

Math 151      Test 1      January 27, 1998      Name \_\_\_\_\_

Show all work needed to complete a problem. If you graph something to solve a problem, show what you plugged into your calculator and what the result was.

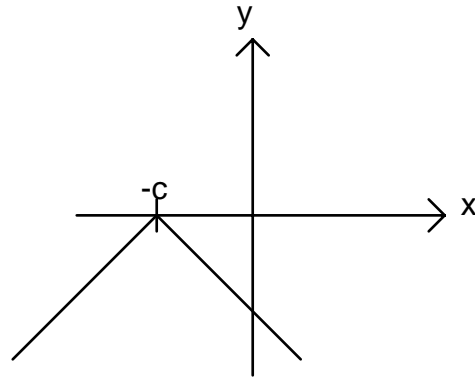
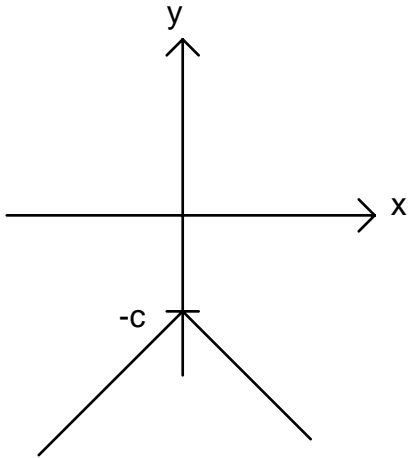
(4 pts) 1.      Suppose a particle moves from A to B(-3, 2),  $\Delta x = 4$ , and  $\Delta y = -3$ . Find A.

(5 pts) 2.      Write an equation for the line that passes through the point (2, 5) and is perpendicular to  $7x + 2y + 8 = 0$ .

(4 pts) 3.      Suppose you want to make a  $100^\circ$  angle by marking an arc on the perimeter of a 10 inch diameter disk and drawing lines from the ends of the arc to the center of the disk. How long should the arc be? (Round answer to the nearest hundredth.)

(8 pts) 4.      Use  $\sin(A + B) = \sin A \cos B + \cos A \sin B$  to evaluate  $\sin(\pi/12)$  as  $\sin(\frac{\pi}{4} - \frac{\pi}{6})$  exactly.

(4 pts) 5. Put the letter of the corresponding equation on each graph (assume  $c > 0$ ):



- (a.)  $y = -|x - c|$       (b.)  $y = -|x + c|$       (c.)  $y = -|x| - c$       (d.)  $y = -|x| + c$   
 (e.)  $y = |-x + c|$       (f.)  $y = |-x| + c$

(8 pts.) 6. Find the center and radius of the following circle exactly:

$$x^2 + y^2 + 4x - 14y + 18 = 0$$

(8 pts) 7. Let  $10 < x < 16$ . Label each of the following as true or false:

a.  $14 < x + 2 < 16$  \_\_\_\_\_

b.  $16 < 2x < 36$  \_\_\_\_\_

c.  $1 < \frac{x}{16} < \frac{8}{5}$  \_\_\_\_\_

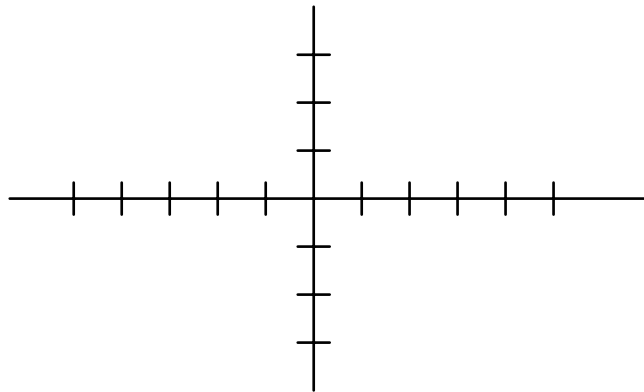
d.  $\frac{5}{8} < \frac{10}{x} < 1$  \_\_\_\_\_

