1033 Final Exam Review

Multiply or divide as indicated. Simplify completely.

1) $\frac{9x^4 - 72x}{3x^2 - 12} \cdot \frac{x^2 + x - 2}{4x^3 + 8x^2 + 16x}$ 1) _____

2) $\frac{x^2 + 13x + 36}{x^2 + 14x + 45} \cdot \frac{x^2 + 5x}{x^2 - 3x - 28}$ 2) _____

3) $\frac{x^2 + 5x - 6}{x^2 + 9x + 18} \div \frac{x^2 - 1}{x^2 + 7x + 12}$ 3) _____

Simplify.

4) $\dfrac{9 + \frac{3}{x}}{\frac{x}{4} + \frac{1}{12}}$ 4) _____

5) $\dfrac{\frac{5}{x} + \frac{4}{x^2}}{\frac{25}{x^2} - \frac{16}{x}}$ 5) _____

6) $\dfrac{\frac{1}{x} + \frac{9}{x^2}}{x + \frac{729}{x^2}}$ 6) _____

7) $\dfrac{\frac{10}{11 - x} + \frac{11}{x - 11}}{\frac{3}{x} + \frac{8}{x - 11}}$ 7) _____

Divide.

8) $(4x^2 - 33x + 8) \div (x - 8)$ 8) _____

9) $(15x^3 + 31x^2 - 2x - 17) \div (3x + 5)$ 9) _____

Use the properties of exponents to simplify the expression. Write with positive exponents.

10) $\frac{x^{4/3} \cdot x^{6/5}}{x^{-1/2}}$ 10) _____

11) $\frac{(3x^{5/3})^2}{x^{1/6}}$ 11) _____

Simplify the radical expression. Assume that all variables represent positive real numbers.

12) $\sqrt{72k^7q^8}$ 12) _____

13) $\frac{\sqrt{189x^5y^6}}{\sqrt{3y^4}}$ 13) _____

Add or subtract. Assume all variables represent positive real numbers.

14) $\sqrt{9} + \sqrt{20} + \sqrt{36} + \sqrt{405}$ 14) _____

15) $\sqrt[3]{27y} - \sqrt[3]{128y}$ 15) _____

Solve.

16) $\sqrt{2x - 1} + 4 = 10$ 16) _____

17) $\sqrt{31 - x} = x - 1$ 17) _____

18) $\sqrt{2x + 5} = 3 + \sqrt{x - 2}$ 18) _____

19) $\sqrt{4x + 5} = \sqrt{2x - 2} - 3$ 19) _____

Perform the indicated operation. Write the result in the form a + bi.

20) $(3 - 6i) + (7 + 2i)$ 20) _____

21) $(7 + 8i) - (-9 + i)$ 21) _____

22) $(8 + 9i)^2$ 22) _____

23) $\frac{8 - 5i}{8 + 2i}$ 23) _____

Solve the equation by completing the square.

24) $x^2 - 4x + 13 = 0$ 24) _____

25) $x^2 + 3x - 9 = 0$ 25) _____

26) $8x^2 - 5x + 1 = 0$ 26) _____

Use the quadratic formula to solve the equation.

27) $x^2 + 10x + 3 = 0$ 27) _____

28) $16x^2 + 1 = 3x$ 28) _____

Use the square root property to solve the quadratic equation.

29) $(x + 7)^2 = 24$ 29) _____

Solve.

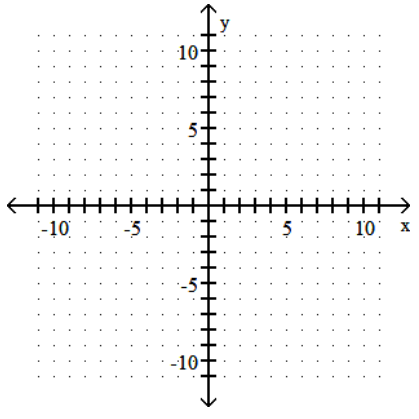
30) A ball is thrown upward with an initial velocity of 42 meters per second from a cliff that is 130 meters high. The height of the ball is given by the quadratic equation $h = -4.9t^2 + 42t + 130$ where h is in meters and t is the time in seconds since the ball was thrown. Find the time it takes the ball to hit the ground. Round your answer to the nearest tenth of a second. 30) _____

