Winter 2013 Math 085
Exam 3 (Final) Chapter 9 Prep v02
Dressler – No Book/No Notes/Yes Calculator

Name_____

Solve the quadratic equation by the square root property.
If possible, simplify radicals or rationalize denominators.

1) $13z^2 - 7 = 0$

2) $13z^2 - 5 = 0$

3) $7x^2 = 81$

4) $(x + 8)^2 = 24$

5) $(x + 5)^2 = 40$

6) $49y^2 = 25$

7) $11z^2 - 3 = 0$

8) $7z^2 - 13 = 0$

9) $3x^2 = 21$

10) $(3x + 2)^2 = 7$

Solve the equation by the method of your choice. Simplify irrational solutions, if possible.

11) $\frac{r^2}{10} - \frac{6}{5}r + \frac{18}{5} = 0$

12) $x^2 - 7x = 0$

13) $\frac{r^2}{8} - \frac{3}{2}r + \frac{9}{2} = 0$

14) $(2x + 5)^2 = 7$

15) $(5x + 4)^2 = 6$

16) $x^2 - 3x = 0$

Solve the quadratic equation using the quadratic formula.

17) $9x^2 = -7x - 6$

18) $7x^2 = -5x - 7$

19) $x^2 + x + 2 = 0$

20) $x^2 = -12x - 46$

21) $y^2 + 18y = -1665$

22) $8x^2 = 9x - 7$

Determine if the parabola whose equation is given opens upward or downward.

23) $y = -2x^2 + 2x - 5$

24) $y = x^2 + 2x - 4$

25) $y = -x^2 - 2x - 8$

26) $y = 4x^2 - 2x - 6$

27) $y = -2x^2 - 2x - 8$

28) $y = -2x^2 - 2x + 2$

Find the vertex for the parabola whose equation is given.

29) $y = 2x^2 - 20x - 1$

30) $y = -x^2 - 8x + 9$

31) $y = x^2 - 5x + 2$

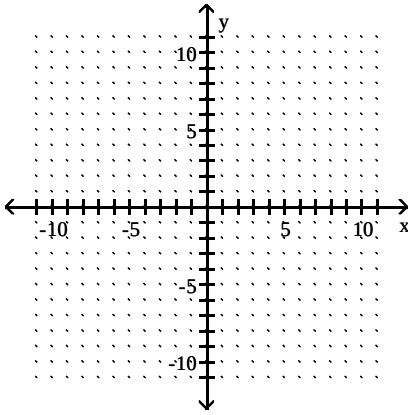
32) $y = -3x^2 - 30x + 8$

33) $y = x^2 + 6x$

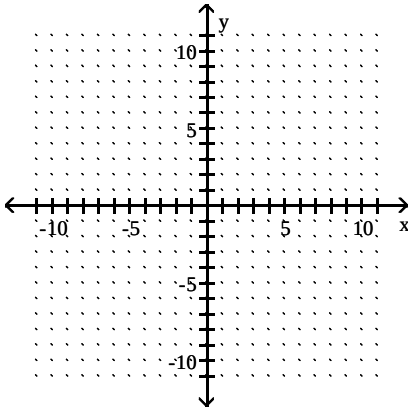
34) $y = -(x - 1)^2 + 4$

Graph the parabola whose equation is given.

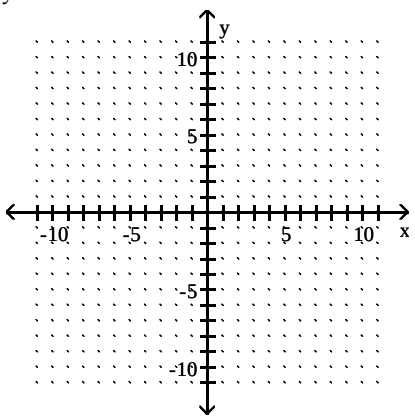
35) $y = x^2 - 6x + 5$



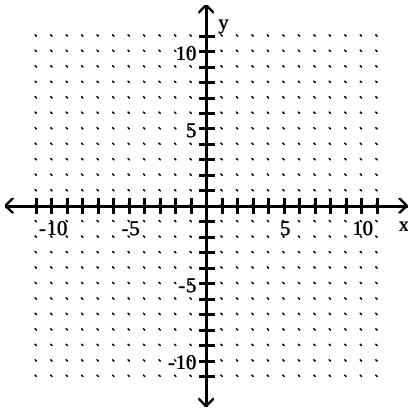
36) $y = -x^2 - 2x + 8$



37) $y = x^2 - 8x + 7$



38) $y = -x^2 - 2x + 3$



Use the coordinates of the vertex to solve the problem. Round your answer to the nearest tenth, if necessary.