(6 pts) 8. Solve the following inequality:  $\left| \frac{4-x}{3} \right| < 8$

(8 pts) 9. Draw a graph that satisfies the following conditions:

$$f(-3) = 1, \quad \lim_{x \rightarrow \pm\infty} f(x) = 2,$$

$$\lim_{x \rightarrow 2^+} f(x) = -\infty, \quad \lim_{x \rightarrow 2^-} f(x) = \infty$$



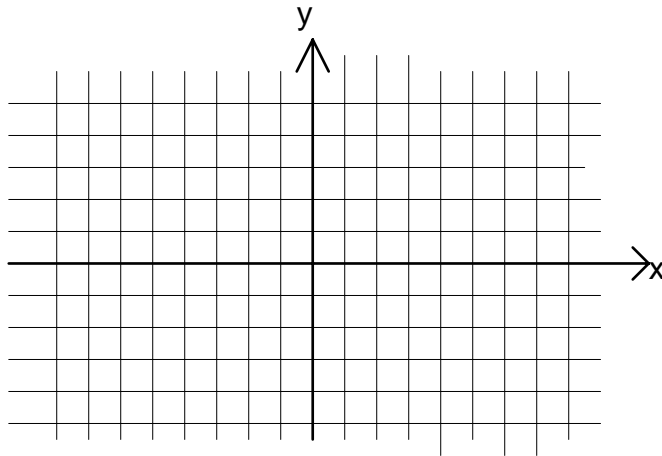
10.

(6 pts)

a. Graph

$$f(x) = \begin{cases} x+3 & \text{if } -2 \leq x < 0 \\ 1 & \text{if } x = 0 \\ 3 & \text{if } 0 < x \leq 2 \\ (x-2)^2 & \text{if } 2 < x < 4 \end{cases}$$

(Make sure you label each axis with your scale.)



(4 pts) b. What is the domain and range of  $f$ ?

(4 pts) c. At what points in the interior of the domain does the limit exist?

(6 pts) d. At what points in the domain is the function continuous?

(15 pts) 11. Evaluate the following limits:

a.  $\lim_{x \rightarrow 3} \frac{x^2 + 2x}{16x + 4}$

b.  $\lim_{x \rightarrow -3} \frac{x^2 + 5x + 6}{9 - x^2}$

c.  $\lim_{x \rightarrow \infty} \left[ \frac{3x^2}{4x^2 + 2} - \frac{x^4 + 7x^3 - 2x + 1}{2x^5 - 32} \right]$

d.  $\lim_{x \rightarrow 5^+} \frac{10}{5 - x}$

e.  $\lim_{x \rightarrow \pi/2} \sin(x + \cos x)$

12. (a through f 1 pt each, g & h 2 pts each)

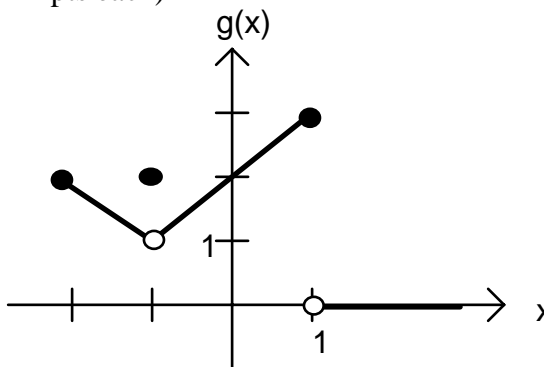
Use the graph to answer the following questions:

a.  $\lim_{x \rightarrow -1^-} g(x) =$

b.  $\lim_{x \rightarrow 0} g(x) =$

c.  $\lim_{x \rightarrow 1^-} g(x) =$

d.  $\lim_{x \rightarrow 1^+} g(x) =$



e. Does  $\lim_{x \rightarrow -1} g(x)$  exist?

f. Does  $\lim_{x \rightarrow 1} g(x)$  exist?

g. At what values is  $g(x)$  discontinuous? \_\_\_\_\_

h. Redefine  $g$  at any removable discontinuities to make  $g$  continuous there.  $g(\quad) =$