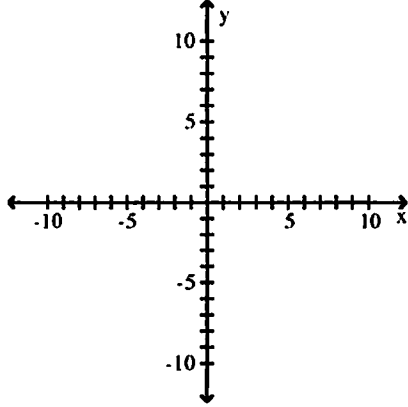


Graph the function f by starting with the graph of $y = x^2$ and using transformations (shifting, compressing, stretching, and/or reflection).

$$1) f(x) = \frac{1}{5}x^2$$



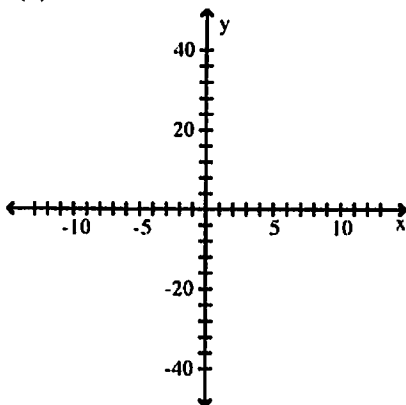
Find the vertex and axis of symmetry of the graph of the function.

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

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

Graph the function using its vertex, axis of symmetry, and intercepts.

$$4) f(x) = x^2 - 12x$$



Determine, without graphing, whether the given quadratic function has a maximum value or a minimum value and then find that value.

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

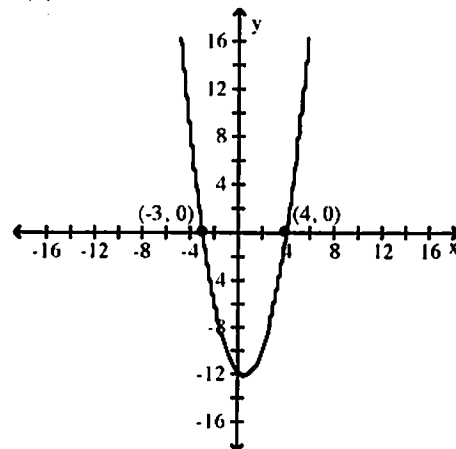
Solve the problem.

- 6) An object is propelled vertically upward from the top of a 288-foot building. The quadratic function $s(t) = -16t^2 + 144t + 288$ models the ball's height above the ground, $s(t)$, in feet, t seconds after it was thrown. How many seconds does it take until the object finally hits the ground? Round to the nearest tenth of a second if necessary.

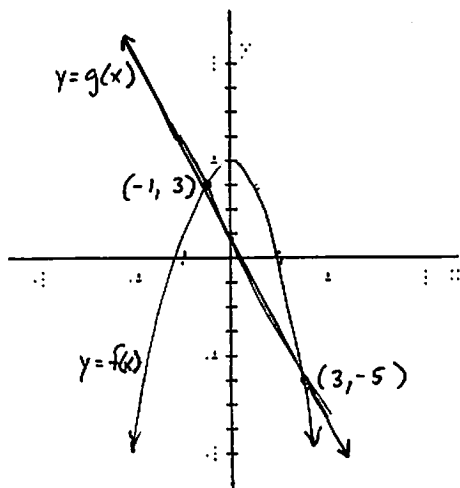
- 7) A developer wants to enclose a rectangular grassy lot that borders a city street for parking. If the developer has 212 feet of fencing and does not fence the side along the street, what is the largest area that can be enclosed?

Use the figure to solve the inequality.

$$8) f(x) < 0$$



9)



$$f(x) \geq g(x)$$

Solve the inequality.