31) A rocket is launched from the top of a cliff that is 112 feet high with an initial velocity of 336 feet per second. The height, h(t), of the rocket after t seconds is given by the equation $h(t) = -16t^2 + 336t + 112$. How long after the rocket is launched will it strike the ground? Round to the nearest tenth of a second, if necessary. 31) _____

32) An arrow is fired into the air with an initial velocity of 64 feet per second. The height in feet of the arrow t seconds after it was shot into the air is given by the function $h(t) = -16t^2 + 64t$. Find the maximum height of the arrow. 32) _____

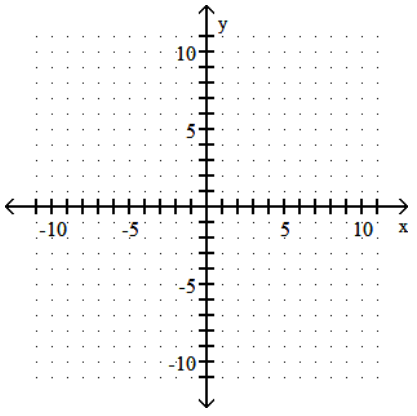
Sketch the graph of the quadratic function by finding the vertex, intercepts, and determining if the graph opens upward or downward.

33) $f(x) = x^2 + 2x - 3$ 33) _____



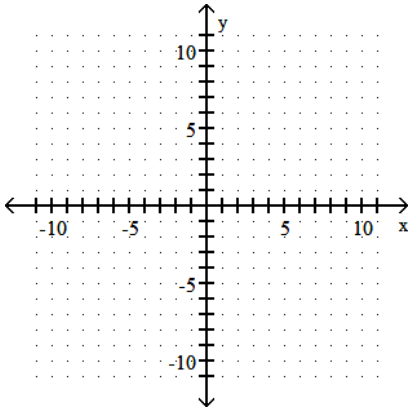
Graph the function. Find the vertex, y-intercept, and x-intercepts (if any).

34) $F(x) = 2x^2 - 4x + 5$ 34) _____

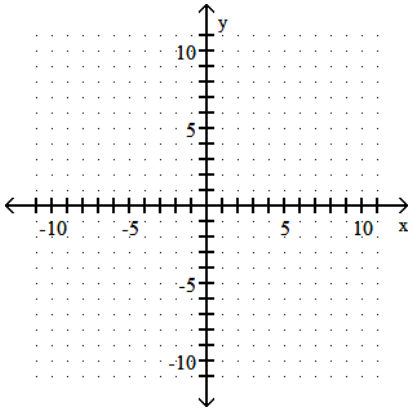


Sketch the graph of the quadratic function. Give the vertex and axis of symmetry.

35) $f(x) = (x + 2)^2 - 5$ 35) _____

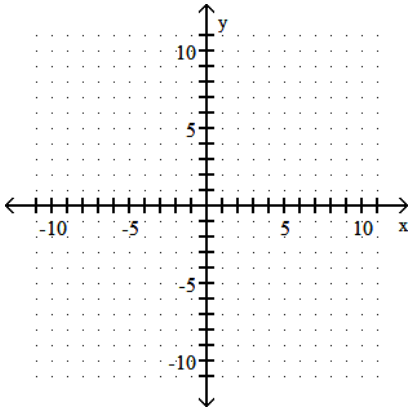


36) $f(x) = -(x - 3)^2$ 36) _____



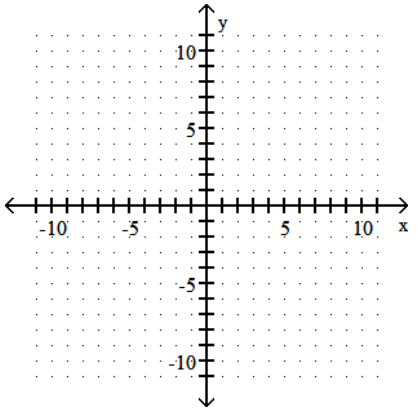
Graph the function by finding x- and y-intercepts.

37) $x + 2y = 8$ 37) _____

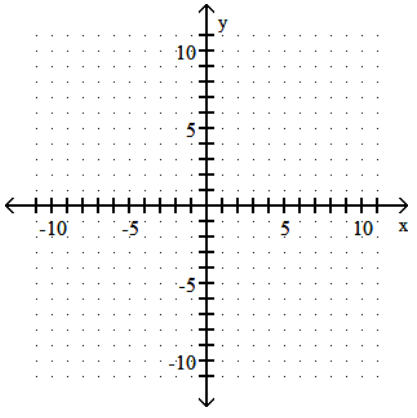


Graph the equation.

