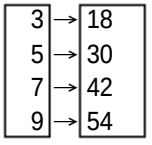
MIAMI DADE COLLEGE
INTERAMERICAN CAMPUS
DEPARTMENT OF MATHEMATICS
MAC 1105
STUDY GUIDE
FUNCTIONS AND THEIR GRAPHS
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the relation represents a function. If it is a function, state the domain and range.

1) 

1) _____

A) function
domain:{18, 30, 42, 54}
range: {3, 5, 7, 9}

B) function
domain: {3, 5, 7, 9}
range: {18, 30, 42, 54}

C) not a function

2) {(5, -3), (-4, -2), (-4, 0), (0, 2), (12, 4)} 2) _____

A) function
domain: {-3, -2, 0, 2, 4}
range: {5, 0, -4, 12}

B) function
domain: {5, 0, -4, 12}
range: {-3, -2, 0, 2, 4}

C) not a function

Find the value for the function.

3) Find f(-2) when $f(x) = \frac{x^2 - 9}{x + 3}$. 3) _____

A) 4 B) 13 C) - 5 D) $\frac{11}{5}$

4) Find f(0) when $f(x) = \sqrt{x^2 + 6x}$. 4) _____

A) 0 B) 6 C) $\sqrt{6}$ D) $\sqrt{42}$

Find the domain of the function.

5) $f(x) = x^2 + 3$ 5) _____

A) $\{x \mid x \geq -3\}$
B) all real numbers
C) $\{x \mid x > -3\}$
D) $\{x \mid x \neq -3\}$

6) $g(x) = \frac{3x}{x^2 - 1}$ 6) _____

A) $\{x \mid x \neq 0\}$
B) $\{x \mid x \neq -1, 1\}$
C) all real numbers
D) $\{x \mid x > 1\}$

7) $f(x) = \sqrt{4 - x}$ 7) _____

A) $\{x \mid x \neq 2\}$ B) $\{x \mid x \leq 2\}$ C) $\{x \mid x \leq 4\}$ D) $\{x \mid x \neq 4\}$

8) $\frac{x}{\sqrt{x - 6}}$ 8) _____

A) $\{x \mid x \geq 6\}$
B) all real numbers
C) $\{x \mid x > 6\}$
D) $\{x \mid x \neq 6\}$

For the given functions f and g, find the requested function and state its domain.

9) $f(x) = 7 - 6x$; $g(x) = -9x + 6$ 9) _____

Find $f + g$.

A) $(f + g)(x) = -15x + 13$; all real numbers

B) $(f + g)(x) = -2x$; all real numbers

C) $(f + g)(x) = -9x + 7$; $\{x \mid x \neq \frac{7}{9}\}$

D) $(f + g)(x) = 3x + 13$; $\{x \mid x \neq \frac{13}{3}\}$

10) $f(x) = 5x + 1$; $g(x) = 3x - 1$ 10) _____

Find $f \cdot g$.

A) $(f \cdot g)(x) = 15x^2 + 2x - 1$; $\{x \mid x \neq -1\}$

B) $(f \cdot g)(x) = 15x^2 - 1$; $\{x \mid x \neq -1\}$

C) $(f \cdot g)(x) = 8x^2 - 2x + 0$; all real numbers

D) $(f \cdot g)(x) = 15x^2 - 2x - 1$; all real numbers

Solve the problem.

11) Express the gross salary G of a person who earns \$24 per hour as a function of the number x of hours worked. 11) _____

A) $G(x) = 24x^2$ B) $G(x) = 24x$ C) $G(x) = 24 + x$ D) $G(x) = \frac{24}{x}$

Find and simplify the difference quotient of f, $\frac{f(x + h) - f(x)}{h}$, $h \neq 0$, for the function.

