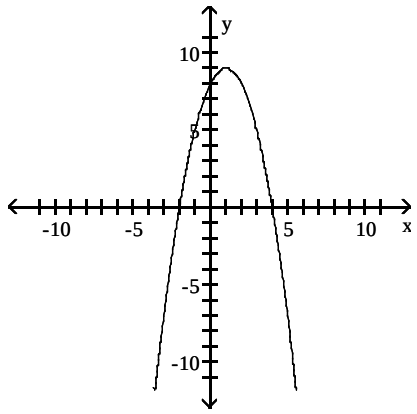
Math 141 Quiz 4 Preparation Ch.3.1 to 3.2 v01
NO BOOK/ NO NOTES/YES CALCUATOR
Dressler Winter 2016

Name_____

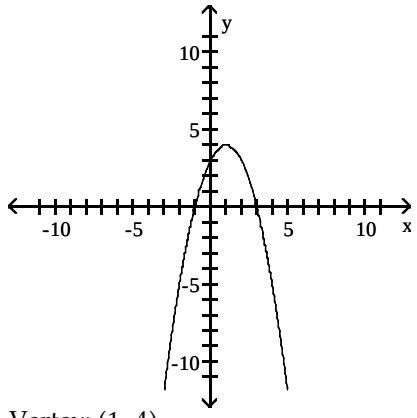
Determine the quadratic function whose graph is given by first writing in standard form.
Express your answer in both standard form and the form $ax^2 + bx + c$.

1) 1) _____



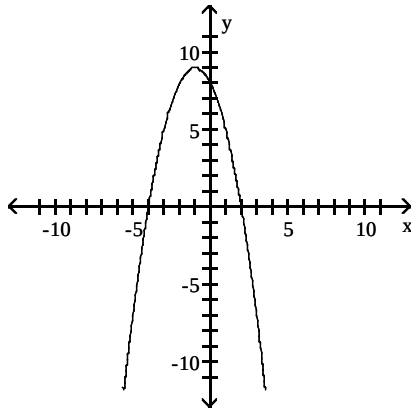
Vertex: (1, 9)
y–intercept: (0, 8)

2) 2) _____



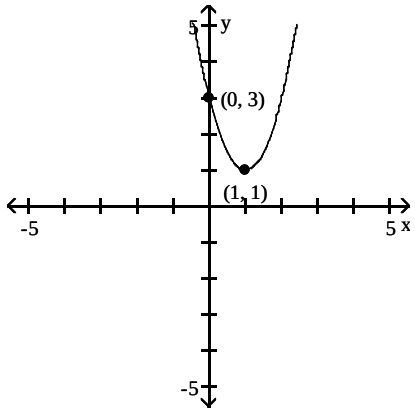
Vertex: (1, 4)
y–intercept: (0, 3)

3) 3) _____

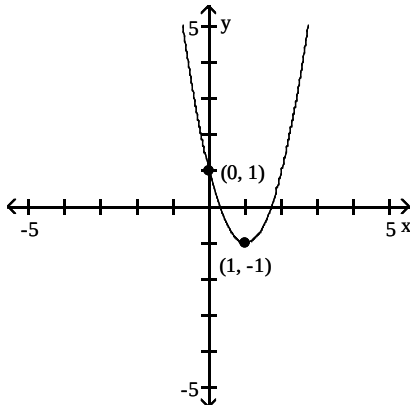


Vertex: (- 1, 9)
y–intercept: (0, 8)

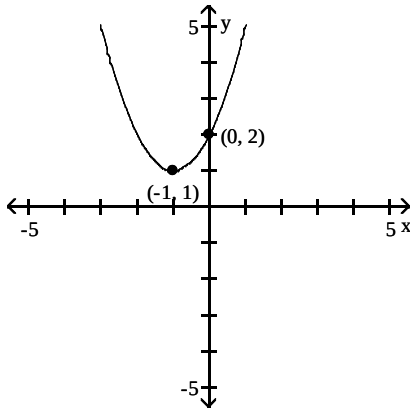
4) 4) _____



5) 5) _____

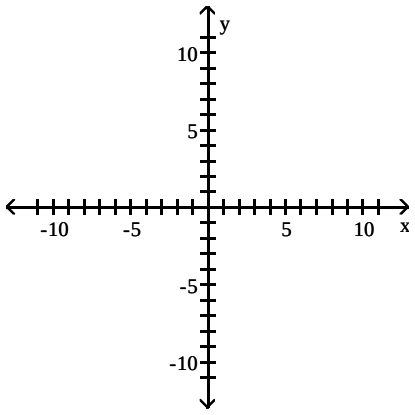


6) 6) _____



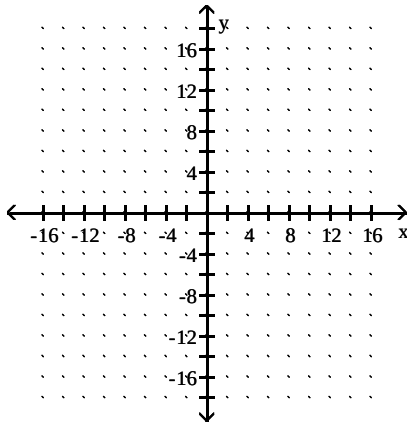
Graph the function f by starting with the graph of $y = x^2$, writing f in standard form, and using transformations (shifting, compressing, stretching, and/or reflection).

7) $f(x) = x^2 + 2x - 8$ 7) _____

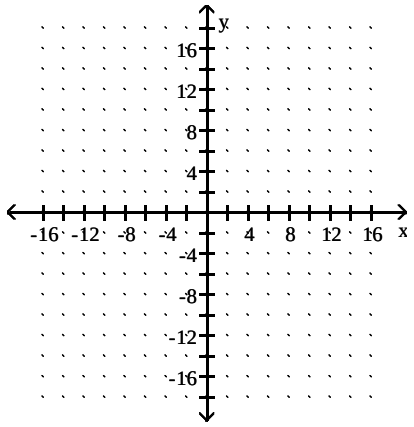


Sketch the graph of the function and find the domain and range.

