Name_____

**MULTIPLE CHOICE.  Choose the one alternative that best completes the statement or answers the question.**

**Write the equation of the line.**

    1) x–intercept 4, y–intercept 4                                                                                                1) _____

       A) $4x - 4y = 16$          B) $4x + 4y = -16$          C) $4x + 4y = 16$          D) $-4x + 4y = 16$

**Find an equation of the line satisfying the conditions. Write the equation in slope –intercept form.**

    2) Through (1, 9); perpendicular to $x = 5$                                                                        2) _____

       A) $y = 9$             B) $y = -9$            C) $y = 1$            D) $y = -1$

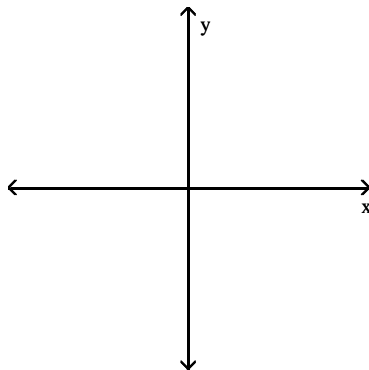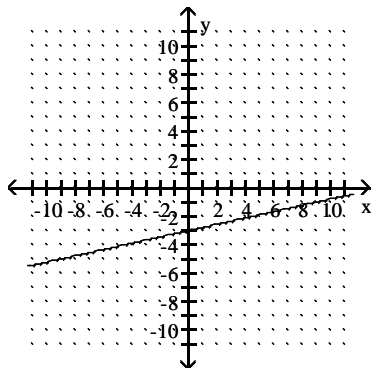**Match the equation with the correct graph.**

    3) $2x - 9y = 27$                                                                                                                          3) _____
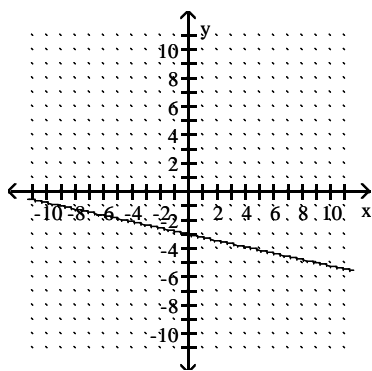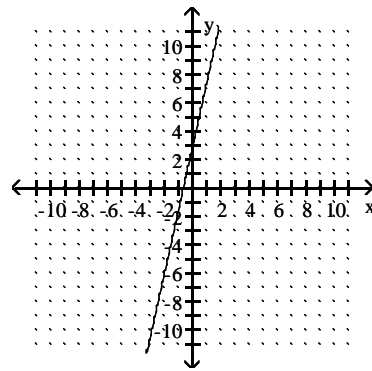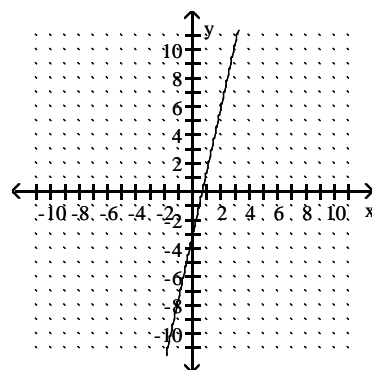
A)

B)

C)

D)

**Find the slope and the y–intercept of the line.**

    4) $4x - 5y = 5$

4)  _____

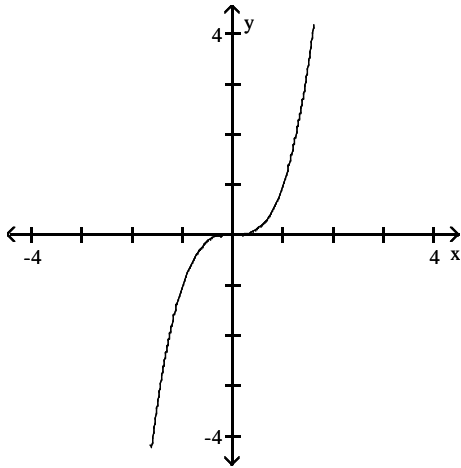        A) Slope 1; y–intercept (0, 1)                B) Slope $\dfrac{4}{5}$; y–intercept (0, –1)

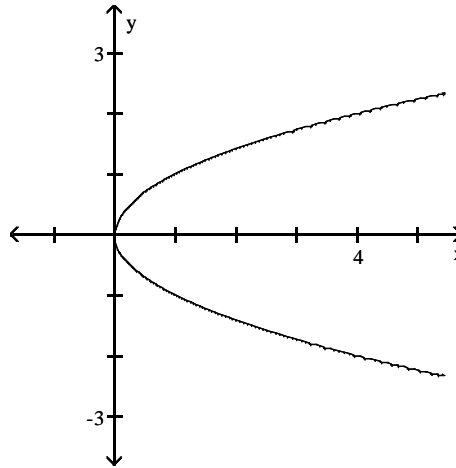        C) Slope $-\dfrac{4}{5}$; y–intercept (0, 1)            D) Slope –1; y–intercept (0, –1)

