

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

Identify f as being linear, quadratic, or neither. If f is quadratic, identify the leading coefficient.

1. $f(x) = \frac{7}{5x^2 + 2}$

- A) Linear B) Quadratic; 5 C) Quadratic; 7 D) Neither

2. $f(x) = 8 + 3x^2$

- A) Linear B) Quadratic; 3 C) Quadratic; 8 D) Neither

3. $f(x) = -5x - 3$

- A) Linear B) Quadratic; -5 C) Quadratic; -3 D) Neither

Evaluate.

4. Given $f(x) = 2x^2 + 6x + 3$, find $f(-5)$.

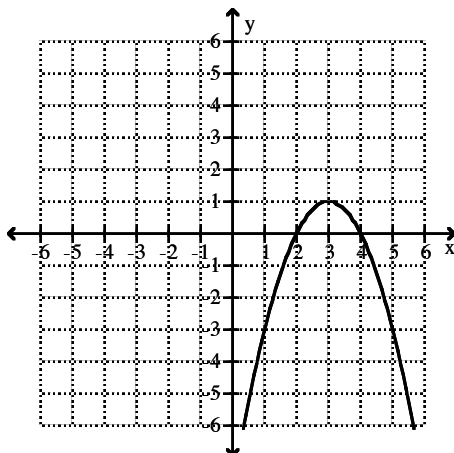
- A) 59 B) 20 C) -37 D) 23

5. Given $f(x) = x^2 + 5x - 6$, find $f(0)$.

- A) 0 B) 6 C) -6 D) 36

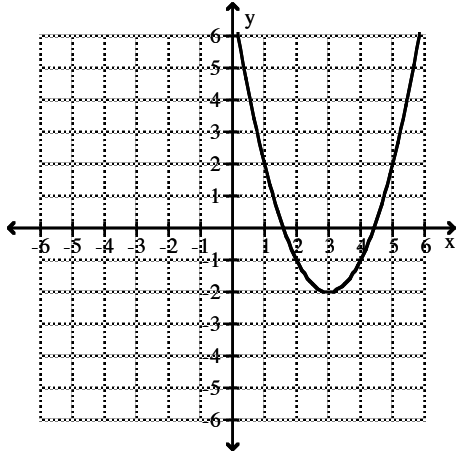
Use the graph of the quadratic function to determine the sign of the leading coefficient, the vertex, and the equation of the axis of symmetry.

6.



- A) Negative; (3, 1); $x = 3$ B) Positive; (3, 1); $x = 3$

7.



A) Positive; (3, -2); $y = -2$

B) Positive; (3, -2); $x = 3$

C) Negative; (3, -2); $x = 3$

Determine the vertex of the graph of f .

8. $f(x) = -2(x+4)^2 - 6$

A) (6, 4)

B) (-4, -6)

C) (-6, -4)

D) (4, -6)

9. $f(x) = \frac{1}{5}(x+4)^2 + 3$

A) (4, 3)

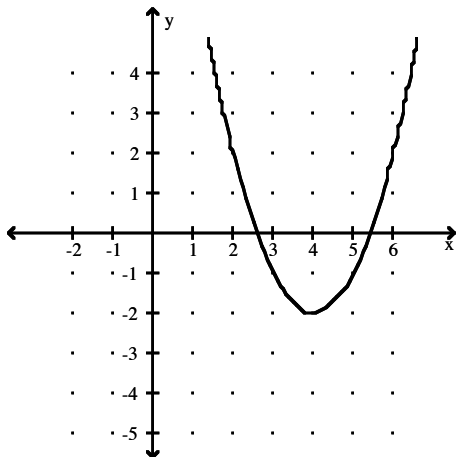
B) (-3, 4)

C) (-4, 3)

D) (3, -4)

Use the given graph of the quadratic function f to write its formula as $f(x) = a(x - h)^2 + k$.

10.