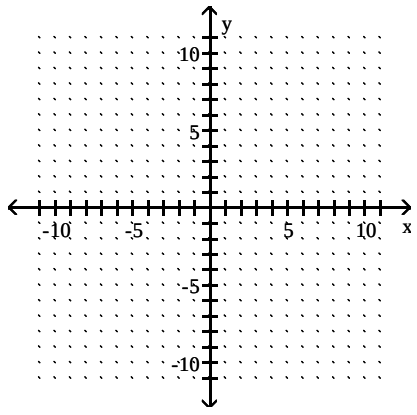
8) $f(x) = x^2 - 1$ 8) _____



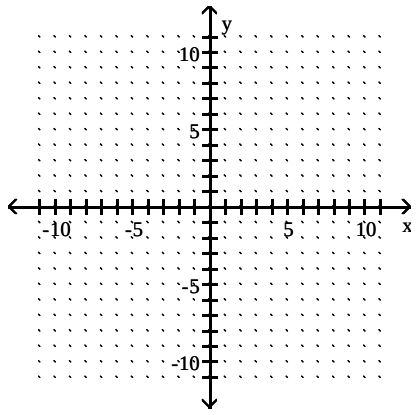
9) $f(x) = x^2 + 9$ 9) _____



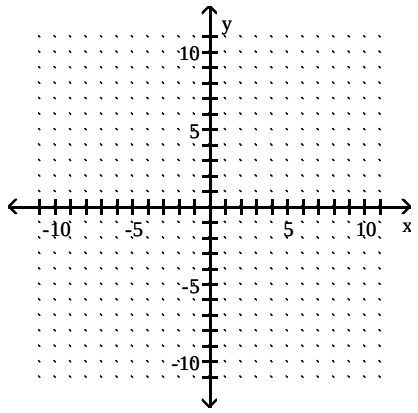
10) $f(x) = (x - 2)^2 - 3$ 10) _____



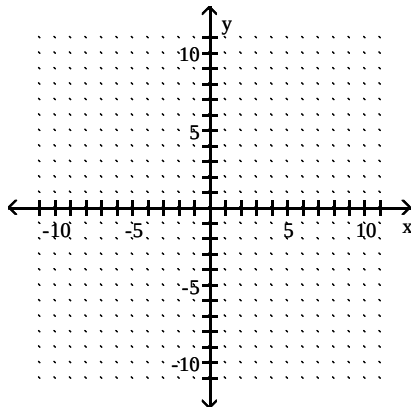
11) $f(x) = (x - 5)^2 + 1$ 11) _____



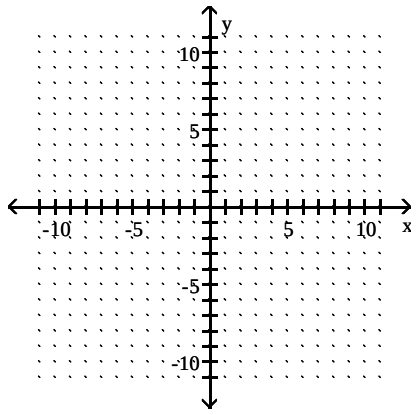
12) $f(x) = (x + 4)^2$ 12) _____



13) $f(x) = -x^2 + 4$ 13) _____

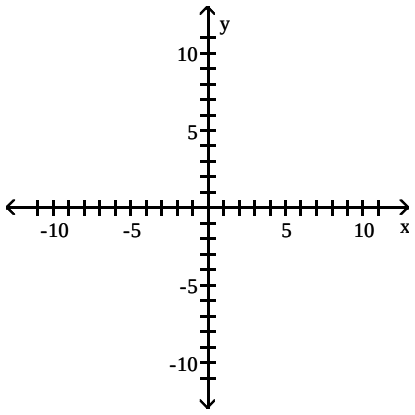


14) $f(x) = 3x^2 - 3$ 14) _____

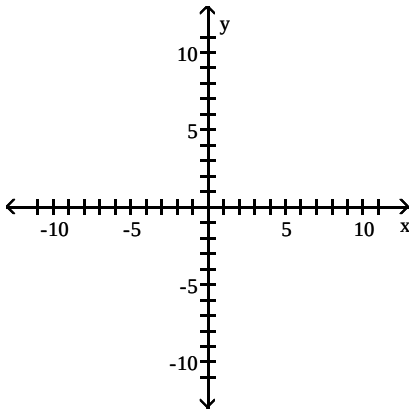


Graph the function f by starting with the graph of $y = x^2$, writing f in standard form, and using transformations (shifting, compressing, stretching, and/or reflection).

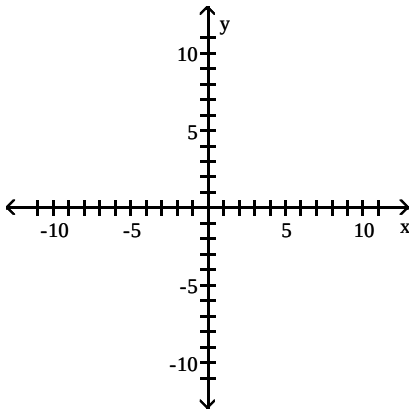
15) $f(x) = x^2 + 2x - 3$ 15) _____



16) $f(x) = x^2 + 6x + 8$ 16) _____

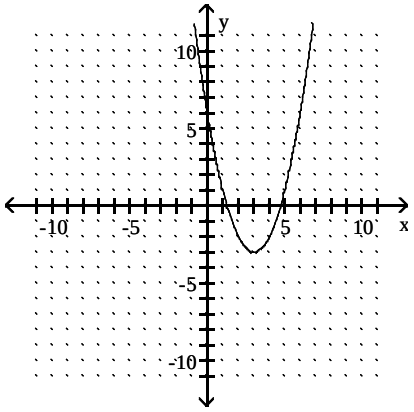


17) $f(x) = x^2 + 4x + 3$ 17) _____

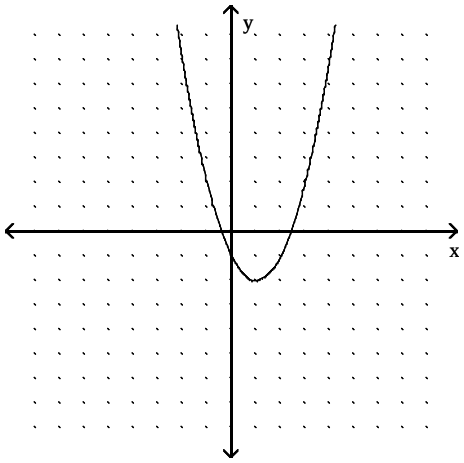


Solve the problem.

18) Find an equation of the function f sketched below in the form $f(x) = a(x - h)^2 + k$. Use the vertex to find the values of h and k and use a second point on the graph to find the value of a. 18) _____



19) A function of the form $y = a(x - h)^2 + k$ is graphed below. Determine whether the constants a, h, and k are positive, negative, or zero. 19) _____



20) An object is propelled vertically upward from the top of a 128–foot building. The quadratic function $s(t) = -16t^2 + 192t + 128$ models the ball's height above the ground, s(t), in feet, t seconds after it was thrown. After how many seconds does the object reach its maximum height? Round to the nearest tenth of a second if necessary. 20) _____

21) You have 188 feet of fencing to enclose a rectangular region. Find the dimensions of the rectangle that maximize the enclosed area. 21) _____

22) You have 360 feet of fencing to enclose a rectangular region. Find the dimensions of the rectangle that maximize the enclosed area. 22) _____

23) A developer wants to enclose a rectangular grassy lot that borders a city street for parking. If the developer has 316 feet of fencing and does not fence the side along the street, what is the largest area that can be enclosed? 23) _____

24) A developer wants to enclose a rectangular grassy lot that borders a city street for parking. If the developer has 308 feet of fencing and does not fence the side along the street, what is the largest area that can be enclosed? 24) _____

25) You have 72 feet of fencing to enclose a rectangular plot that borders on a river. If you do not fence the side along the river, find the length and width of the plot that will maximize the area. 25) _____

26) You have 112 feet of fencing to enclose a rectangular plot that borders on a river. If you do not fence the side along the river, find the length and width of the plot that will maximize the area. 26) _____

27) The cost in millions of dollars for a company to manufacture x thousand automobiles is given by the function $C(x) = 3x^2 - 30x + 225$. Find the number of automobiles that must be produced to minimize the cost. 27) _____

Find the x–intercepts of the polynomial function. State whether the graph crosses the x–axis, or touches the x–axis and turns around, at each intercept.

28) $f(x) = 3x^2 - x^3$ 28) _____

29) $f(x) = x^4 - 121x^2$ 29) _____

30) $x^5 - 6x^3 + 8x = 0$ 30) _____

31) $x^4 + 3x^3 - 40x^2 = 0$ 31) _____

32) $f(x) = x^3 + 10x^2 + 33x + 36$ 32) _____

33) $f(x) = (x + 1)(x - 6)(x - 1)^2$ 33) _____

34) $f(x) = -x^2(x + 5)(x^2 - 1)$ 34) _____

35) $f(x) = -x^2(x + 2)(x^2 + 1)$ 35) _____

36) $f(x) = x^2(x - 3)(x - 4)$ 36) _____

37) $f(x) = -x^3(x + 3)^2(x - 6)$ 37) _____

38) $f(x) = (x - 3)^2(x^2 - 25)$ 38) _____

Determine whether the graph of the polynomial has y –axis symmetry, origin symmetry, or neither.