38) $y = \frac{3}{4}x + 3$ 38) _____

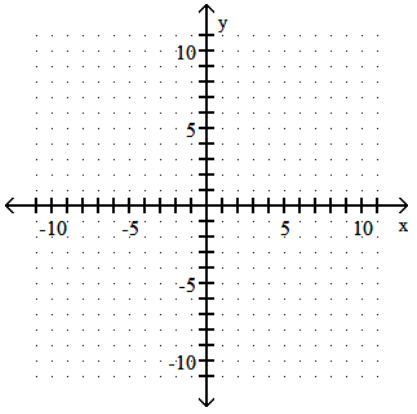


39) $-5x + 3y = -15$ 39) _____

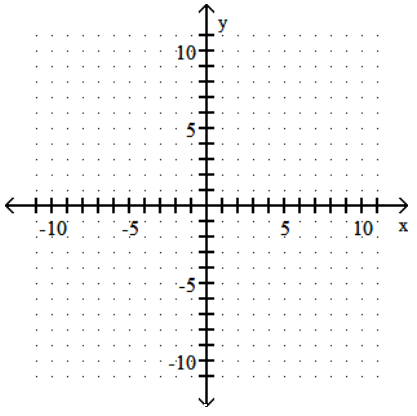


Graph the linear equation.

40) $y = 3$ 40) _____



41) $x = -6$ 41) _____



Write an equation of the line with the given slope and containing the given point. Write the equation in the form $y = mx + b$.

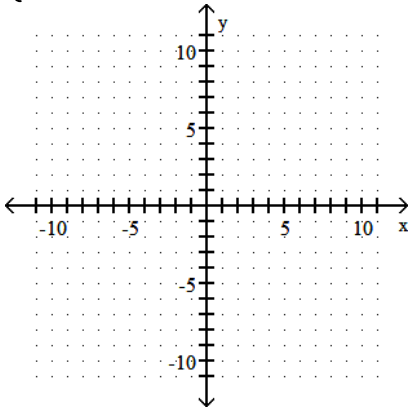
42) Slope -3; through (-7, -7) 42) _____

Find an equation of the line. Write the equation using function notation.

43) Through (9, 43) and (1, 11) 43) _____

Graph the solution of the system of linear inequalities.

44) $\begin{cases} y < 2x + 6 \\ y \geq x - 8 \end{cases}$ 44) _____



Solve.

45) University Theater sold 491 tickets for a play. Tickets cost $25 per adult and $13 per senior citizen. If total receipts were $8195, how many senior citizen tickets were sold? 45) _____

46) The manager of a bulk foods establishment sells a trail mix for $5 per pound and premium cashews for $15 per pound. The manager wishes to make a 75-pound trail mix-cashew mixture that will sell for $13 per pound. How many pounds of each should be used? 46) _____

Solve the equation.

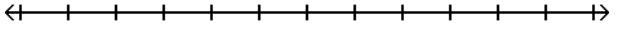
47) $\frac{1}{x+4} - \frac{7}{x-4} = \frac{4}{x^2-16}$ 47) _____

48) $1 + \frac{1}{x} = \frac{12}{x^2}$ 48) _____

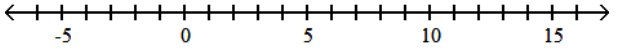
49) $\frac{x+5}{x^2+3x-4} - \frac{5}{x^2-2x+1} = \frac{x-5}{x^2+3x-4}$ 49) _____

Solve the compound inequality. Graph the solution set.

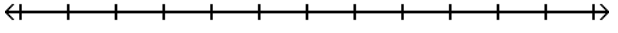
50) $x \le 3$ and $x \ge -2$ 50) _____



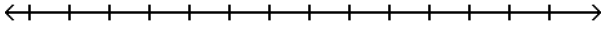
51) $11 \le \frac{5}{2}x + 6 < 31$ 51) _____