10) $x^2 - 3x - 10 \leq 0$

11) $x^2 - 36 > 0$

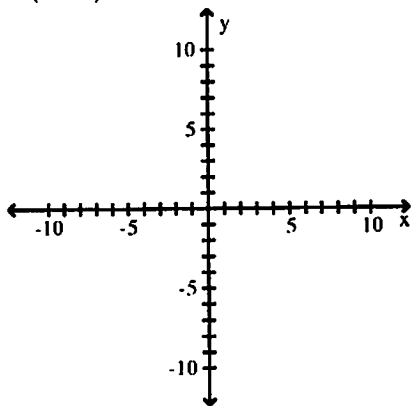
State whether the function is a polynomial function or not. If it is, give its degree. If it is not, tell why not.

12) $f(x) = \frac{5 - x^2}{4}$

13) $f(x) = 1 + \frac{15}{x}$

Use transformations of the graph of $y = x^4$ or $y = x^5$ to graph the function.

14) $f(x) = (x + 3)^5$



Form a polynomial whose zeros and degree are given.

15) Zeros: 3, multiplicity 2; -3, multiplicity 2; degree 4

For the polynomial, list each real zero and its multiplicity. Determine whether the graph crosses or touches the x-axis at each x-intercept.

16) $f(x) = 4(x - 7)(x + 4)^4$

Find the x- and y-intercepts of f.

17) $f(x) = (x + 4)(x - 2)(x + 2)$

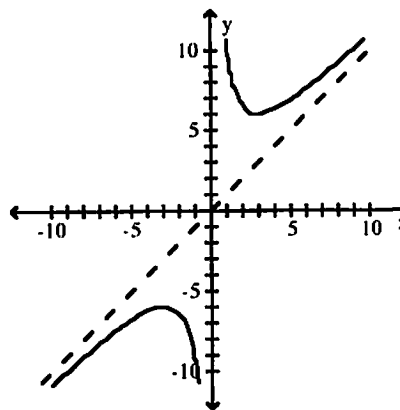
Find the domain of the rational function.

18) $f(x) = \frac{x + 7}{x^2 - 9}$

19) $f(x) = \frac{x + 2}{x^2 + 16x}$

Use the graph to determine the domain and range of the function.

20)



Give the equation of the horizontal asymptote, if any, of the function.

21) $R(x) = \frac{-3x^2}{x^2 + 5x - 84}$

Give the equation of the oblique asymptote, if any, of the function.

$$22) f(x) = \frac{x^2 - 4x + 8}{x + 7}$$

Find the vertical asymptotes of the rational function.

$$23) g(x) = \frac{x + 6}{x^2 - 49}$$

Solve the inequality.

$$24) (x + 3)(x + 1) > 0$$

$$25) x^2 - 49 \leq 0$$

Solve the problem.

26) A ball is thrown vertically upward with an initial velocity of 192 feet per second. The distance in feet of the ball from the ground after t seconds is $s = 192t - 16t^2$. For what interval of time is the ball more than 512 above the ground?

Solve the inequality.

$$27) \frac{x - 2}{x + 5} < 0$$

$$28) \frac{(x + 6)(x - 3)}{x - 1} \geq 0$$

Use the Factor Theorem to determine whether $x - c$ is a factor of $f(x)$.

$$29) f(x) = x^3 + 6x^2 - 14x + 16; x + 8$$

$$30) f(x) = x^4 - 21x^2 - 100; x - 10$$

List the potential rational zeros of the polynomial function. Do not find the zeros.

$$31) f(x) = 11x^3 - x^2 + 7$$

Find the intercepts of the function $f(x)$.

$$32) f(x) = 2x^3 - x^2 - 12x + 6$$

Solve the equation in the real number system.

$$33) 3x^3 - 14x^2 + 13x + 6 = 0$$

Use the Intermediate Value Theorem to determine whether the polynomial function has a zero in the given interval.

$$34) f(x) = -7x^4 + 4x^2 + 7; [-2, -1]$$

Information is given about a polynomial $f(x)$ whose coefficients are real numbers. Find the remaining zeros of f .