**Refer to the following graphs to determine an appropriate response.**
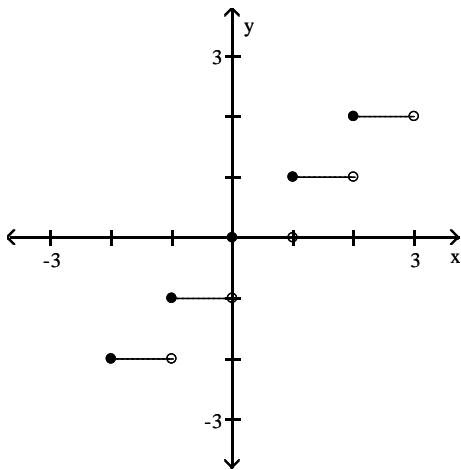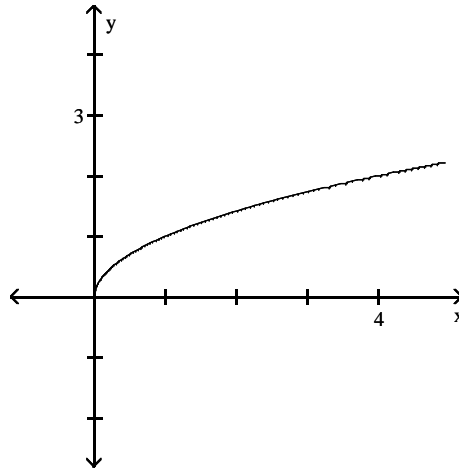
**Graph A**



**Graph B**



**Graph C**



**Graph D**



    5)  Which one is the graph of $y = \sqrt{x}$?  What is it's domain?

5)  _____

        A) Graph A; (–∞, ∞)                    B) Graph B; [0, ∞)
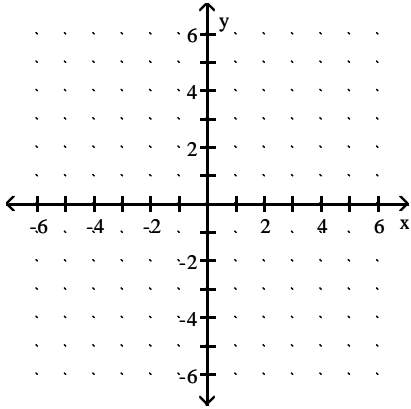
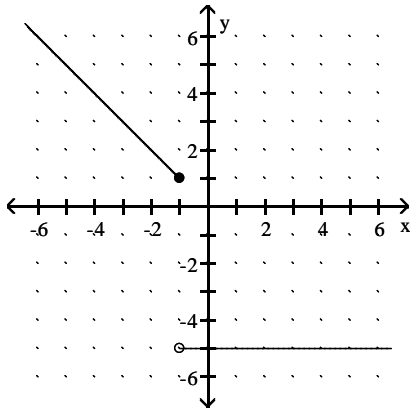        C) Graph D; [0, ∞)                    D) Graph C; {–2, –1, 0, 1, 2}
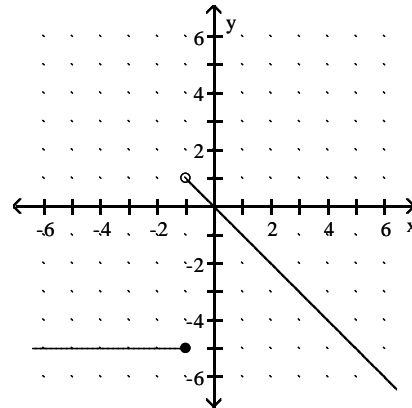
**Graph the function.**

6)

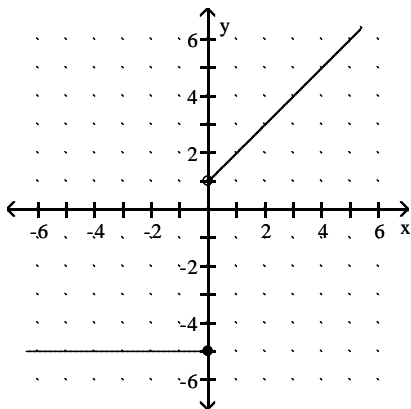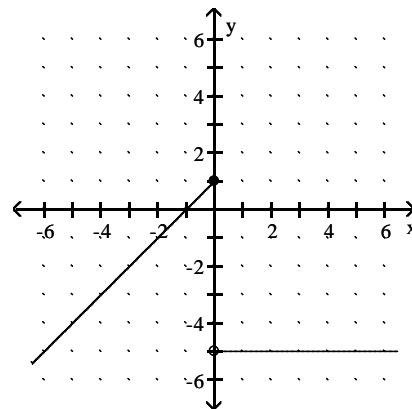$$f(x) = \begin{cases} x + 1, & \text{if } x > 0 \\ -5, & \text{if } x \leq 0 \end{cases}$$

A)

B)

C)
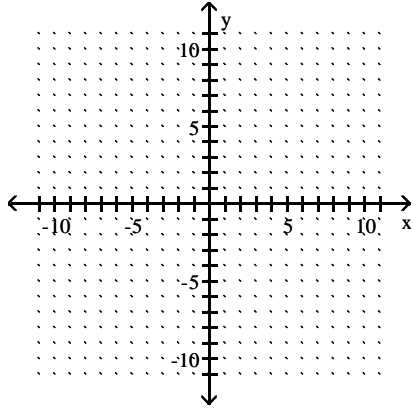
D)