39) $f(x) = 2x^2 - x^3$ 39) _____

40) $f(x) = 5 - x^4$ 40) _____

41) $f(x) = x^4 - 36x^2$ 41) _____

42) $f(x) = x^3 - 3x$ 42) _____

43) $f(x) = x^3 + x^2 - 5$ 43) _____

44) $f(x) = x(5 - x^2)$ 44) _____

45) $x^5 - 12x^3 + 27x = 0$ 45) _____

46) $f(x) = x^3 + 11x^2 + 39x + 45$ 46) _____

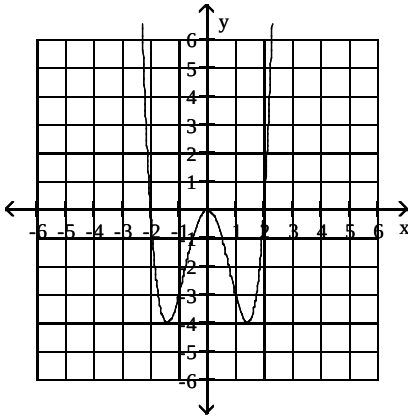
47) $f(x) = (x + 1)(x - 2)(x - 1)^2$ 47) _____

48) $f(x) = -x^2(x + 2)(x^2 - 1)$ 48) _____

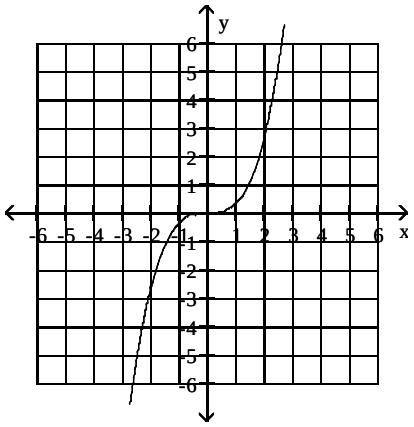
49) $f(x) = -x^3(x + 4)^2(x - 7)$ 49) _____

50) $f(x) = (x - 2)^2(x^2 - 16)$ 50) _____

51) 51) _____



52)



52) _____

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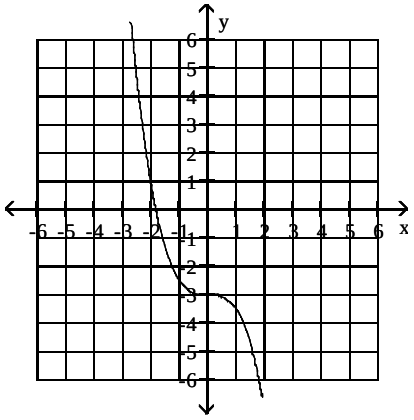

53) _____

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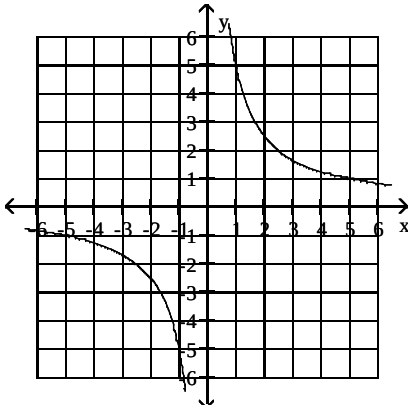
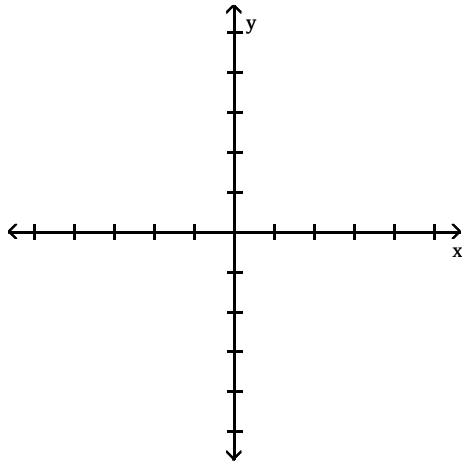


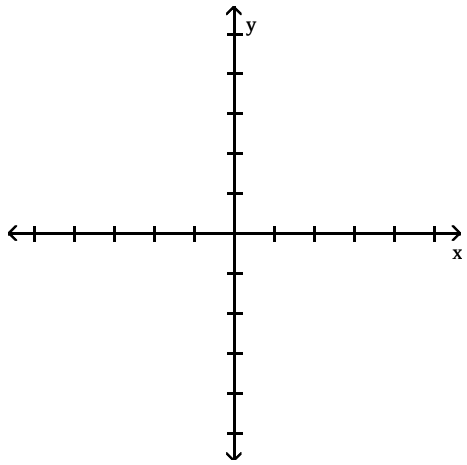
54) _____

Complete the following:
(a) Use the Leading Coefficient Test to determine the graph's end behavior.
(b) Find the x–intercepts. State whether the graph crosses the x–axis or touches the x–axis and turns around at each intercept.
(c) Find the y–intercept.
(d) Graph the function.

55) $f(x) = x^2(x + 3)$ 55) _____

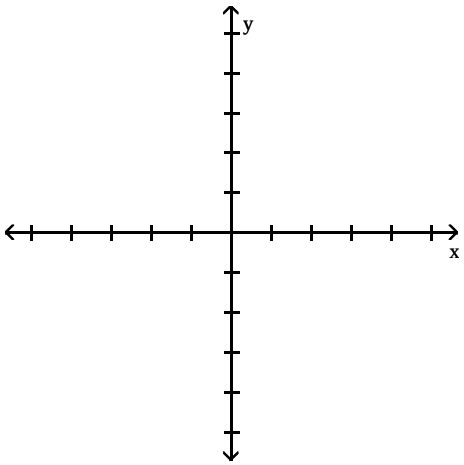


56) $f(x) = (x + 1)(x - 3)^2$ 56) _____



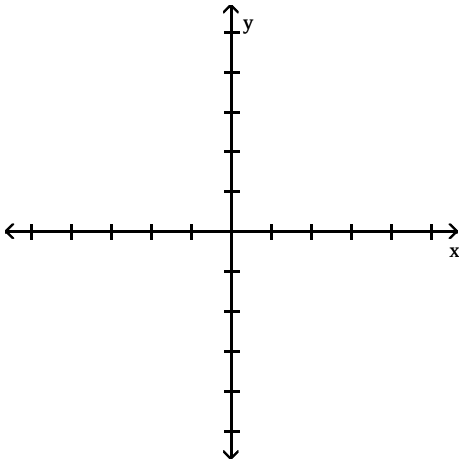
57) $f(x) = -2(x - 3)(x + 1)^3$

57) _____



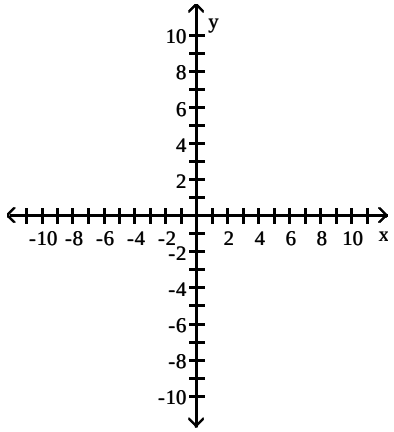
58) $f(x) = -2(x - 3)(x + 2)^3$

58) _____

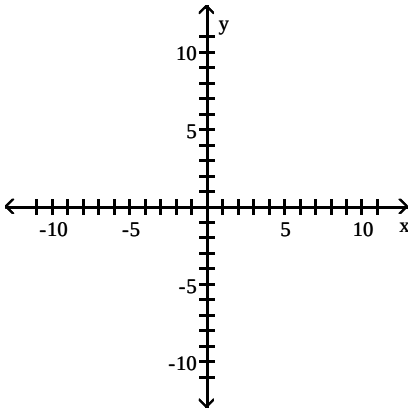


Graph the polynomial function.

