

**1 Chapter Test**

Directions: Show all work where appropriate. A graphing calculator may be necessary to answer some questions.

1. Determine the *domain* of the real-valued function

$$f(x) = \ln(x - 4).$$

- A.  $(0, \infty)$       B.  $(4, \infty)$       C.  $(-\infty, 4)$   
 D.  $(4, -\infty)$       E.  $(-\infty, -4)$

1. \_\_\_\_\_

2. Find all vertical and horizontal asymptotes of the graph

$$\text{of } y = \frac{5x}{2x^2 - 11x - 6}.$$

2. Vertical: \_\_\_\_\_

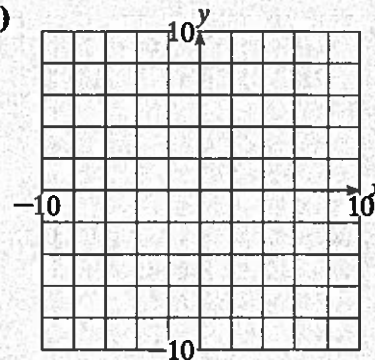
Horizontal: \_\_\_\_\_

3. (a) Graph the piecewise function

$$f(x) = \begin{cases} x^3 + 2, & \text{if } x > 0 \\ 2 - x, & \text{if } x < 0 \end{cases}.$$

- (b) Is the function continuous? Why or why not?

3. (a)



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

4. Solve the equation  $-x^2 - x + 12 = 0$ . Give exact solutions.

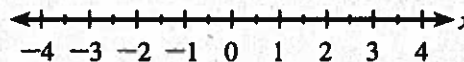
4. \_\_\_\_\_

5. Angela drives on a county highway for 2 hours. She travels 112 miles during this time. She averages 22 mph faster on this drive than she does in the city traffic. What is her average speed in the city?

5. \_\_\_\_\_

6. Solve the inequality  $|3x + 6| > 1$  algebraically. Write the solution in interval notation and draw its number line graph.

6. \_\_\_\_\_



7. Let  $f(x) = -5(x + 1)^2$  and  $g(x) = \frac{x - 2}{2}$ . Find the function  $f \circ g$ . Give the domain of  $f \circ g$ .

7. \_\_\_\_\_

Domain: \_\_\_\_\_

8. A cylindrical tank with diameter 25 meters is filled with gasoline to a depth of 40 meters. The gasoline begins draining at a constant rate of 4 cubic meters per second. Write the volume of gasoline remaining in the tank  $t$  seconds after the tank begins draining as a function of  $t$ .

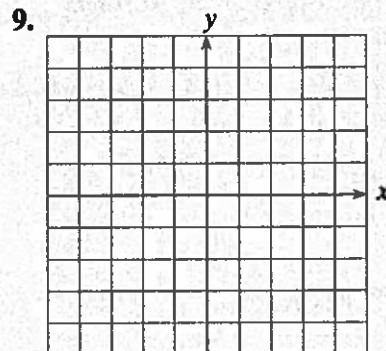
8. \_\_\_\_\_

**1 Chapter Test** *(continued)*

NAME \_\_\_\_\_

9. Graph the relation defined by the parametric equations below. Use an appropriate window size for  $-3 \leq t \leq 3$ .

$$x = 5 - 2t^2, y = 2(t - 1)$$



10. Describe how the graph of  $y = (5x - 5)^2$  can be obtained from the graph of  $y = x^2$ .

10. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

11. Five of the twelve basic functions are odd functions. Which are they?

11. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

12. A ball is hit straight up from a height of 4 ft with an initial velocity of 65 ft/sec. Write a set of parametric equations that you would use to graph height against time. Then find the maximum height of the ball and the number of seconds to reach that height.

12.  $x =$  \_\_\_\_\_  
 $y =$  \_\_\_\_\_  
 Max. ht. = \_\_\_\_\_  
 Time = \_\_\_\_\_

13. Use a graphing calculator to determine all local maxima and/or minima for the function  $y = 2x^3 - 5x^2 - 4x$ . Give the values where the extremum occur to two decimal places.

13. \_\_\_\_\_

14. Let  $f(x) = \sqrt{x - 5}$ .

- (a) Why does  $f$  have an inverse that is a function?  
 (b) Find a rule for  $f^{-1}(x)$  and state its domain.

14. (a) \_\_\_\_\_  
 (b) \_\_\_\_\_  
 Domain: \_\_\_\_\_

15. What are the upper and lower bounds for the function  $f(x) = \cos x - 1$ ?

15. Upper: \_\_\_\_\_  
 Lower: \_\_\_\_\_