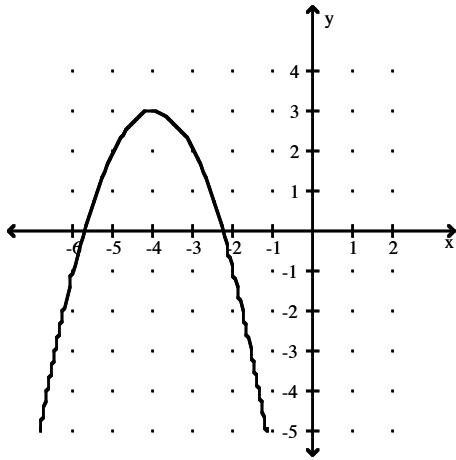
A) $f(x) = (x-4)^2 - 2$

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

C) $f(x) = (x-4)^2 + 2$

D) $f(x) = (x+4)^2 - 2$

11.



- A) $f(x) = -(x+4)^2 + 3$
 C) $f(x) = -(x-4)^2 + 3$

- B) $f(x) = -(x+4)^2 - 3$
 D) $f(x) = (x+4)^2 + 3$

Solve the quadratic equation.

12. $x^2 - 8x + 15 = 0$

A) -3, -5

B) 6, 10

C) 3, 5

D) -6, -10

13. $5x^2 = 65$

A) ± 13

C) $\pm\sqrt{13}$

B) 14

D) No real solutions

14. $2x^2 + 8x + 5 = 0$

A) $\frac{-8 \pm \sqrt{6}}{2}$

B) $\frac{-4 \pm \sqrt{6}}{4}$

C) $\frac{-4 \pm \sqrt{6}}{2}$

D) $\frac{-4 \pm \sqrt{26}}{2}$

Solve the problem.

15. Your company uses the quadratic model $y = -11x^2 + 350x$ to represent how many units (y) of a new product will be sold (x) weeks after its release. How many units can you expect to sell in week 19?

A) 6859 units

B) 2679 units

C) 10,621 units

D) 6441 units

16. Your company uses the quadratic model $y = -11x^2 + 350x$ to represent how many units (y) of a new product will be sold (x) weeks after its release. How many units can you expect to sell in week 16?

A) 2784 units

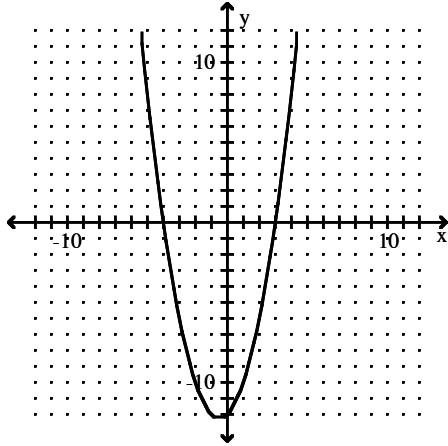
B) 5424 units

C) 5776 units

D) 8416 units

Use the given graph of $f(x) = ax^2 + bx + c$ to solve the specified inequality.

17. $f(x) < 0$



- A) $x < -4$ or $x > 3$ B) $x < -4$ C) $-4 < x < 3$ D) No solutions

Solve the inequality.

18. $x^2 + 4x - 5 > 0$

- A) $-5 < x < 1$ B) $x < -5$ or $x > 1$ C) $x < -5$ D) $x > 1$

19. $x^2 - 3x - 4 < 0$

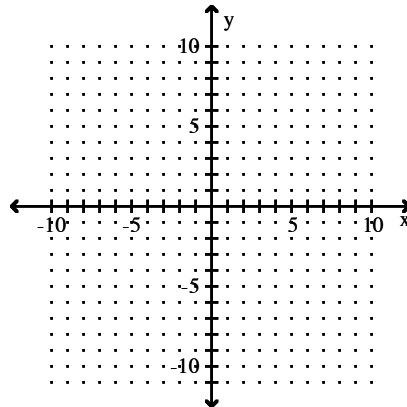
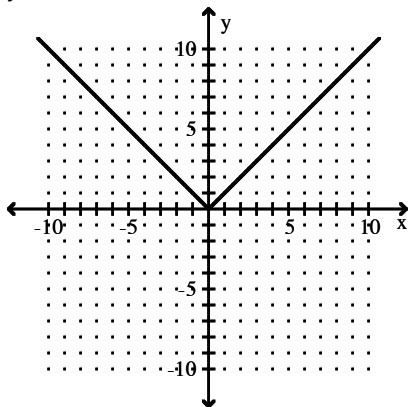
- A) $x < -1$ B) $-1 < x < 4$ C) $x < -1$ or $x > 4$ D) $x > 4$