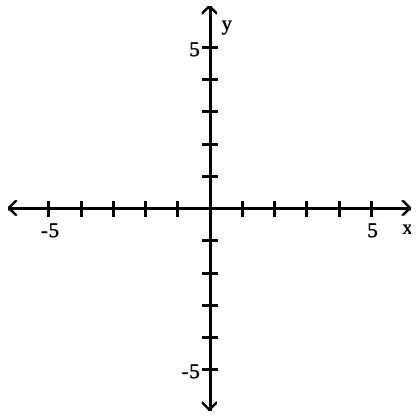
59) $f(x) = x^4 - 4x^2$ 59) _____



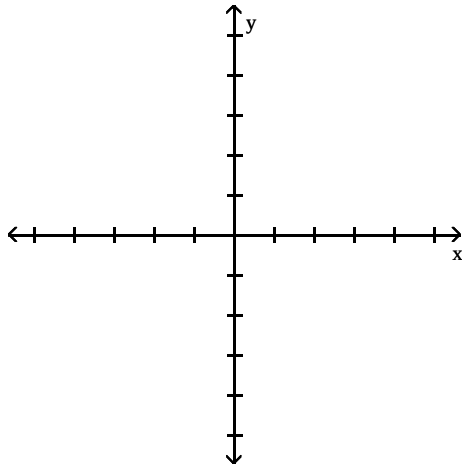
60) $f(x) = 4x^2 - x^3$ 60) _____



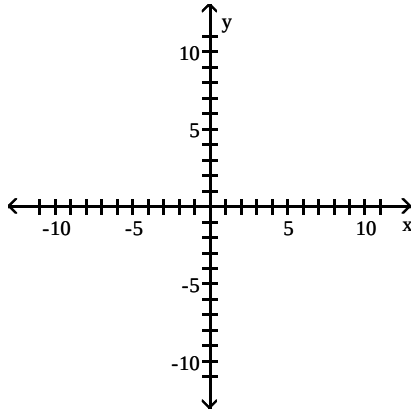
61) $f(x) = \frac{1}{2} - \frac{1}{2}x^4$ 61) _____



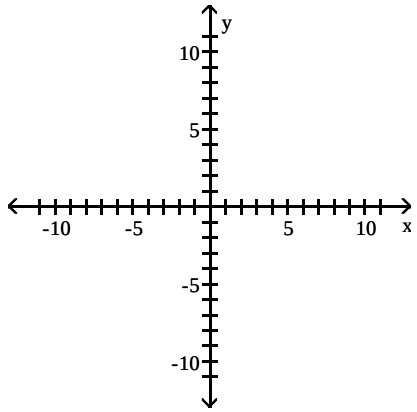
62) $f(x) = x^3 + 9x^2 - x - 9$ 62) _____



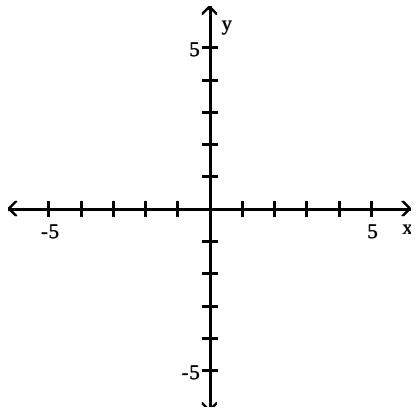
63) $f(x) = x^3 - 2x^2 - 5x + 6$ 63) _____



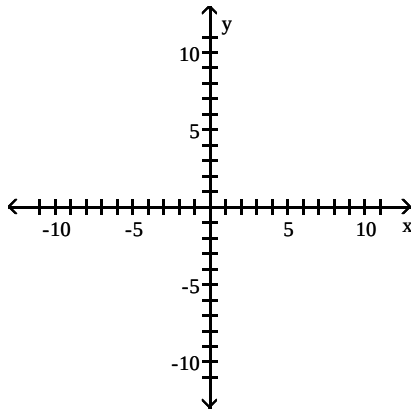
64) $f(x) = 4x - x^3 - x^5$ 64) _____



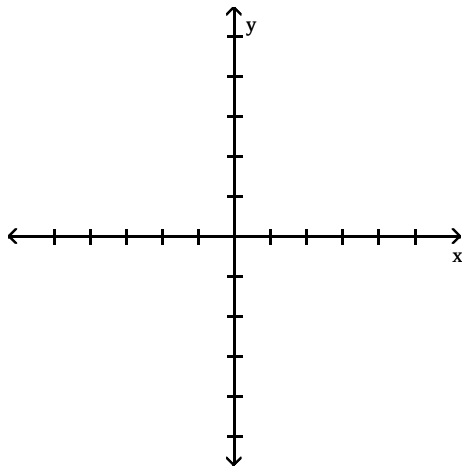
65) $f(x) = -4x^4 + 4x^3$ 65) _____



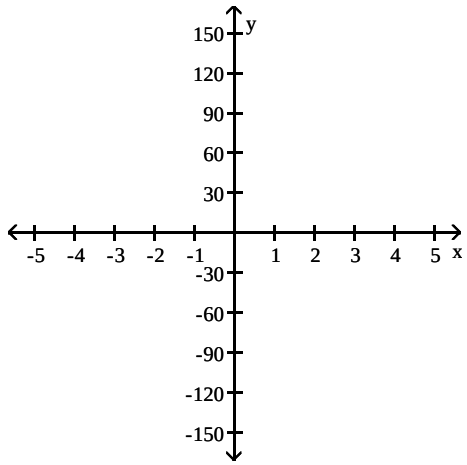
66) $f(x) = 6x^3 - 6x - x^5$ 66) _____



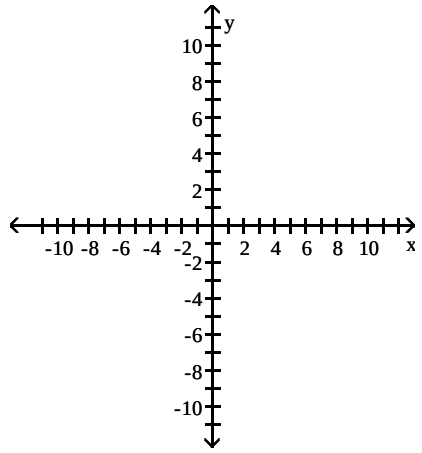
67) $f(x) = x^4 + 12x^3 + 36x^2$ 67) _____



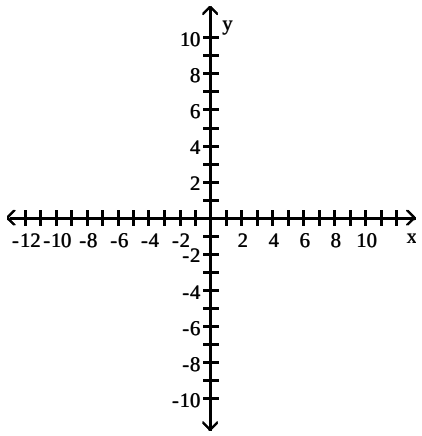
68) $f(x) = x^5 - 6x^3 - 16x$ 68) _____



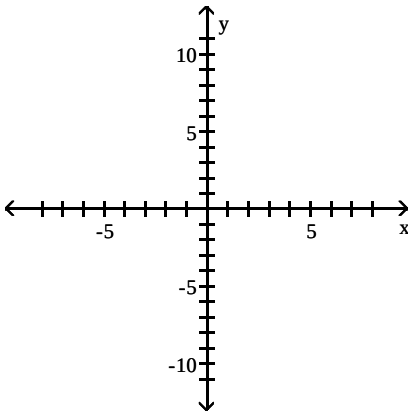
69) $f(x) = x^4 - 3x^3 - x^2 + 3$ 69) _____