12) $f(x) = 8x + 2$ 12) _____

A) $8 + \frac{16(x + 2)}{h}$ B) 0 C) $8 + \frac{4}{h}$ D) 8

13) $f(x) = x^2 + 9x + 6$ 13) _____

A) $2x + h + 9$

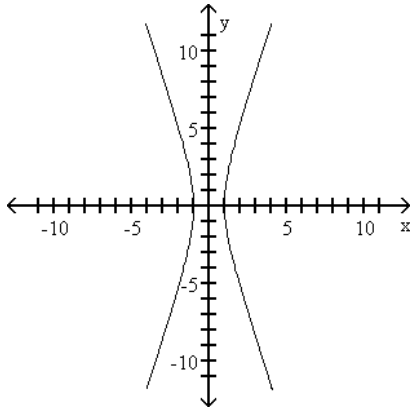
B) $2x + h + 6$

C) $\frac{2x^2 + 2x + 2xh + h^2 + h + 12}{h}$

D) 1

Determine whether the graph is that of a function. If it is, use the graph to find its domain and range, the intercepts, if any, and any symmetry with respect to the x-axis, the y-axis, or the origin.

14) 14) _____



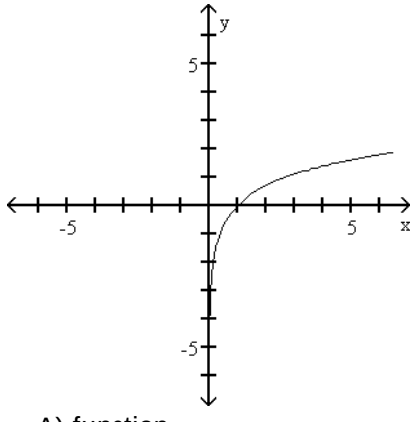
A) function
domain: all real numbers
range: {y|y ≤ -1 or y ≥ 1}
intercepts: (-1, 0), (1, 0)
symmetry: y-axis

B) function
domain: {x|-1 ≤ x ≤ 1}
range: all real numbers
intercepts: (-1, 0), (1, 0)
symmetry: x-axis, y-axis

C) function
domain: {x|x ≤ -1 or x ≥ 1}
range: all real numbers
intercepts: (-1, 0), (1, 0)
symmetry: x-axis, y-axis, origin

D) not a function

15) 15) _____



A) function
domain: all real numbers
range: {y|y > 0}
intercept: (1, 0)
symmetry: none

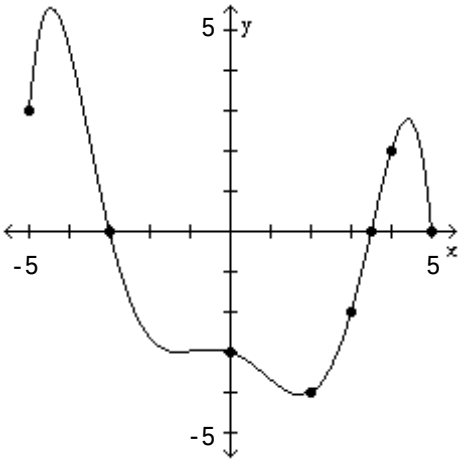
B) function
domain: {x|x > 0}
range: all real numbers
intercept: (1, 0)
symmetry: none

C) function
domain: {x|x > 0}
range: all real numbers
intercept: (0, 1)
symmetry: origin

D) not a function

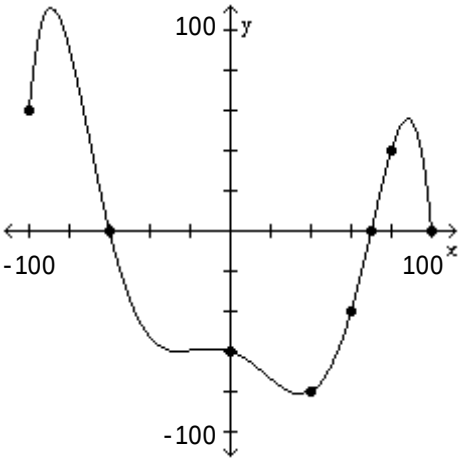
The graph of a function f is given. Use the graph to answer the question.

16) What are the x-intercepts? 16) _____



A) -3, 3.5 B) -3 C) -3, 3.5, 5 D) -5, -3, 3.5, 5

17) What is the y-intercept? 17) _____



A) -80 B) 100 C) -60 D) 70

Answer the question about the given function.