3

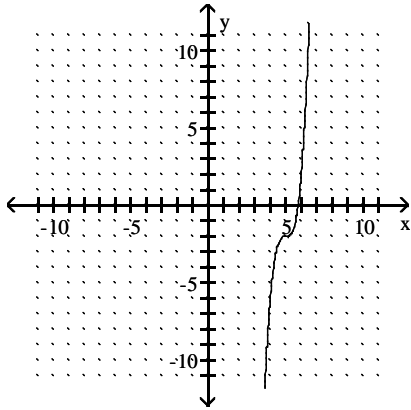7) $f(x) = \dfrac{1}{4}(x - 5)^3 - 2$

7) _____

A)

B)

C)

D)

4

**Graph the point symmetric to the given point.**

8) Plot (–2, –9), then plot the point that is symmetric to (–2, –9) with respect to the x–axis.          8) _____
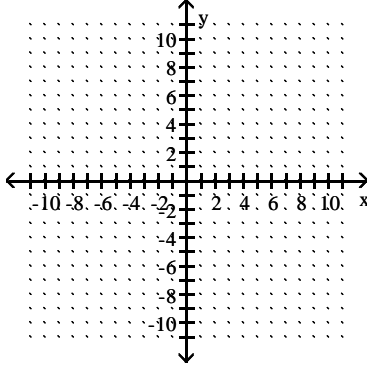
A)
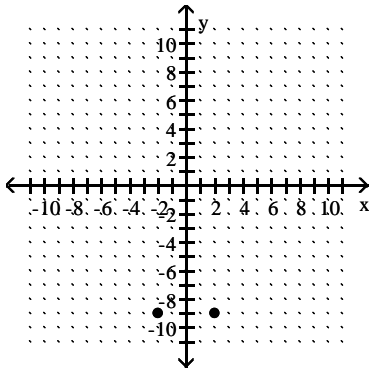
B)
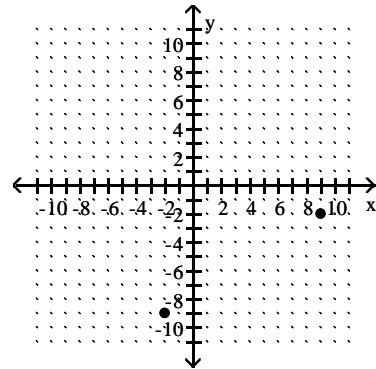
C)
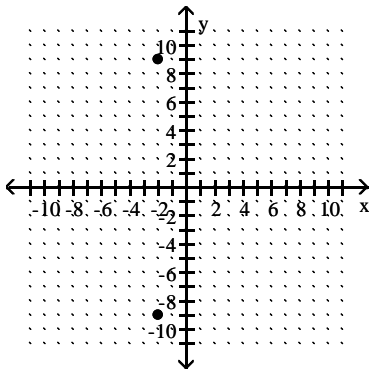
D)
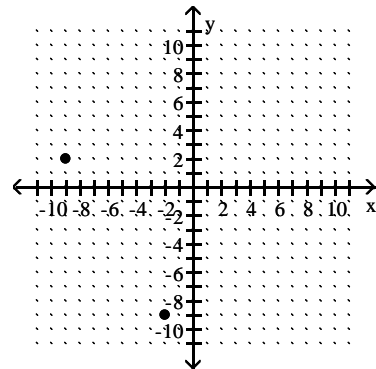
**Graph the basic function using a solid line and the transformed function using a dotted line.**

9) $y = -3|x|$

9) _____



A)



B)



C)



D)

10) $y = \frac{1}{4}|x + 4| - 5$

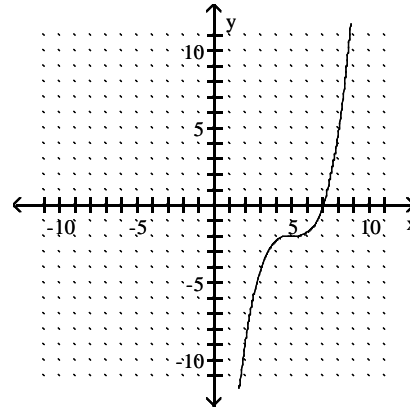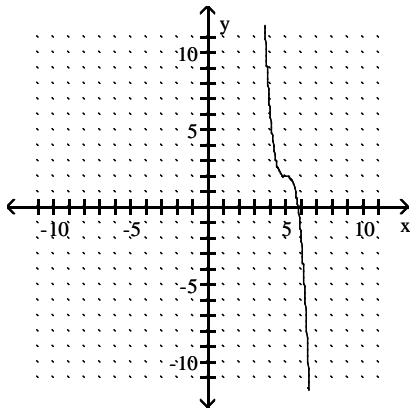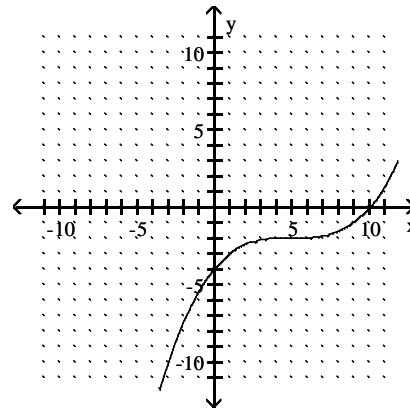10) _____