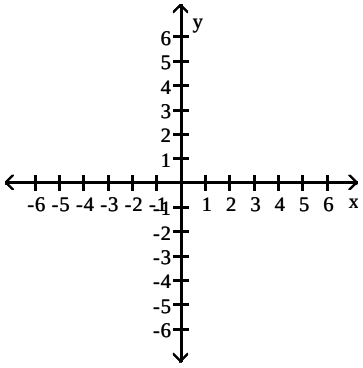
70) $f(x) = x^4 - 6x^3 + 9x^2$ 70) _____



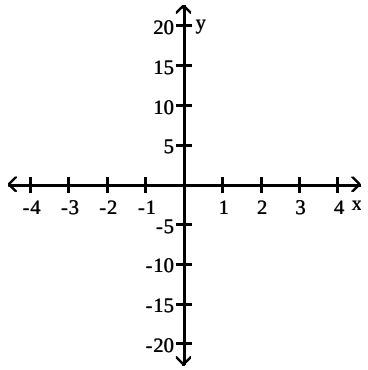
71) $f(x) = -3x(x - 1)^2$ 71) _____



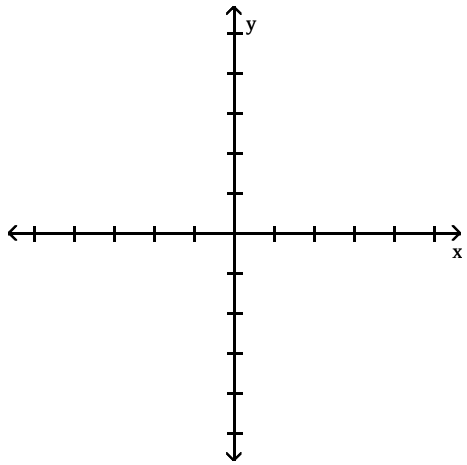
72) $f(x) = x(x - 2)(x + 2)$ 72) _____



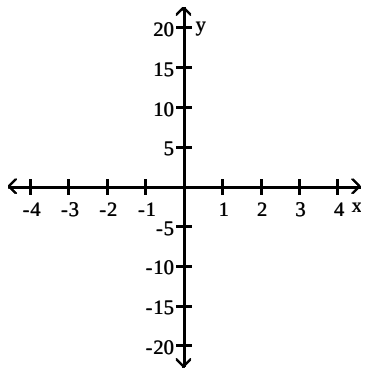
73) $f(x) = -x^2(x + 1)(x + 2)$ 73) _____



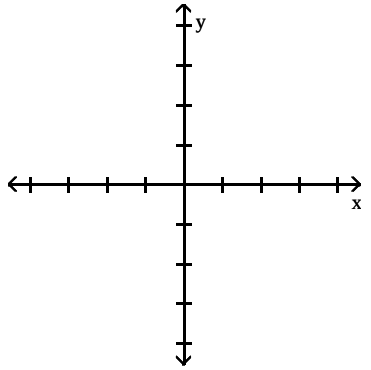
74) $f(x) = (x + 1)^2(x^2 - 25)$ 74) _____



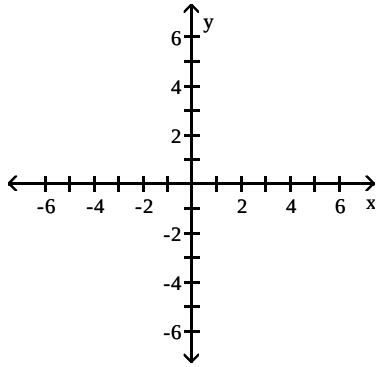
75) $f(x) = -x^2(x - 2)(x + 2)$ 75) _____



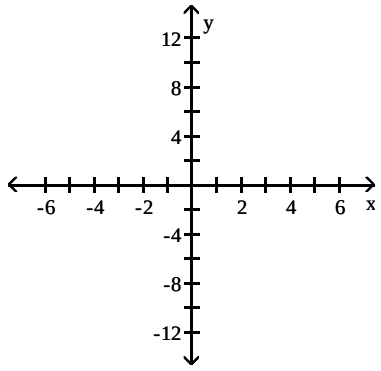
76) $f(x) = -2x^3(x - 3)^2(x - 1)$ 76) _____



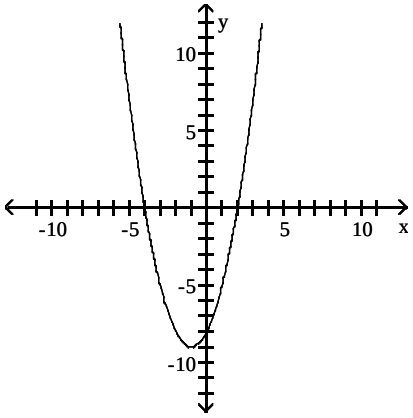
77) $f(x) = (x - 4)(x - 2)(x - 1)$ 77) _____



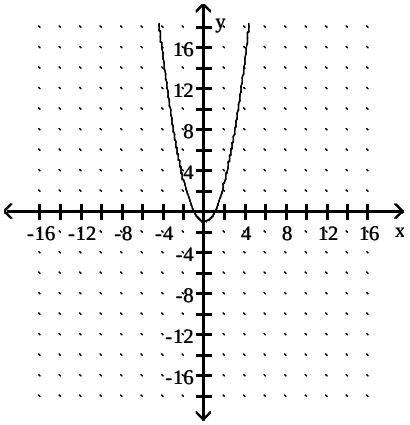
78) $f(x) = (x + 1)(x + 2)(x + 4)^2$ 78) _____



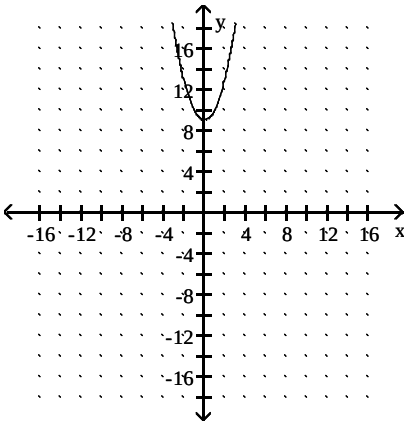
1) $f(x) = -x^2 + 2x + 8$
2) $f(x) = -x^2 + 2x + 3$
3) $f(x) = -x^2 - 2x + 8$
4) $f(x) = 2x^2 - 4x + 3$
5) $f(x) = 2x^2 - 4x + 1$
6) $f(x) = x^2 + 2x + 2$
7)



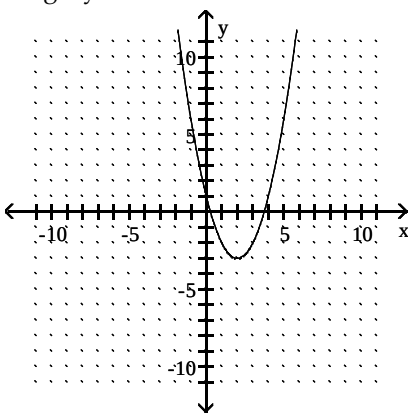
8) domain: all real numbers
range: $y \geq -1$



