

4. Given the function  $f(x) = x^3 - 7x + 6$

- c. The order of this polynomial is \_\_\_\_\_. (1 point)
- d. We should be looking for \_\_\_\_\_ zeros. (how many?) (1 point)
- c. What is the end behavior of the function? (2 points)

d. Find all of the factors of the function. (4 points)

e. Graph the function. (5 points)



f. Use synthetic division to find  $f(-2)$ . (3 points)

5. Suppose

$$f(x) = 2x^2 + 3x + 1$$

$$g(x) = 3 - x$$

Calculate each of the following values:  
(3 points each)

a.  $(f \circ g)(3)$

b.  $(g \circ f)(3)$

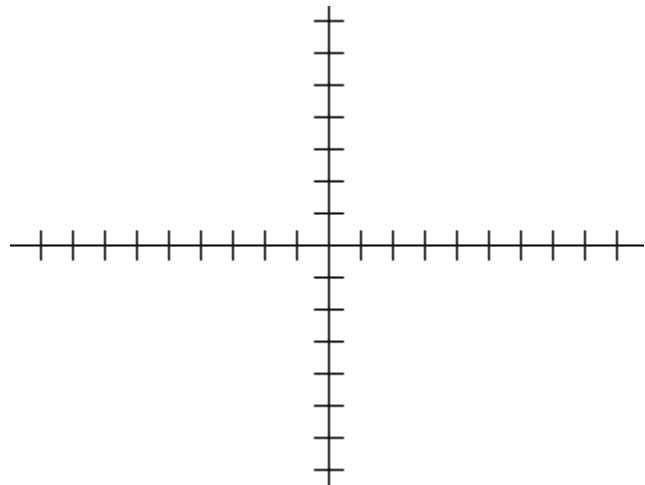
c.  $(f \circ f)(1)$

d.  $(g \circ g)(1)$

e.  $(f \circ g)(x)$

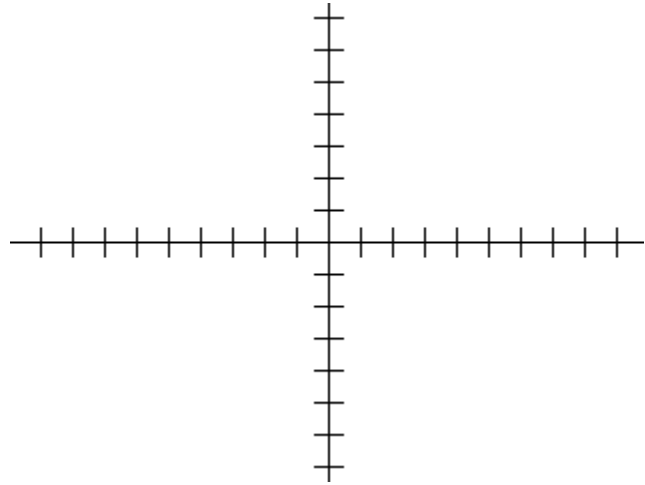
6. Graph the piecewise defined function  $f(x) = \begin{cases} 2 & \text{if } x \leq 2 \\ -2 & \text{if } x > 2 \end{cases}$

(5 points)

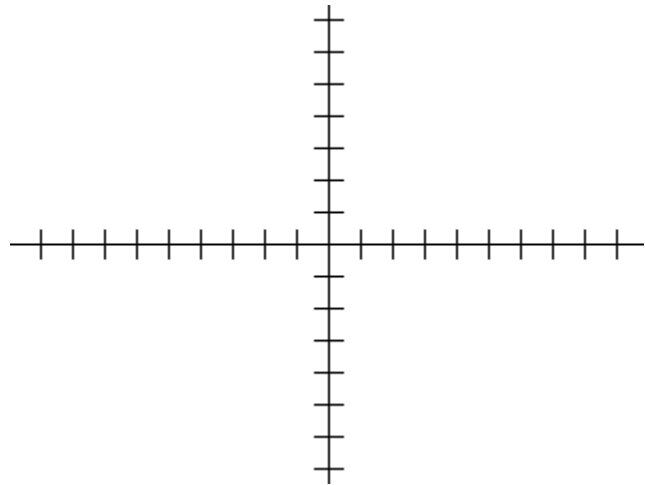


7. Sketch the following functions on the axes provided. (5 points each)

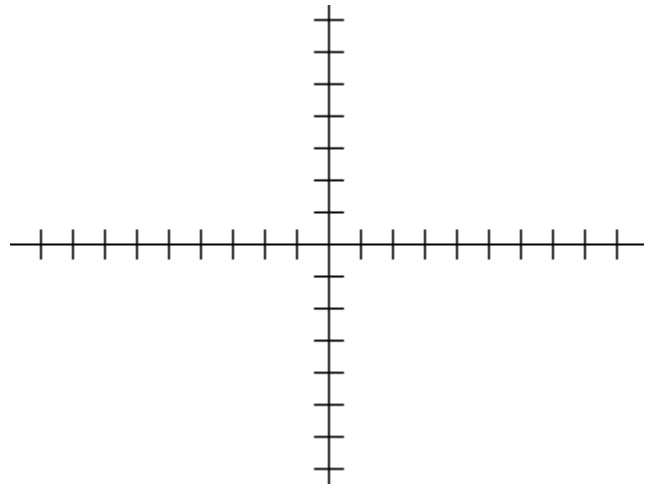
a.  $y = \sqrt{x+3} + 2$



b.  $y = x^3 - 1$



c.  $y = x^2 - x + 1$



8. Suppose the perimeter of a rectangular field is 100 square feet. (Perimeter is given by  $P = 2w + 2l$ . Draw a picture if you need one.)
- a) Represent the length  $l$  in terms of the width  $w$ .
  - b) What are the restrictions on  $w$ ?
  - c) Determine a function  $f$  that represents the area of the field in terms of  $w$ .
  - d) What are the dimensions that maximize the area? What is the maximum area?
  - e) For what dimensions is the area equal to 609?
- (2 points each)