18) Given the function $f(x) = -5x^2 - 10x + 6$, is the point (-2, -4) on the graph of f? 18) _____

A) Yes B) No

19) Given the function $f(x) = -7x^2 + 14x - 1$, what is the domain of f? 19) _____

A) all real numbers B) $\{x \mid x \geq 1\}$

C) $\{x \mid x \leq 1\}$ D) $\{x \mid x \geq -1\}$

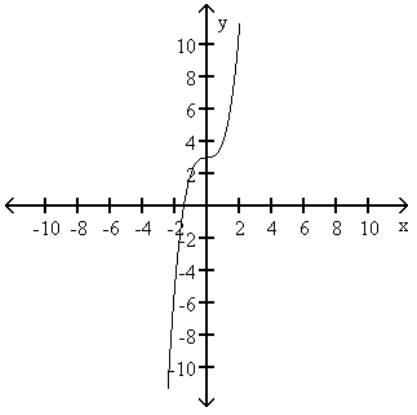
20) Given the function $f(x) = x^2 + 2x - 24$, list the x-intercepts, if any, of the graph of f. 20) _____

A) (6, 0), (-4, 0) B) (6, 0), (4, 0) C) (-6, 0), (1, 0) D) (-6, 0), (4, 0)

21) Given the function $f(x) = 7x^2 - 14x - 9$, list the y-intercept, if there is one, of the graph of f. 21) _____

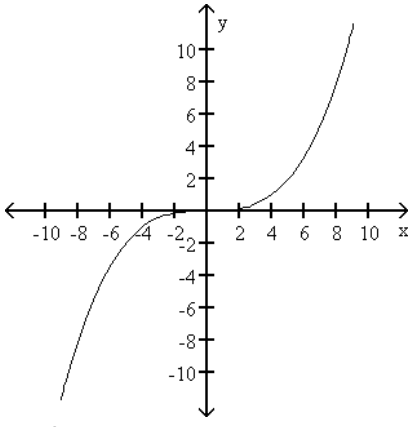
A) -9 B) 5 C) 12 D) -16

The graph of a function is given. Decide whether it is even, odd, or neither.

22) 

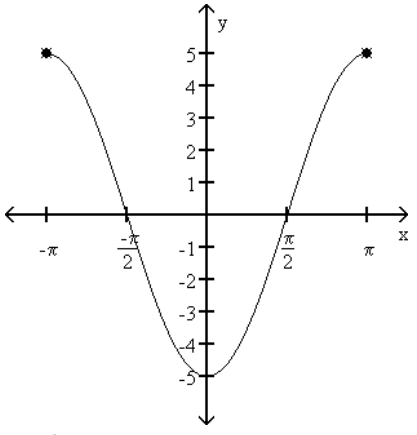
22) _____

A) even B) odd C) neither

23) 

23) _____

A) even B) odd C) neither

24) 

24) _____

A) even B) odd C) neither

Determine algebraically whether the function is even, odd, or neither.

25) $f(x) = -5x^4 - x^2$

25) _____

A) even B) odd C) neither

26) $f(x) = 8x^3 + 7$ 26) _____

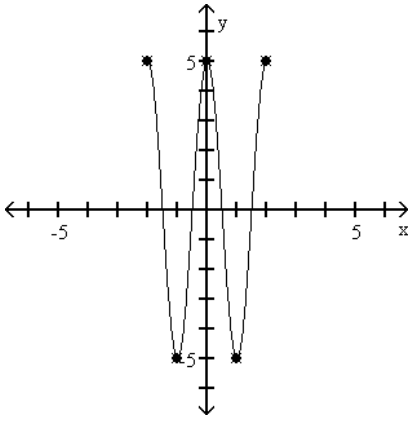
A) even B) odd C) neither

27) $\sqrt[3]{4x^2 + 9}$ 27) _____

A) even B) odd C) neither

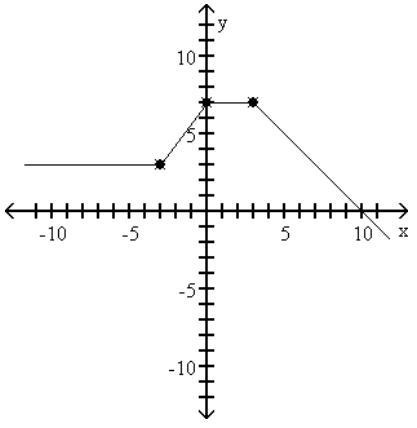
The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