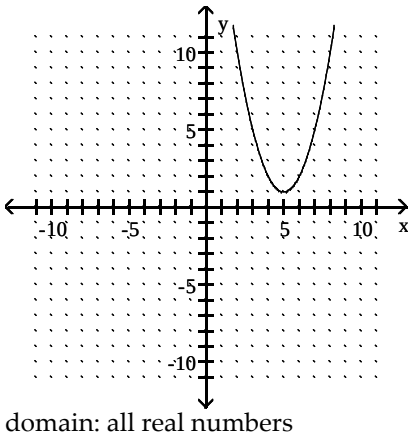
9) domain: all real numbers
range: $y \geq 9$



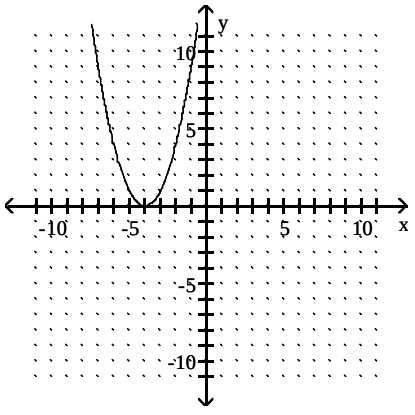
10) domain: all real numbers
range: y ≥ -3



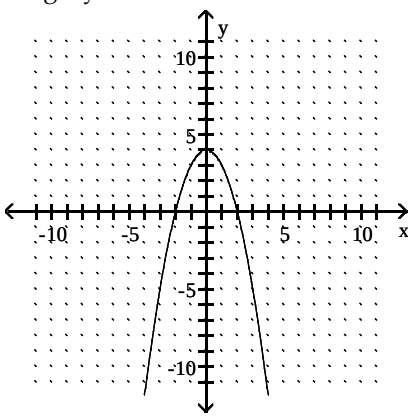
11) domain: all real numbers
range: y ≥ 1



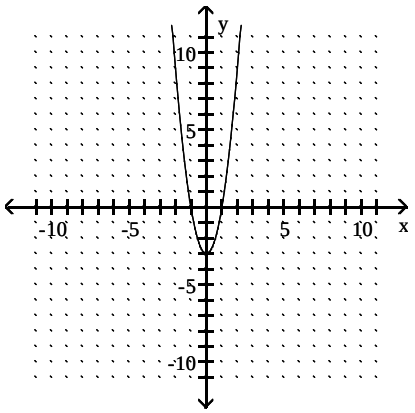
12) domain: all real numbers
range: y ≥ 0



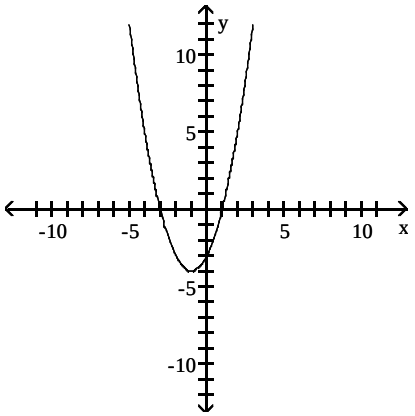
13) domain: all real numbers
range: $y \leq 4$



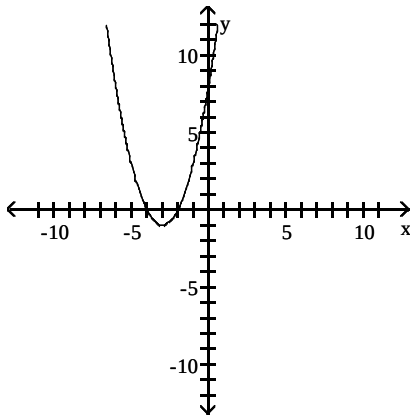
14) domain: all real numbers
range: $y \geq -3$



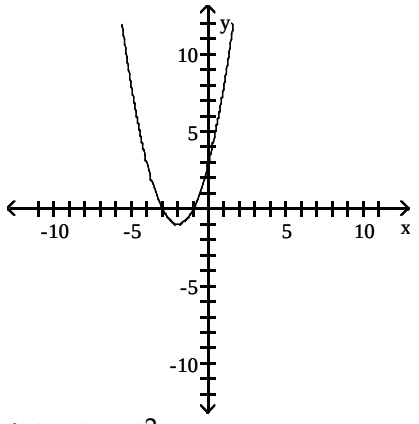
15)



16)



17)



18) $f(x) = (x - 3)^2 - 3$

19) a is positive, h is positive, k is negative

20) 6 sec

21) 47 ft by 47 ft

22) 90 ft by 90 ft

23) 12,482 ft^2

24) 11,858 ft^2

25) length: 36 ft, width: 18 ft

26) length: 56 ft, width: 28 ft

27) 5 thousand automobiles

28) 0, touches the x–axis and turns around;
3, crosses the x–axis

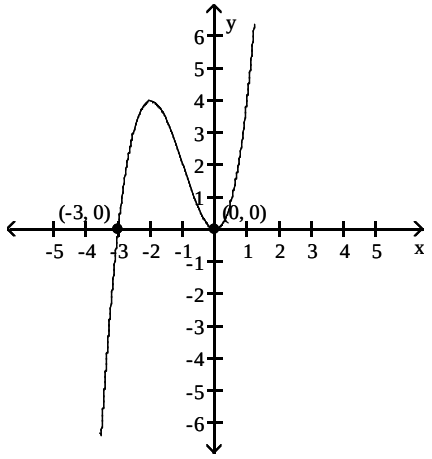
29) 0, touches the x–axis and turns around;
11, crosses the x–axis;
–11, crosses the x–axis

30) 0, crosses the x–axis;
2, crosses the x–axis;
–2, crosses the x–axis;
$\sqrt{2}$, crosses the x–axis;
$-\sqrt{2}$, crosses the x–axis

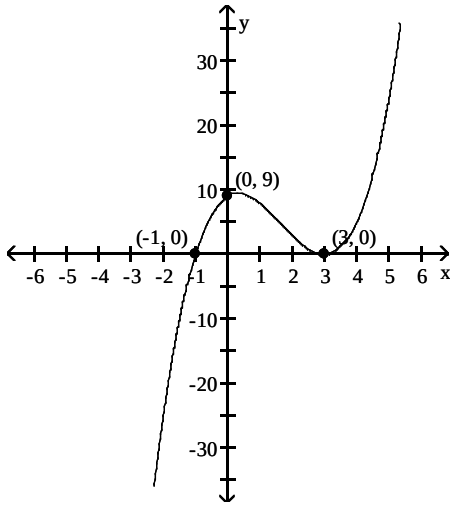
31) 0, touches the x–axis and turns around;
–8, crosses the x–axis;
5, crosses the x–axis

32) –3, touches the x–axis and turns around;
–4, crosses the x–axis.
33) –1, crosses the x–axis;
6, crosses the x–axis;
1, touches the x–axis and turns around
34) 0, touches the x–axis and turns around;
–5, crosses the x–axis;
–1, crosses the x–axis;
1, crosses the x–axis
35) 0, touches the x–axis and turns around;
–2, crosses the x–axis
36) 0, touches the x–axis and turns around;
3, crosses the x–axis;
4, crosses the x–axis
37) 0, crosses the x–axis;
–3, touches the x–axis and turns around;
6, crosses the x–axis
38) 3, touches the x–axis and turns around;
–5, crosses the x–axis;
5, crosses the x–axis
39) neither
40) y–axis symmetry
41) y–axis symmetry
42) origin symmetry
43) neither
44) origin symmetry
45) origin symmetry
46) neither
47) neither
48) neither
49) neither
50) neither
51) y–axis symmetry
52) origin symmetry
53) neither
54) origin symmetry