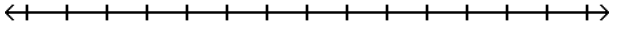
52) $x + 4 < 1$ and $-4x < 4$ 52) _____



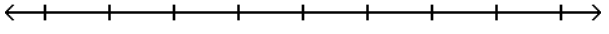
53) $x \le 4$ or $x \ge 6$ 53) _____



54) $x < 4$ or $x < 7$ 54) _____



55) $-5x + 1 \ge 11$ or $3x + 3 \ge -9$ 55) _____



1) $\frac{3(x - 1)}{4}$

2) $\frac{x}{x - 7}$

3) $\frac{x + 4}{x + 1}$

4) $\frac{36}{x}$

5) $\frac{5x + 4}{25 - 16x}$

6) $\frac{1}{x^2 - 9x + 81}$

7) $\frac{x}{11x - 33}$

8) $4x - 1$

9) $5x^2 + 2x - 4 + \frac{3}{3x + 5}$

10) $x^{91/30}$

11) $9x^{19/6}$

12) $6k^3q^4\sqrt{2k}$

13) $3x^2y\sqrt{7x}$

14) $11\sqrt{5} + 9$

15) $3\sqrt[3]{y} - 4\sqrt[3]{2y}$

16) $\frac{37}{2}$

17) 6

18) 2, 38

19) $\varnothing$

20) $10 - 4i$

21) $16 + 7i$

22) $-17 + 144i$

23) $\frac{27}{34} - \frac{14}{17}i$

24) $2 + 3i, 2 - 3i$

25) $\frac{-3 - 3\sqrt{5}}{2}, \frac{-3 + 3\sqrt{5}}{2}$

26) $\frac{5 - i\sqrt{7}}{16}, \frac{5 + i\sqrt{7}}{16}$

27) $-5 - \sqrt{22}, -5 + \sqrt{22}$

28) $\frac{3 - i\sqrt{55}}{32}, \frac{3 + i\sqrt{55}}{32}$

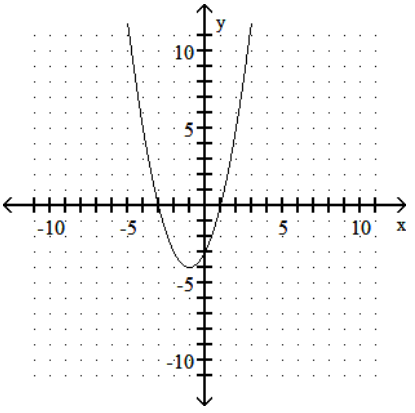
29) $-7 \pm 2\sqrt{6}$

30) 11.0 sec

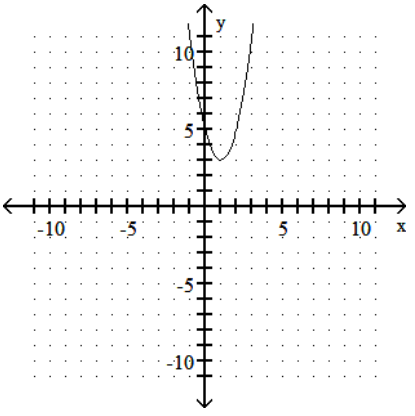
31) 21.3 sec

32) 64 ft

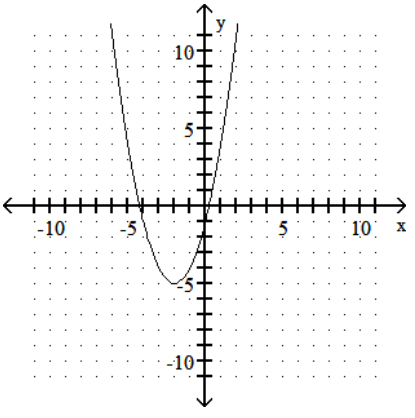
33)



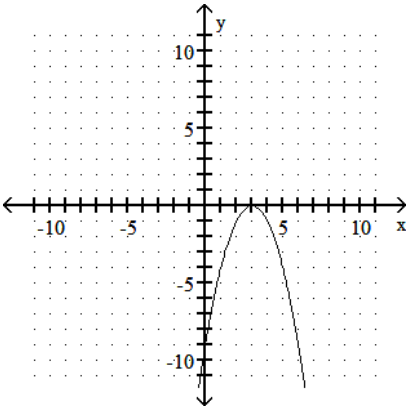
34) vertex: (1, 3)
x-intercept: none, y-intercept: (0, 5)