20. $x^2 - 3x - 18 \leq 0$

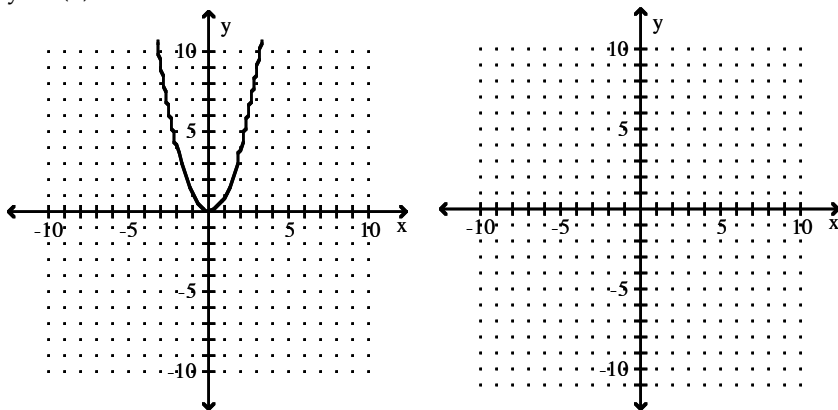
- A) $x \leq -3$ or $x \geq 6$ B) $x \geq 6$ C) $-3 \leq x \leq 6$ D) $x \leq -3$

Use the accompanying graph of $y = f(x)$ to sketch the graph of the indicated equation.

21. $y = f(x - 2)$



22. $y = f(x) - 3$



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

Find an equation that shifts the graph of f by the indicated amounts.

23. $f(x) = x^4$; right 5 units, up 2 units

A) $y = -(x - 5)^4 + 2$

B) $y = (x + 5)^4 - 2$

C) $y = (x - 5)^4 + 2$

D) $y = -(x - 5)^4 + 10$

24. $f(x) = x^2 + 2x - 7$; right 6 units, down 13 units

A) $y = (x + 6)^2 + 2(x - 6) + 19$

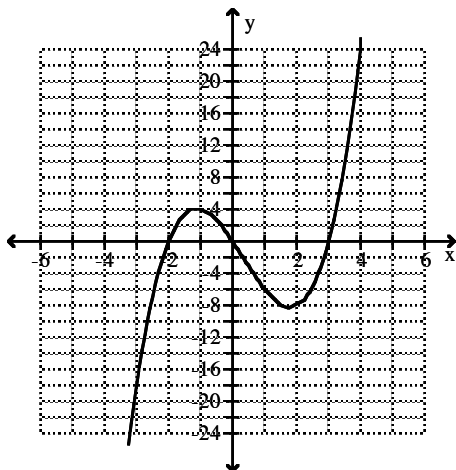
B) $y = (x + 6)^2 + 2(x + 6) - 23$

C) $y = (x - 6)^2 + 2(x + 6) - 20$

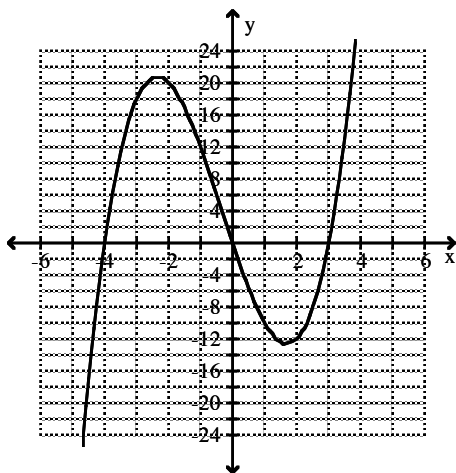
D) $y = (x - 6)^2 + 2(x - 6) - 20$

The graph of a polynomial function (f) is given. Identify the degree of the polynomial, the turning points, any x -intercepts, and the intervals where f is increasing and where f is decreasing. Also estimate any local maxima or minima and any absolute maxima or minima.

25.



26.



Identify the intervals where f is increasing or where f is decreasing as indicated. Round your answer to two decimal places where appropriate.

27. Given $f(x) = 2x^2 + 6x + 3$, increasing.

28. Given $f(x) = x^2 - 4x + 3$, decreasing.

Use your calculator to graph the function.