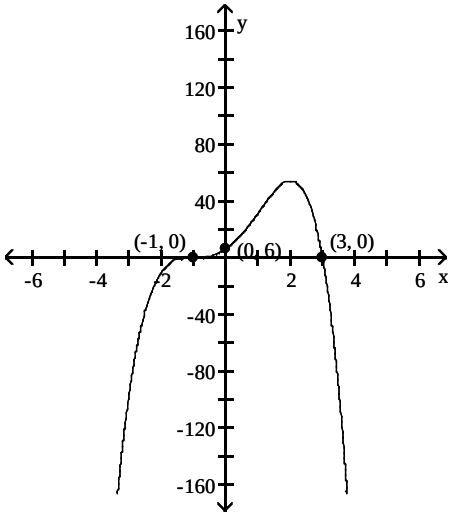
55) (a) falls to the left and rises to the right
(b) x–intercepts: (0, 0), touches x–axis and turns; (–3, 0), crosses x–axis
(c) y–intercept: (0, 0)
(d)



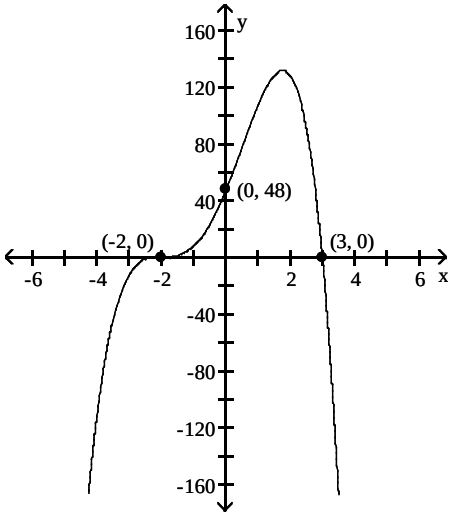
56) (a) falls to the left and rises to the right
(b) x–intercepts: (3, 0), touches x–axis and turns; (–1, 0), crosses x–axis
(c) y–intercept: (0, 9)
(d)



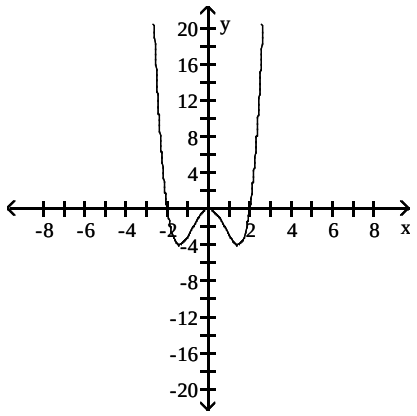
57) (a) falls to the left and to the right
(b) x–intercepts: (–1, 0), crosses x–axis; (3, 0), crosses x–axis
(c) y–intercept: (0, 6)
(d)



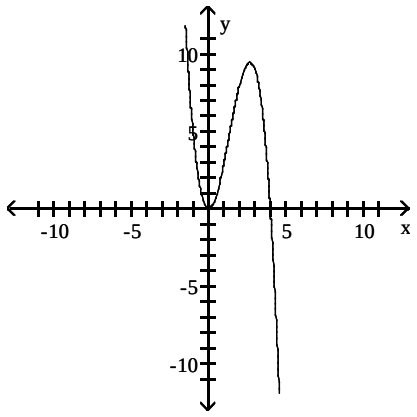
58) (a) falls to the left and to the right
(b) x–intercepts: (–2, 0), crosses x–axis; (3, 0), crosses x–axis
(c) y–intercept: (0, 48)
(d)



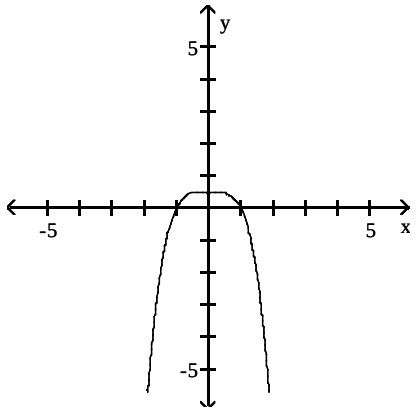
59)



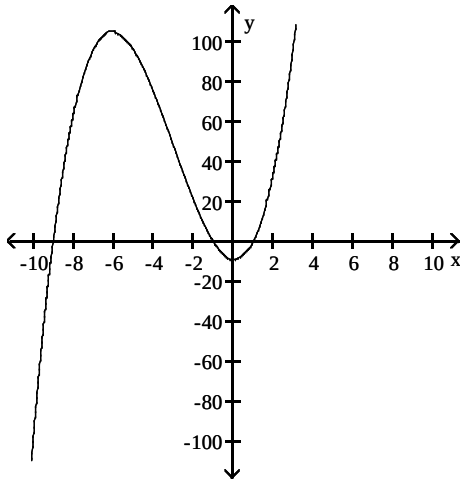
60)



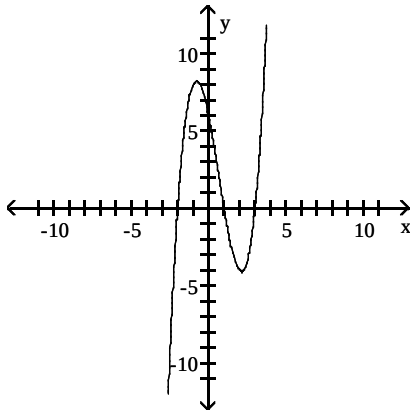
61)



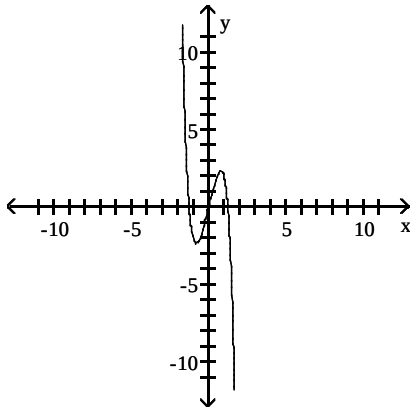
62)


y
100
80
60
40
20
-10
-8
-6
-4
-2
2
4
6
8
10
x
-20
-40
-60
-80
-100

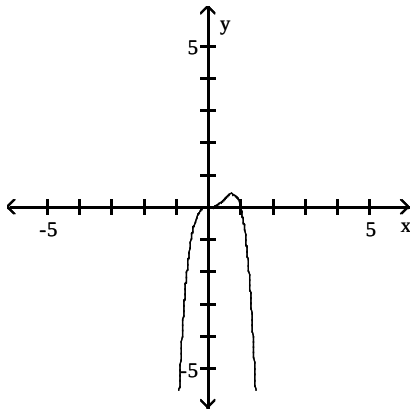
63)


y
10
5
-10
-5
5
10
x
-5
-10

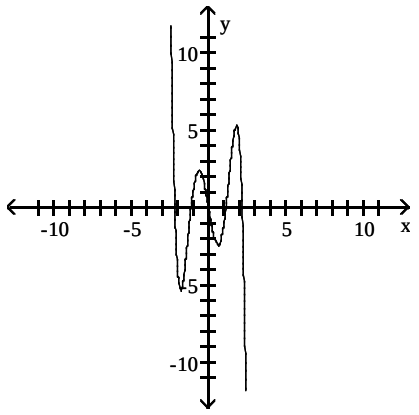
64)