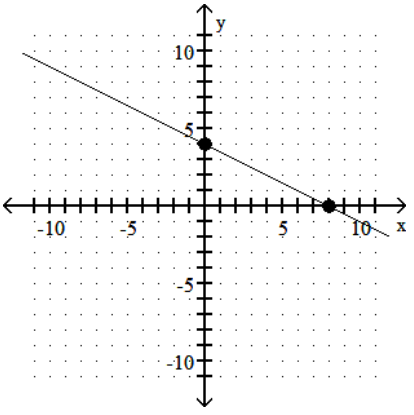
35) vertex (-2, -5); axis x = -2



36) vertex (3, 0); axis x = 3



37)



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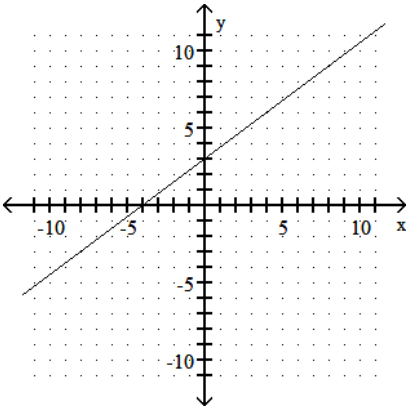

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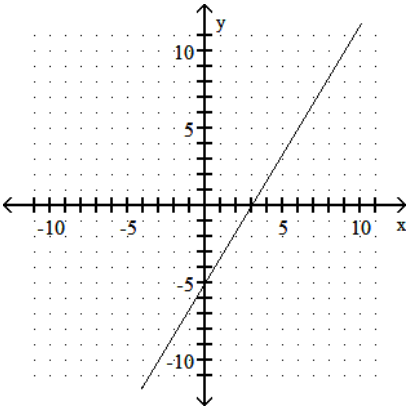

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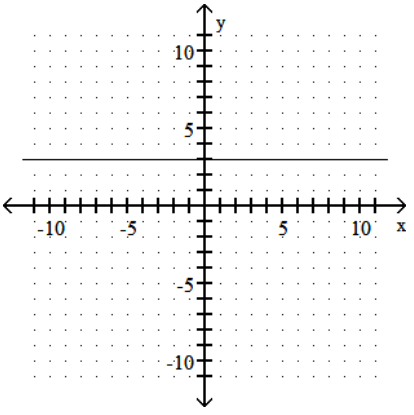
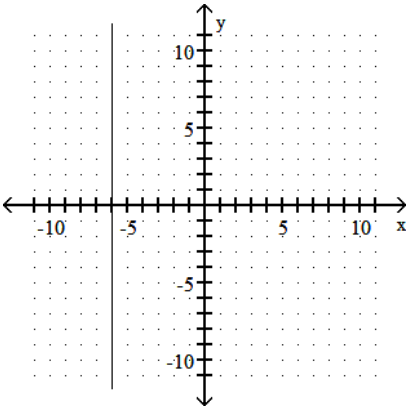


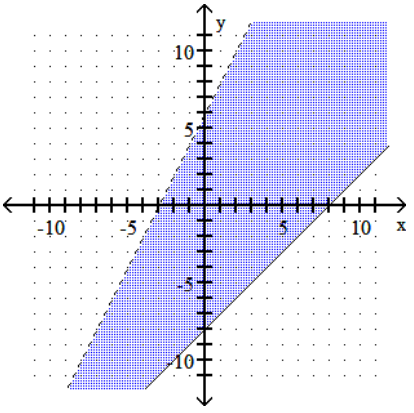
41)



42) y = - 3x - 28

43) f(x) = 4x + 7

44)



45) 340 senior citizen tickets

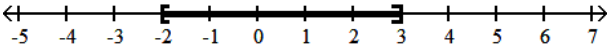
46) 15 pounds of trail mix
60 pounds of cashews

47) -6

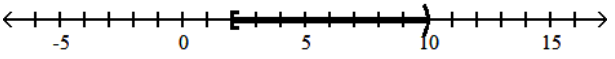
48) -4, 3

49) 6

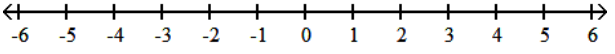
50) [-2, 3]



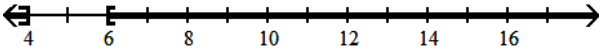
51) [2, 10)



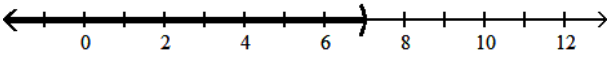
52) ∅



53) (-∞, 4] ∪ [6, ∞)



54) (-∞, 7)



55) (-∞, ∞)