28) (- 2, - 1) 28) _____



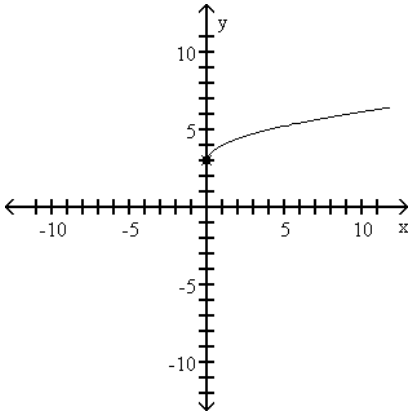
A) decreasing B) constant C) increasing

29) (0, 3) 29) _____



A) increasing B) constant C) decreasing

30) (0, ∞) 30) _____

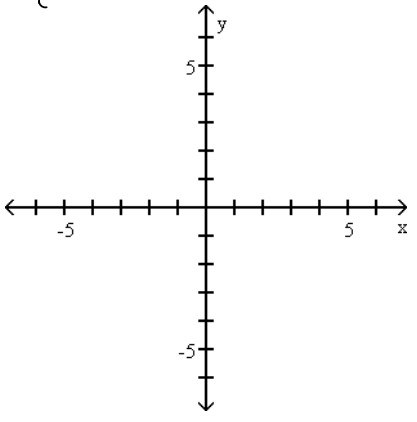


A) decreasing B) increasing C) constant

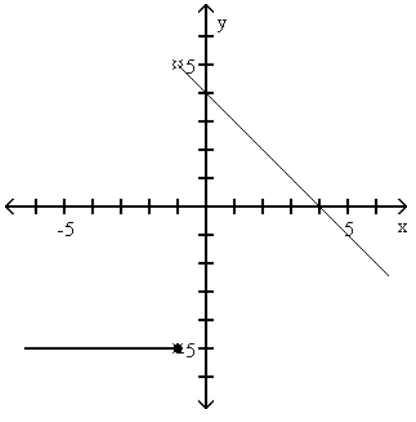
Graph the function.

31) 31) _____

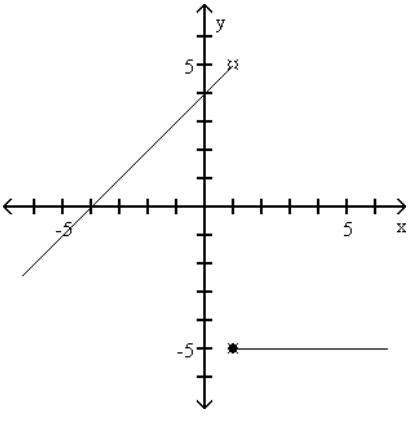
$$f(x) = \begin{cases} x + 4 & \text{if } x < 1 \\ -5 & \text{if } x \geq 1 \end{cases}$$



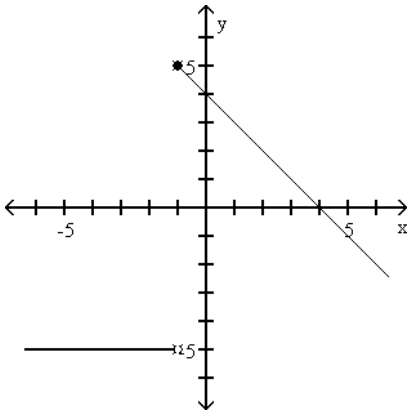
A)