y
10
5
-10
-5
5
10
x
-5
-10

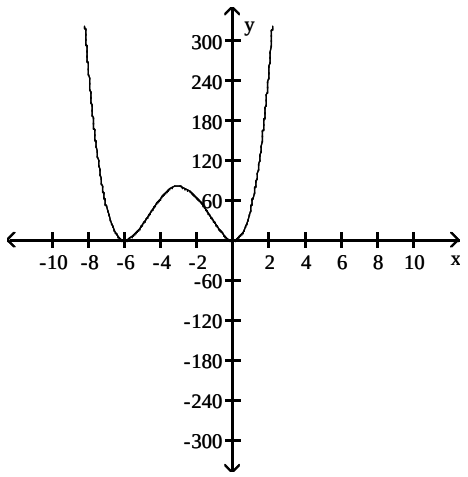
65)


y
5
-5
5
x
-5

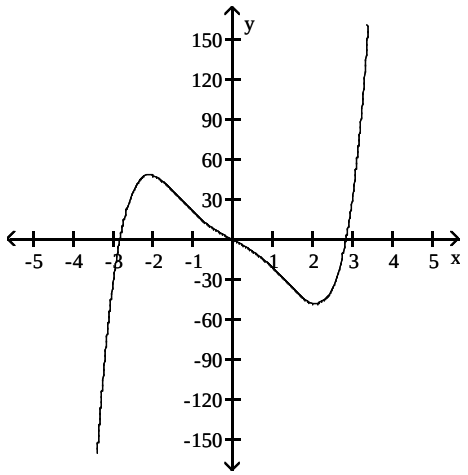
66)


y
10
5
-10
-5
5
10
x
-5
-10

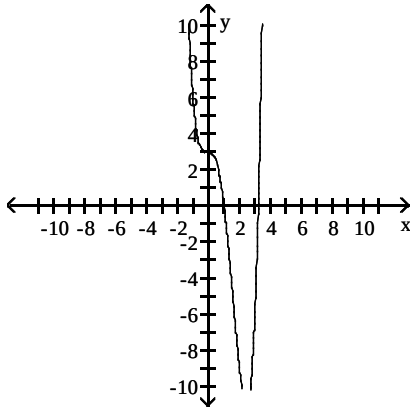
67)


y
300
240
180
120
60
-60
-120
-180
-240
-300
-10
-8
-6
-4
-2
2
4
6
8
10
x

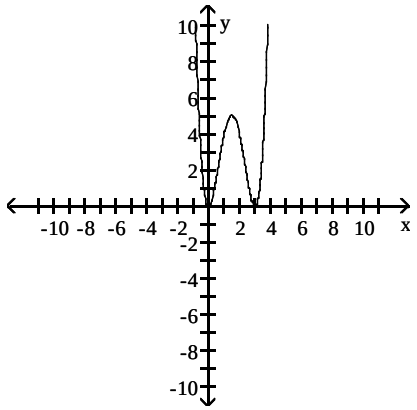
68)


y
150
120
90
60
30
-5 -4 -3 -2 -1 1 2 3 4 5 x
-30
-60
-90
-120
-150

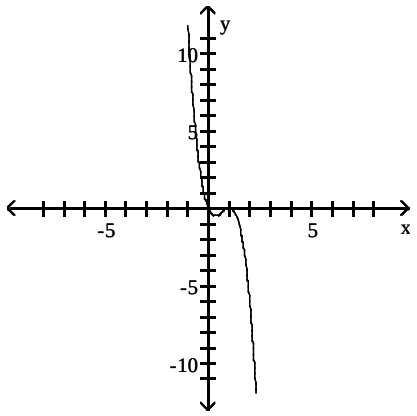
69)


y
10
8
6
4
2
-10 -8 -6 -4 -2 2 4 6 8 10 x
-2
-4
-6
-8
-10

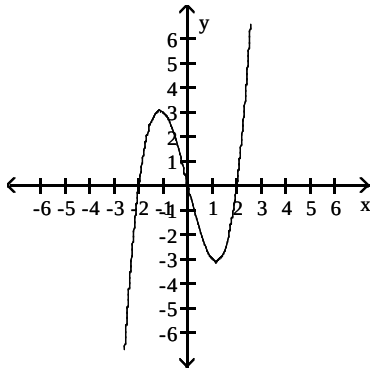
70)


y
10
8
6
4
2
-10 -8 -6 -4 -2 2 4 6 8 10 x
-2
-4
-6
-8
-10

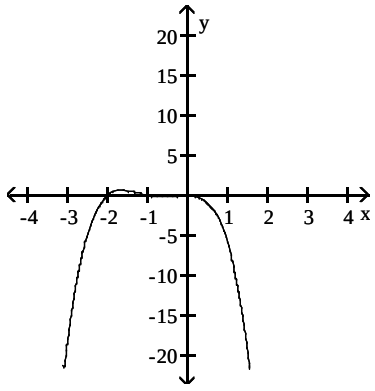
71)

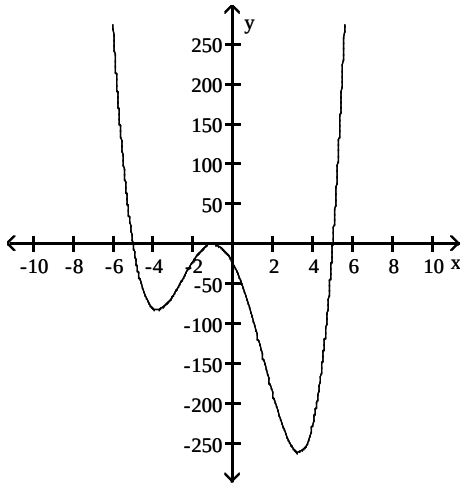

y
10
5
-5
5
x
-5
-10

72)


y
6
5
4
3
2
1
-6 -5 -4 -3 -2 -1 1 2 3 4 5 6 x
-2
-3
-4
-5
-6

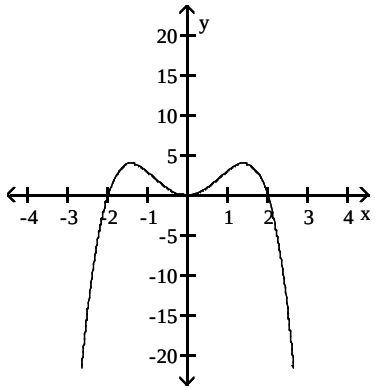
73)


y
20
15
10
5
-4 -3 -2 -1 1 2 3 4 x
-5
-10
-15
-20

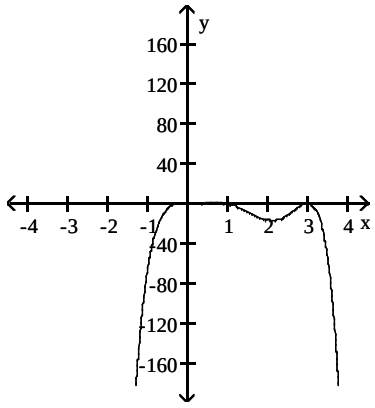

y
250
200
150
100
50
-10 -8 -6 -4 -2 2 4 6 8 10 x
-50
-100
-150
-200
-250

74)

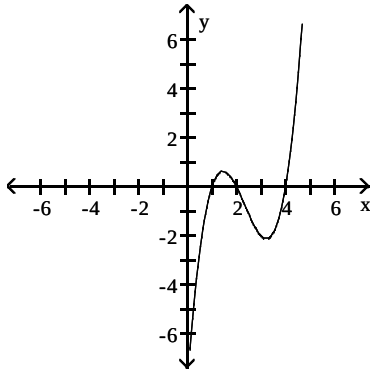
75)


y
20
15
10
5
-4 -3 -2 -1 1 2 3 4 x
-5
-10
-15
-20

76)


y
160
120
80
40
-4 -3 -2 -1 1 2 3 4 x
-40
-80
-120
-160

77)



78)