29. $f(x) = x^3 + 4$

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

Determine whether the given equation is a rational function.

30. $f(x) = \frac{-5x^2 - 2x + 3}{x^3 + x + 1}$

A) No

B) Yes

$$31. f(x) = \frac{-5x - 1}{x^2 + \sqrt{x+1}}$$

A) No

B) Yes

Find the domain of f.

$$32. f(x) = \frac{17}{11 - x}$$

A) $\{x \mid x \neq \pm 17\}$

B) $\{x \mid x \neq 17\}$

C) $\{x \mid x \neq \pm 11\}$

D) $\{x \mid x \neq 11\}$

$$33. f(x) = \frac{x - 4}{x^2 + 8}$$

A) $\{x \mid x \neq 8\}$

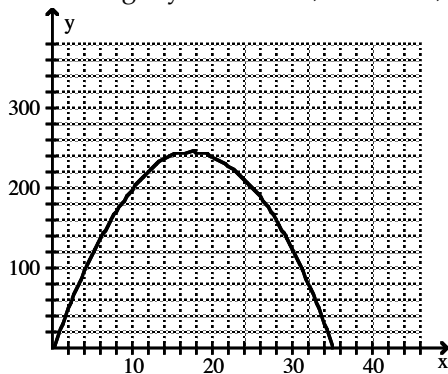
B) $\{x \mid x \neq \pm 2\}$

C) All real numbers

D) $\{x \mid x \neq -8\}$

Solve the problem.

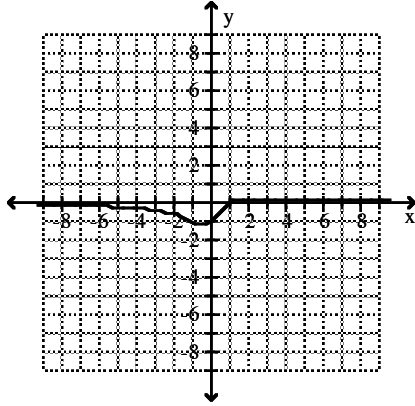
34. A rock is thrown vertically upward from the surface of the moon at a velocity of 28 m/sec. The graph shows the height y of the rock, in meters, after x seconds. Estimate and interpret the turning point.



- A) The turning point is at approximately (35, 245). This is the point at which the rock reaches its maximum height and starts to fall back towards the surface of the moon.
- B) The turning point is at approximately (35, 0). This is the point at which the rock reaches the surface of the moon again.
- C) The turning point is at approximately (17.5, 245). This is the point at which the rock reaches its maximum height and starts to fall back towards the surface of the moon.
- D) The turning point is at approximately (17.5, 245). This is the point at which the rock reaches its maximum velocity and starts to slow down.

Identify any vertical asymptotes in the graph.

35.



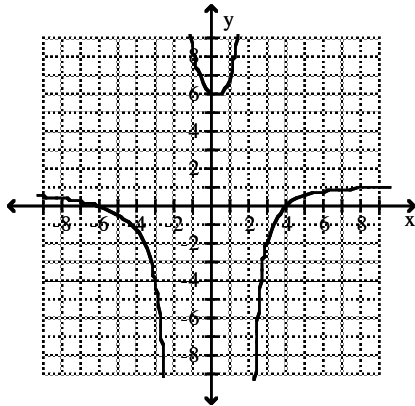
A) $x = 1, x = -1$

B) None

C) $x = -1$

D) $x = 1$

36.



A) $x = 2, x = -2$

B) None

C) $x = 4, x = -6$

D) $x = -4, x = 6$

Find any vertical asymptotes.

37. $f(x) = \frac{7x+4}{2x-1}$

A) $x = \frac{7}{2}$

B) $x = -2$

C) $x = 2$

D) $x = \frac{1}{2}$

38. $f(x) = \frac{x-4}{x^2+6}$

A) $x = -6$

B) None

C) $x = 6$

D) $x = 2, x = -2$

39. $h(x) = \frac{(x-2)(x+7)}{x^2-9}$

A) $x=3, x=-3$

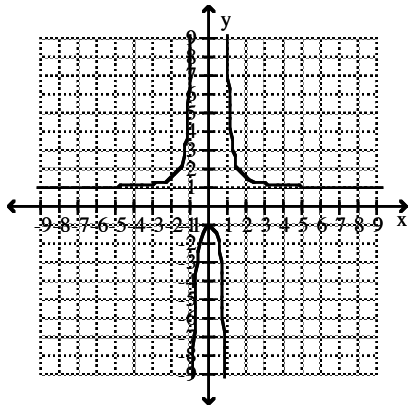
B) $x=-2, x=7$

C) $x=2, x=-7$

D) None

Identify any horizontal asymptotes in the graph.