$$35) \text{Degree } 3; \text{ zeros: } 5, 2 - i$$

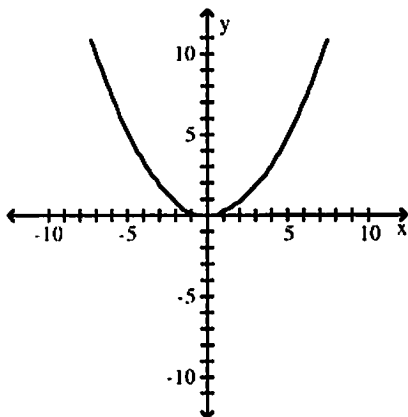
Use the given zero to find the remaining zeros of the function.

$$36) f(x) = x^3 + 3x^2 + 9x - 13; \text{ zero: } -2 + 3i$$

Answer Key

Testname: REVIEW4,5

1)

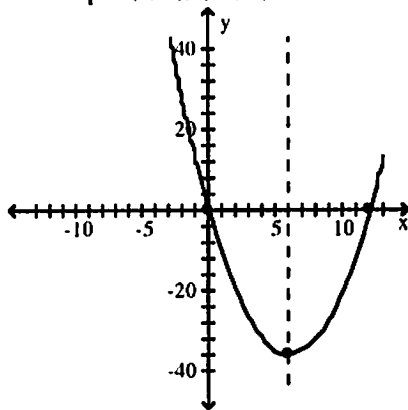


2) (4, -16); $x = 4$

3) (-3, -4); $x = -3$

4) vertex (6, -36)

intercepts (0, 0), (12, 0)



5) minimum; $(-\frac{1}{2}, -\frac{3}{4})$

6) 10.7 seconds

7) 5618 ft²

8) $\{x \mid -3 < x < 4\}$; (-3, 4)

9) $\{x \mid -1 \leq x \leq 3\}$; [-1, 3]

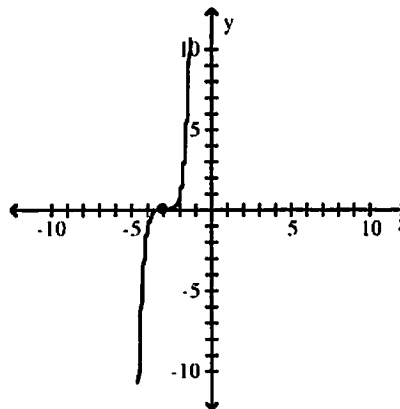
10) [-2, 5]

11) $(-\infty, -6)$ or $(6, \infty)$

12) Yes; degree 2

13) No; x is raised to a negative power

14)



15) $f(x) = x^4 - 18x^2 + 81$

16) 7, multiplicity 1, crosses x-axis; -4, multiplicity 4, touches x-axis

17) x-intercepts: -4, -2, 2; y-intercept: -16

18) $\{x \mid x \neq -3, x \neq 3\}$

19) $\{x \mid x \neq 0, x \neq -16\}$

20) domain: $\{x \mid x \neq 0\}$

range: $\{y \mid y \leq -6 \text{ or } y \geq 6\}$

21) $y = -3$

22) $y = x - 11$

23) $x = -7, x = 7$

24) $(-\infty, -3)$ or $(-1, \infty)$

25) [-7, 7]

26) $\{x \mid 4 \text{ sec} < x < 8 \text{ sec}\}$

27) (-5, 2)

28) [-6, 1) or $[3, \infty)$

29) Yes

30) No

31) $\pm \frac{1}{11}, \pm \frac{7}{11}, \pm 1, \pm 7$

32) x-intercepts: $\frac{1}{2}, \sqrt{6}, -\sqrt{6}$; y-intercept: 6

33) $\left\{-\frac{1}{3}, 2, 3\right\}$

34) $f(-2) = -89$ and $f(-1) = 4$; yes

35) $2 + i$

36) $-2 - 3i, 1$