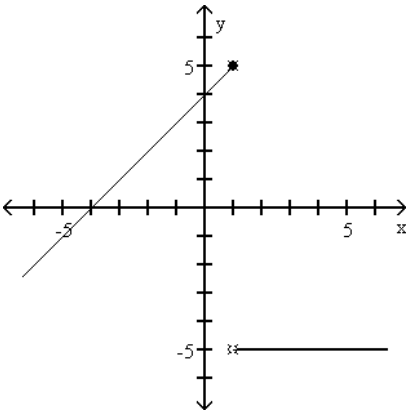
B)



C)

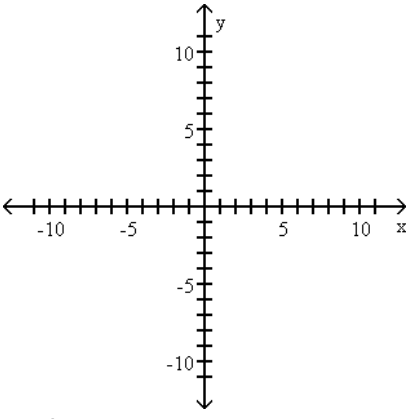


D)

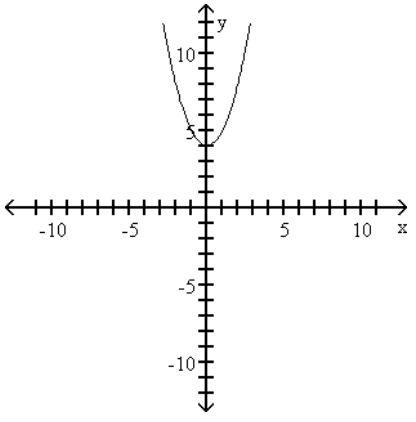


Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

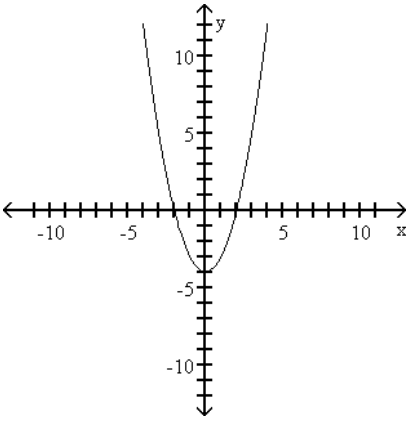
32) $f(x) = x^2 - 4$ 32) _____



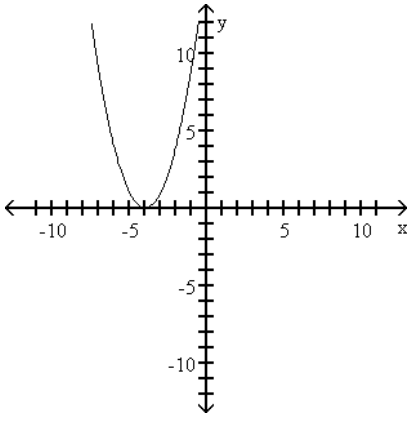
A)



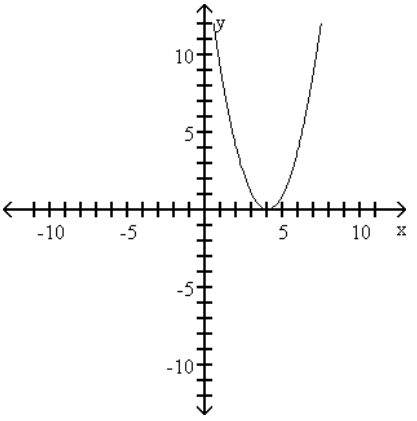
B)



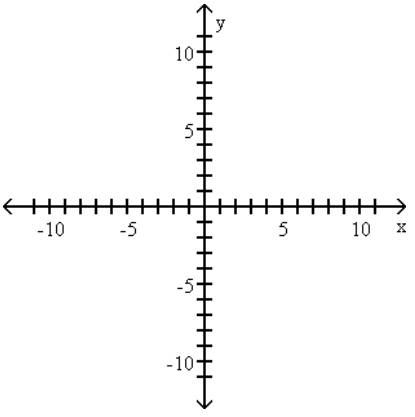
C)