A)

B)

C)

D)
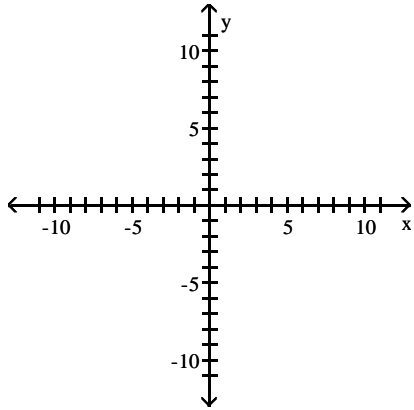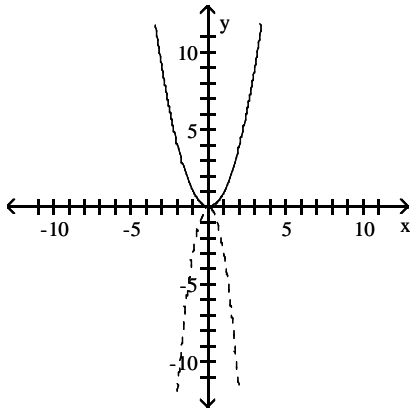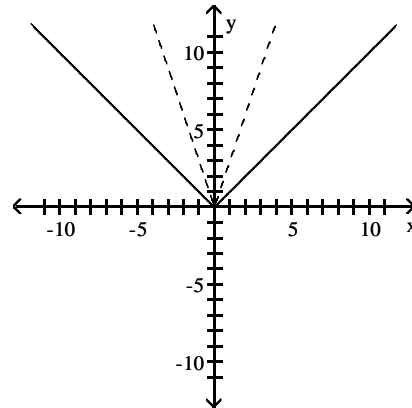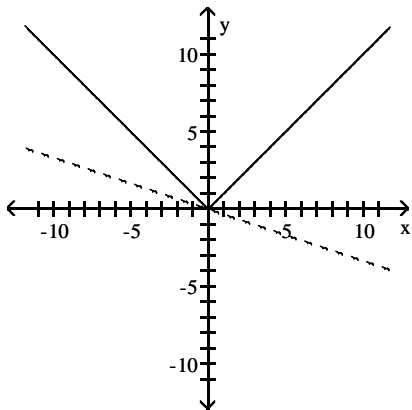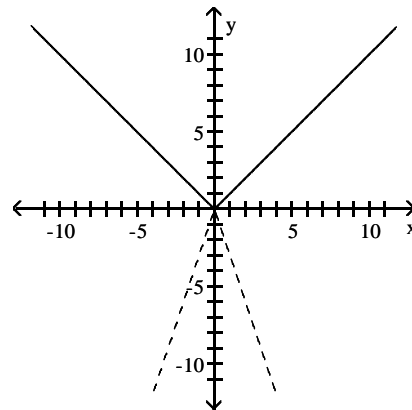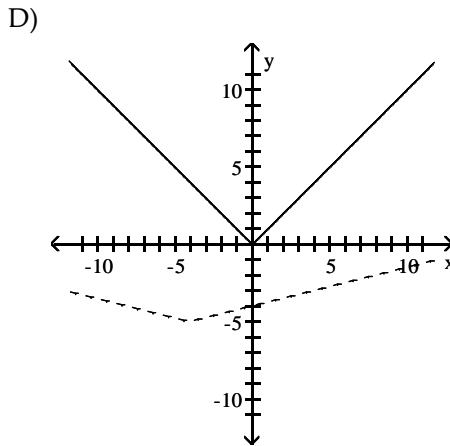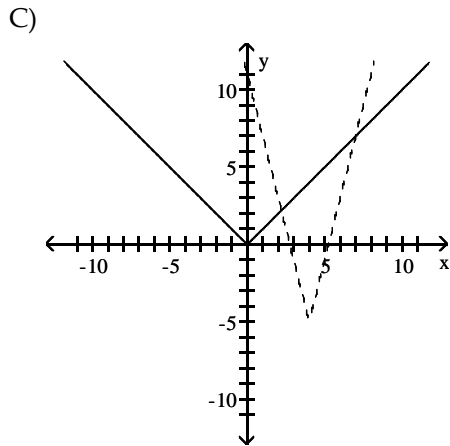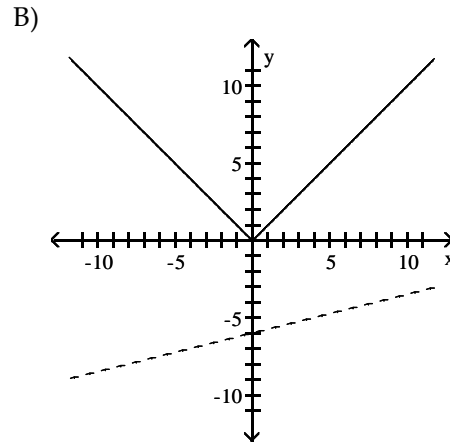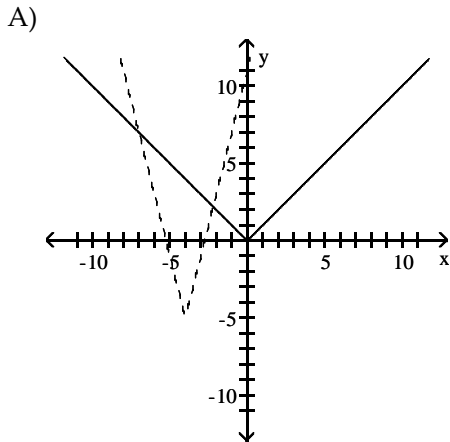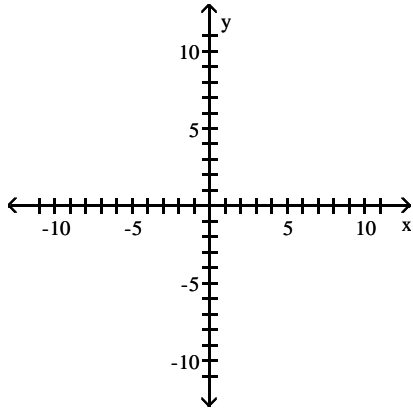
**Solve the problem.**