40.



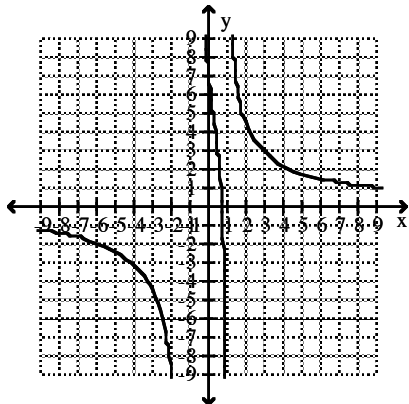
A) $y=-5$

B) $y=1$

C) None

D) $y=5$

41.



A) $y=-9$

B) $y=1$

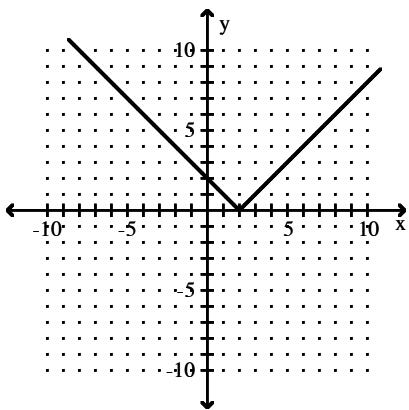
C) $y=0$

D) None

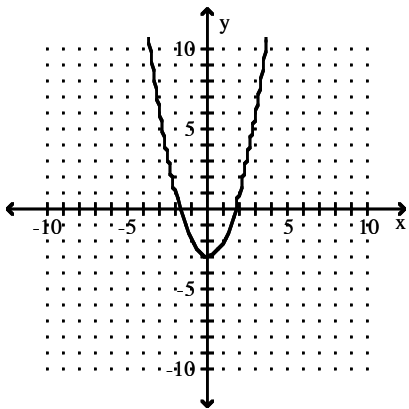
Answer Key

Testname: UNIT 4 REV 2014 SP

- 1. D
- 2. B
- 3. A
- 4. D
- 5. C
- 6. A
- 7. B
- 8. B
- 9. C
- 10. A
- 11. A
- 12. C
- 13. C
- 14. C
- 15. B
- 16. A
- 17. C
- 18. B
- 19. B
- 20. C
- 21.



22.

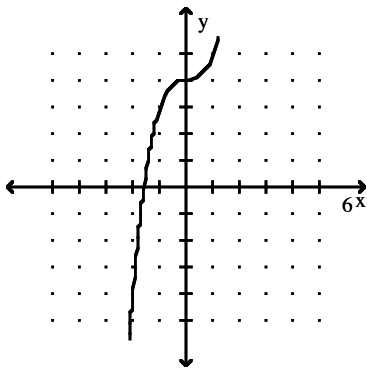


- 23. C
- 24. D

Answer Key

Testname: UNIT 4 REV 2014 SP

25. Degree = 3;
Turning points $\approx (-1.1, 4.1)$ and $(1.8, -8.2)$;
x-intercepts: $x = -2, x = 0, x = 3$;
Local maximum ≈ 4.1 ;
Local minimum ≈ -8.2 ;
Absolute maximum: none;
Absolute minimum: none
26. Degree = 3;
Turning points $\approx (-2.4, 20.7)$ and $(1.7, -12.6)$;
x-intercepts: $x = -4, x = 0, x = 3$;
Local maximum ≈ 20.7 ;
Local minimum ≈ -12.6 ;
Absolute maximum: none;
Absolute minimum: none
27. 23
28. 3
- 29.



30. B
31. A
32. D
33. C
34. C
35. B
36. A
37. D
38. B
39. A
40. B
41. C