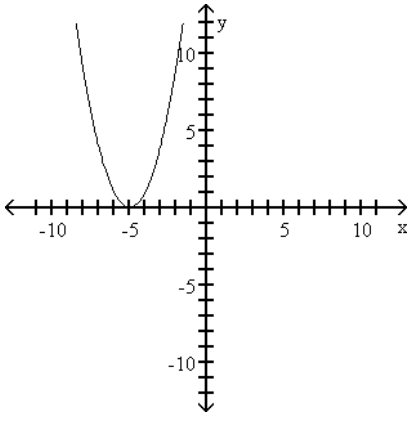
D)



33) $f(x) = (x - 5)^2$ 33) _____



A)



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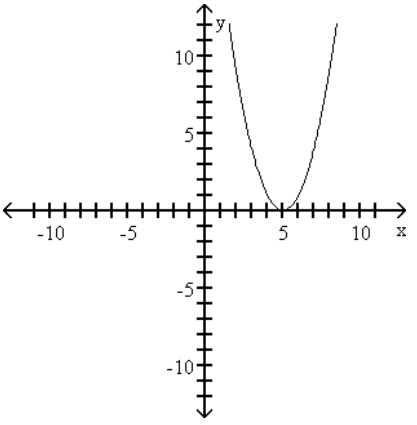
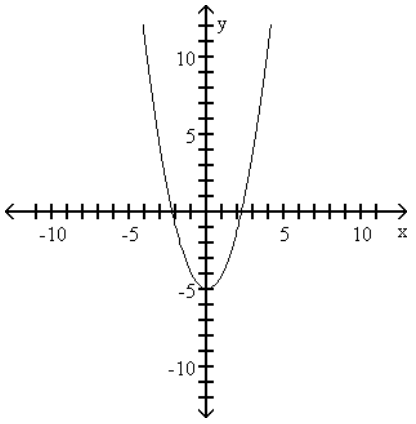
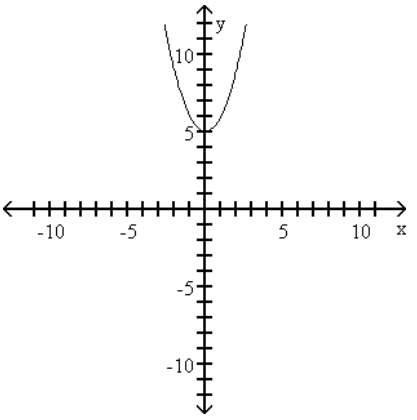


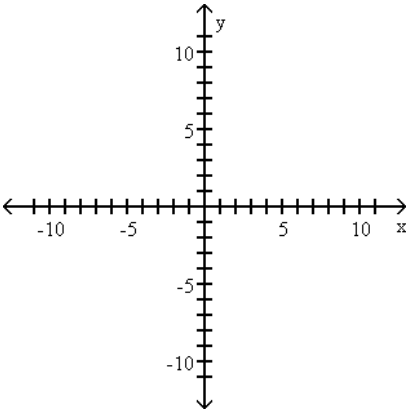
C)



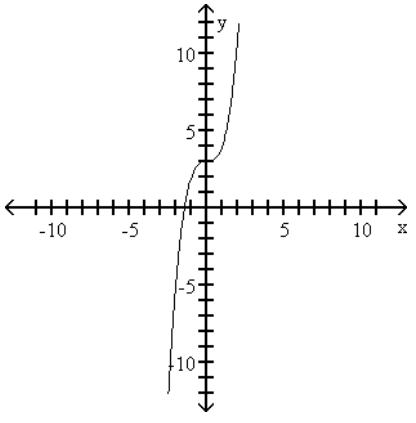
D)