11) The volume of water added to a circular drum of radius r is given by $V_W = 35t$, where $V_W$ is volume in cu ft and t is time in sec. Find the depth of water in a drum of radius 6 ft after adding water for 5 sec. (Round result to one decimal place.)

11) _____

    A) 3.1 ft                    B) 4.9 ft                    C) 1.5 ft                    D) 1.2 ft

**Compute and simplify the difference quotient** $\dfrac{f(x + h) - f(x)}{h}$, $h \neq 0$.

12) $f(x) = 10x - 13$

    A) 13                 B) –13h             C) $\dfrac{13}{10}$           D) 10

12) _____

**Find the domain and range of the indicated function.**

13) Find the domain and range of $(f - g)(x)$ when $f(x) = 4x - 2$ and $g(x) = 6x - 4$.

    A) Domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$          B) Domain: $(-\infty, \infty)$; range: $(-4, \infty)$
    C) Domain: $(-\infty, \infty)$; range: $(-2, 4)$           D) Domain: $(-4, 2)$; range: $(-\infty, \infty)$

13) _____

**Solve the problem.**

14) Find $(g \circ f)(7)$ when $f(x) = -7x - 3$ and $g(x) = 4x^2 - 9x - 8$.

    A) 252            B) –878            C) 11,276         D) 298

14) _____

**Find the requested value.**

15) Using the given tables find $(f \circ g)\,(9)$

15) _____

| x | 23 | 19 | 15 | 17 |
|------|----|----|----|----|
| f(x) | 46 | 38 | 30 | 34 |

| x | 11 | 9 | 12 | 10 |
|------|----|----|----|----|
| g(x) | 21 | 17 | 23 | 19 |

    A) 17            B) 9             C) 34            D) 38

16) Using the given tables find $(g \circ f)\,(3)$

16) _____

| x | 3 | 6 | 4 | 8 |
|------|---|---|----|----|
| f(x) | 4 | 6 | 13 | 15 |

| x | 5 | 8 | 3 | 4 |
|------|---|---|---|---|
| g(x) | 9 | 5 | 8 | 7 |

    A) 5             B) 3             C) 13            D) 7

**Perform the requested operation or operations.**

17) $f(x) = 4 - 4x$, $g(x) = -9x + 4$
    Find $(f + g)(x)$.

    A) –5x           B) –9x + 4        C) –13x + 8        D) 5x + 8

17) _____

**Give all possible rational zeros for the following polynomial.**

18) $P(x) = 14x^3 + 56x^2 + 2x - 7$

    A) ±1, ±7, ±1/2                   B) ±1, ±1/2, ±7, ±7/2, ±1/7, ±1/14
    C) ±1, ±1/2, ±7, ±2/7, ±1/14       D) ±1, ±1/7, ±2, ±2/7, ±7, ±14

18) _____

**Find a polynomial of degree 3 with real coefficients that satisfies the given conditions.**

19) Zeros of 1, –2, 3 and P(2) = 20                                              19) _____

    A) $P(x) = -5x^3 + 10x^2 + 25x - 30$           B) $P(x) = 5x^3 - 10x^2 - 25x + 30$

    C) $P(x) = 5x^3 + 20x^2 - 25x + 30$           D) $P(x) = -5x^3 - 20x^2 + 25x - 30$

**Use Descartes' Rule of Signs to determine the possible number of positive real zeros and the possible number of negative real zeros for the function.**

20) $5x^3 - 6x^2 + 3x + 5 = 0$                                              20) _____

    A) Positive (1, 0), negative (1, 0)           B) Positive (1, 0), negative (2)

    C) Positive (0), negative (2, 1)             D) Positive (2, 0), negative (1)

**Find the zeros of the polynomial function and state the multiplicity of each.**

21) $5x(x + 6)(x^2 - 16)^2$                                              21) _____

    A) Multiplicity 1 : 0                      B) Multiplicity 1 : 0

      Multiplicity 1 : –6                   Multiplicity 1 : –6

      Multiplicity 1 : ±4                   Multiplicity 2 : ±4

    C) Multiplicity 1 : 0                      D) Multiplicity 1 : 0

      Multiplicity 1 : 6                     Multiplicity 1 : –6

      Multiplicity 2 : ±4                   Multiplicity 2 : – 16

**Factor f(x) into linear factors given that k is a zero of f(x).**

22) $f(x) = x^4 + 14x^3 + 46x^2 - 42x - 147;\ k = -7$ (multiplicity 2)                                              22) _____