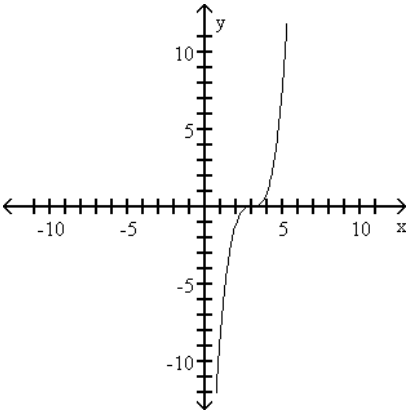
34) $f(x) = x^3 + 3$ 34) _____



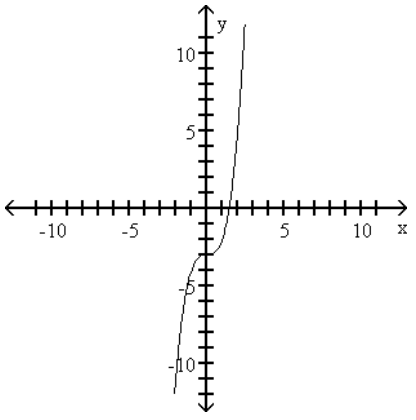
A)



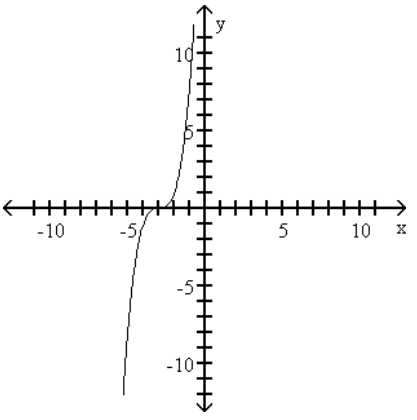
B)



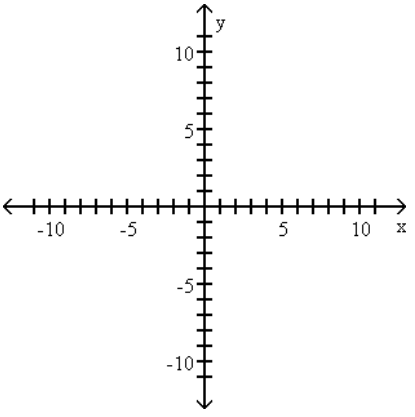
C)



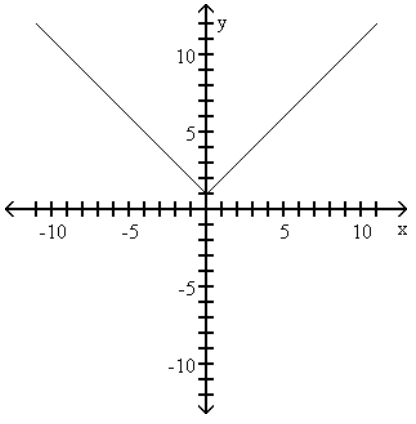
D)



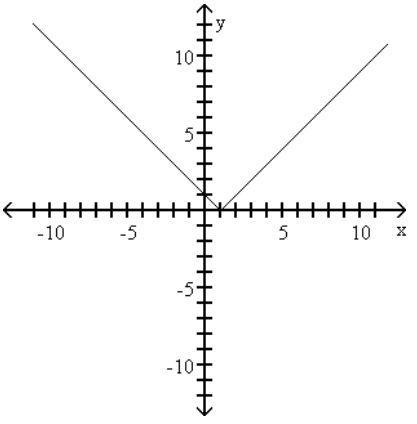
35) f(x) = |x| - 1 35) _____



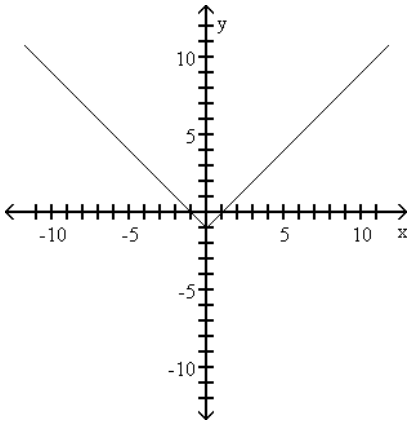
A)



B)



C)



D)