    A) $f(x) = (x - 7)^2(x - \sqrt{3})(x + \sqrt{3})$           B) $f(x) = (x + 7)^2(x - \sqrt{3})(x + \sqrt{3})$

    C) $f(x) = (x - 7)(x + 7)(x - \sqrt{3})(x + \sqrt{3})$        D) $f(x) = (x + 7)^2(x - 3)(x + 3)$

**Find the correct end behavior diagram for the given polynomial function.**

23) $P(x) = -x^5 - 5x^3 - 3x + 4$                                              23) _____
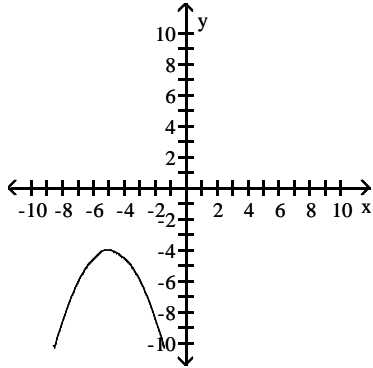
    A) �           B) ⤻           C) ⤴⤵           D) ⤵⤴
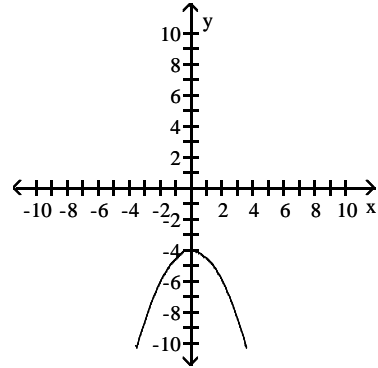
**Match the equation to the correct graph.**

24) $y = -\dfrac{1}{2}(x + 5)^2 - 4$
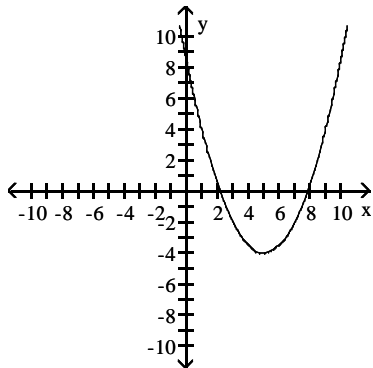
A)
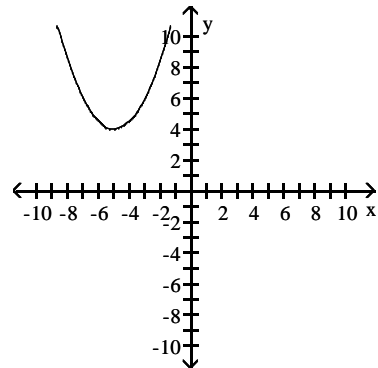


B)



C)



D)

**Find the domain and range of the function.**

25) $f(x) = (x + 1)^2 + 7$

    A) Domain: $(-\infty, \infty)$; range: $(-7, \infty)$         B) Domain: $(7, \infty)$; range: $(-\infty, \infty)$

    C) Domain: $(-\infty, \infty)$; range: $[7, \infty)$         D) Domain: $(-7, \infty)$; range: $(-\infty, \infty)$

**Solve the problem.**

26) The pitch P of a musical tone varies inversely as its wavelength W. One tone has a pitch of 382 vibrations per second and a wavelength of 18.9 ft. Find the wavelength of another tone that has a pitch of 474 vibrations per second.
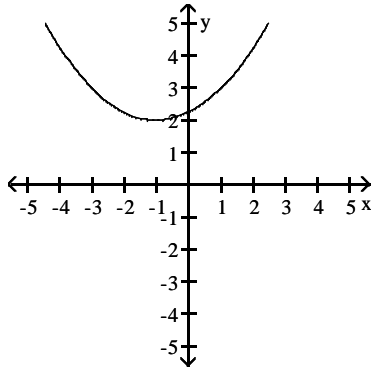
    A) 9580.3 ft         B) 0.000104 ft         C) 0.07 ft         D) 15.2 ft

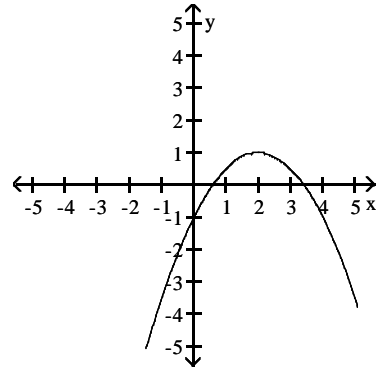**Given the equation or other information for a parabola, find the matching description or graph.**

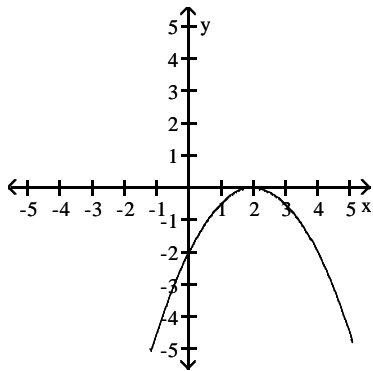27) $f(x) = ax^2 + bx + c$,
$a < 0; b^2 - 4ac > 0$
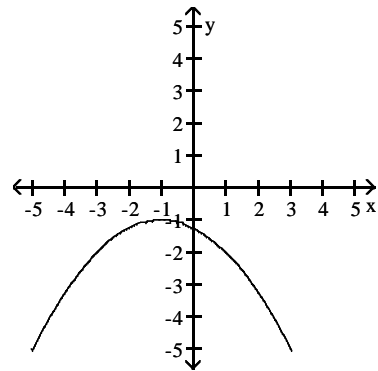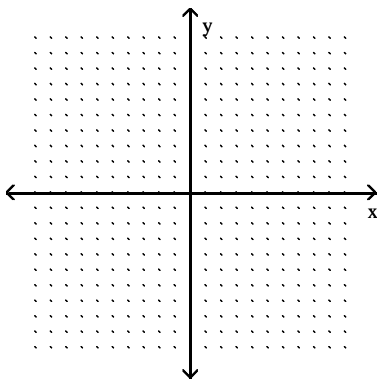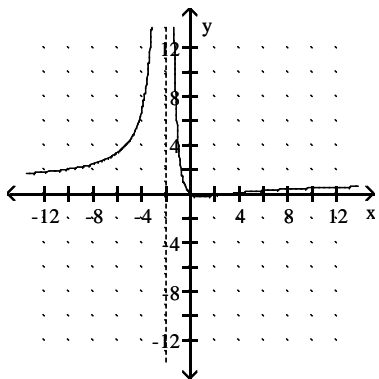
27) _____

A)



B)



C)



D)

**Sketch the graph of the rational function.**

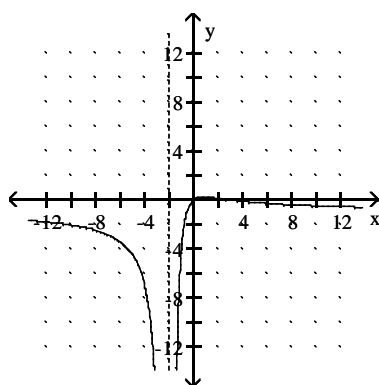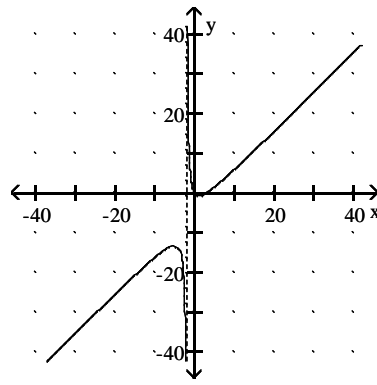28) $f(x) = \dfrac{x(x-3)}{(x+2)^2}$

28) _____

A)

B)
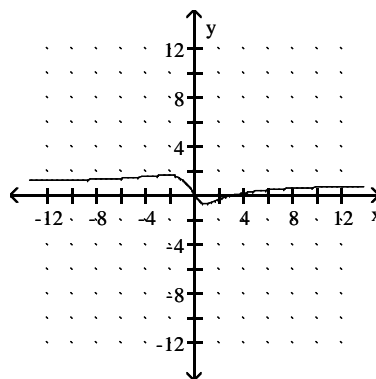
C)

D)

**Identify the vertex of the parabola.**

29) $y = 4x^2 + 24x + 37$

29) _____

A) (3, −1)    B) (−1, 3)    C) (1, −3)    D) (−3, 1)

**Find the horizontal asymptote of the given function.**

30) $h(x) = \dfrac{5x^2 - 9x - 2}{9x^2 - 4x + 8}$

30) _____

A) None    B) y = 5/9    C) y = 9/4    D) y = 0

12

**Solve the problem.**

31) A ball is thrown downward from a window in a tall building. Its position at time t in seconds    31) _____
is $s = 16t^2 + 32t$, where s is in feet. How long (to the nearest tenth) will it take the ball to fall 90
feet?

    A) 1.6 sec               B) 1.4 sec               C) 2.4 sec               D) 2.6 sec

32) If s varies directly as $t^2$, and $s = 63$ when $t = 3$, find s when t is 6.    32) _____

    A) 21                   B) 252                  C)  18                  D) 126

**Use synthetic division to decide whether the given number is a zero of the given polynomial.**

33) 7i;  $f(x) = x^3 + 5x^2 + 49x + 245$    33) _____

    A) Yes                                        B) No

**Find the zeros of the polynomial function and state the multiplicity of each.**

34) $5x(x - 7)^2 (x^2 - 16)$    34) _____

    A) Multiplicity 1 :  0                        B) Multiplicity 1 :  0
         Multiplicity 1 : ±4                           Multiplicity 2 : ±4
         Multiplicity 2 :  7                            Multiplicity 2 :  -7
    C) Multiplicity 1 : ±4                       D) Multiplicity 1 :  0
         Multiplicity 2 :  7                           Multiplicity 2 : - 16
                                                  Multiplicity 2 :  7

**Answer the question.**

35) Find a quadratic function f having x-intercepts 3 and -4 and y-intercept -24    35) _____

    A) $f(x) = x^2 + 5x - 24$                     B) $f(x) = 2x^2 + 2x - 24$
    C) $f(x) = x^2 + x - 24$                      D) $f(x) = x^2 + x - 12$

**Give all possible rational zeros for the following polynomial.**

36) $P(x) = 3x^3 + 43x^2 + 43x + 27$    36) _____

    A) ±1, ±1/3, ±1/9, ±1/27, ±3            B) ±1, ±3, ±9, ±27
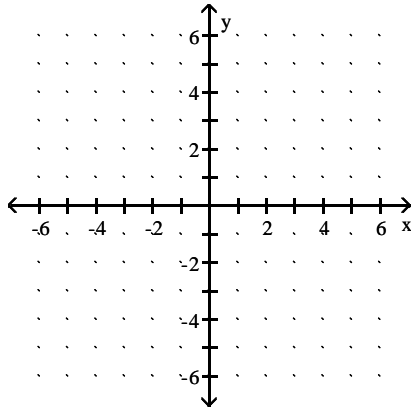    C) ±1, ±3, ±6, ±9, ±27                  D) ±1, ±1/3, ±3, ±9, ±27

**Use the remainder theorem and synthetic division to find f(k).**

37) $k = 2$; $f(x) = 6x^4 + 8x^3 + 6x^2 - 4x + 27$    37) _____

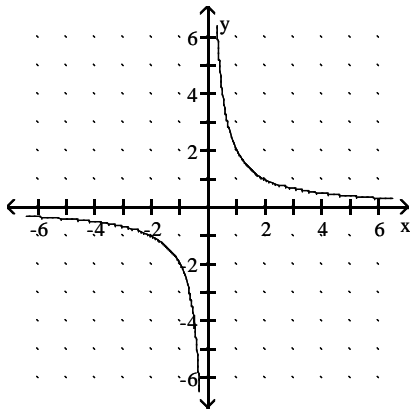    A) 310                  B) 67                  C) -11                 D) 203

**Graph the function.**

38) $f(x) = \dfrac{2}{x}$
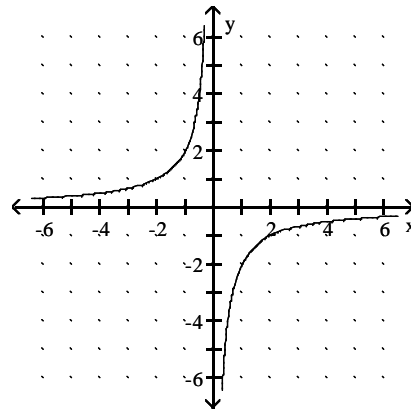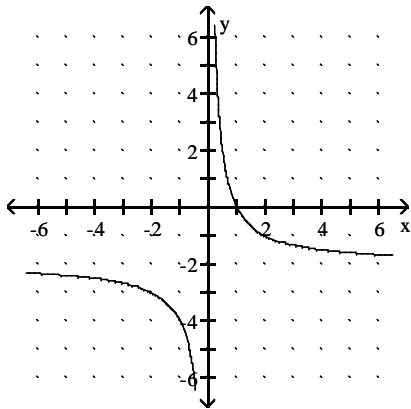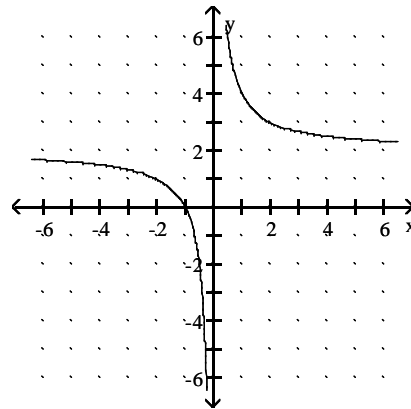
38) _____



A)



B)



C)



D)



**Solve the problem.**

39) The period of vibration P for a pendulum varies directly as the square root of the length L. If the period of vibration is 3.5 sec when the length is 49 inches, what is the period when L = 2.25 inches?

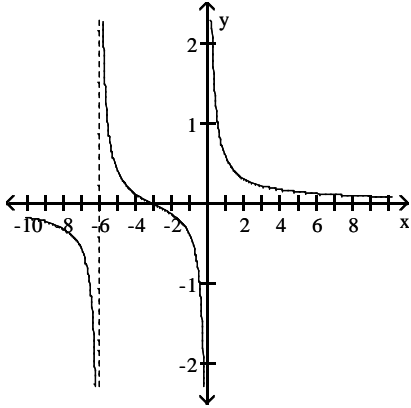39) _____

   A) 4.25 sec              B) 0.75 sec              C) 3.75 sec              D) 4.5 sec

**Find an equation for the rational function graph.**

40)



40) _____

A) $f(x) = \dfrac{x + 6}{x(x + 3)}$

B) $f(x) = \dfrac{x + 3}{x(x + 6)}$

C) $f(x) = \dfrac{x(x + 6)}{x + 3}$

D) $f(x) = \dfrac{x(x + 3)}{x + 6}$

1) C
2) A
3) A
4) B
5) C
6) C
7) B
8) C
9) D
10) D
11) C
12) D
13) A
14) C
15) C
16) D
17) C
18) B
19) A
20) D
21) B
22) B
23) C
24) A
25) C
26) D
27) B
28) A
29) D
30) B
31) A
32) B
33) A
34) A
35) B
36) D
37) D
38) A
39) B
40) B