39) The profit that the vendor makes per day by selling x pretzels is given by the function $P(x) = -0.004x^2 + 2.8x - 200$. Find the number of pretzels that must be sold to maximize profit.

40) The cost, in millions of dollars, for a company to manufacture x thousand automobiles is given by the function $C(x) = 3x^2 - 24x + 144$. Find the number of automobiles that must be produced to minimize cost.

41) The profit that the vendor makes per day by selling x pretzels is given by the function $P(x) = -0.004x^2 + 2.4x - 50$. Find the number of pretzels that must be sold to maximize profit.

42) The cost, in millions of dollars, for a company to manufacture x thousand automobiles is given by the function $C(x) = 3x^2 - 30x + 175$. Find the number of automobiles that must be produced to minimize cost.

43) An arrow is fired into the air with an initial velocity of 160 feet per second. The formula

$$y = -16x^2 + 160x$$

models the arrow's height above the ground, y, in feet, x seconds after it was shot into the air. When does the arrow reach its maximum height? What is that height?

44) An arrow is fired into the air with an initial velocity of 128 feet per second. The formula

$$y = -16x^2 + 128x$$

models the arrow's height above the ground, y, in feet, x seconds after it was shot into the air. When does the arrow reach its maximum height? What is that height?

45) The profit that the vendor makes per day by selling x pretzels is given by the function $P(x) = -0.004x^2 + 2.4x - 100$. Find the number of pretzels that must be sold to maximize profit.

46) The cost, in millions of dollars, for a company to manufacture x thousand automobiles is given by the function $C(x) = 4x^2 - 16x + 32$. Find the number of automobiles that must be produced to minimize cost.

Give the domain and range for the relation.

47) {(5, 0), (–7, 0), (10, 0), (–9, 0)}

48) {(12, –15), (2, –11), (–5, –13), (–2, –9), (–4, –8)}

49) {(–2, 1), (–2, –8), (8, –1), (–8, 4), (7, –4)}

50) {(5, 8), (1, –9), (–4, 4), (–4, 3)}

51) {(8, 3), (10, –5), (–3, 9), (1, 8)}

52) {(1, 0), (–5, 0), (4, 0), (6, 0)}

Decide whether the relation is a function.

53) {(–9, –5), (–9, –9), (2, –2), (3, 6), (7, 9)}

54) {(3, –3), (3, 4), (4, 3), (7, –1), (11, –5)}

55) {(–6, –4), (–6, 5), (–1, 8), (6, –7), (9, 6)}

56) {(–4, –9), (–3, 7), (1, 6), (1, 5)}

57) {(–5, –7), (–3, 3), (–1, –7), (8, 9)}

58) {(–1, –4), (2, –8), (6, –6), (9, –1), (11, –9)}

Evaluate the function at the given value.

59) $f(t) = \sqrt{t + 133} + 2$; f(11)

60) $f(x) = -7x + 3$; f(−2)

61) $f(x) = 7x + 6$; f(2)

62) $f(x) = 9x - 4$; f(0)

63) $f(x) = x^2 - 3x - 3$; f(2)

64) $h(x) = |x - 2|$; h(14)

65) $h(x) = 11$; h(−2)

66) $g(x) = 10x$; g(6)

67) $f(x) = x^2 + 10x$; f(12)

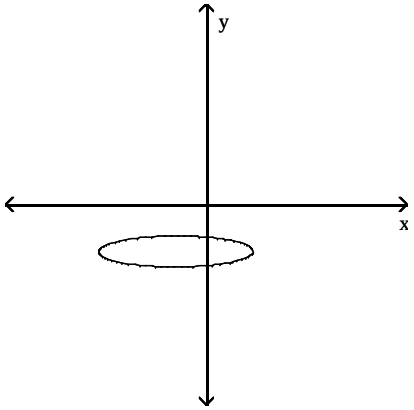
68) $f(t) = \sqrt{t + 133} + 2$; f(11)

69) $f(r) = \frac{5r}{|5r|}$; f(−10)

70) $f(r) = \frac{3r}{|3r|}$; f(−12)

Use the vertical line test on the graph to determine if y is a function of x.

71)



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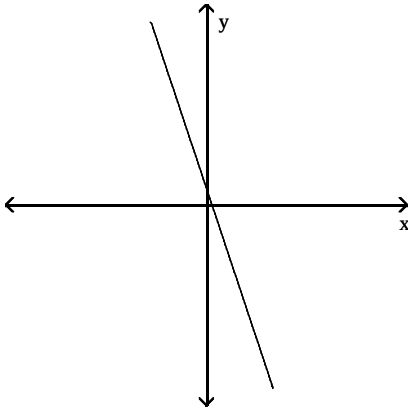

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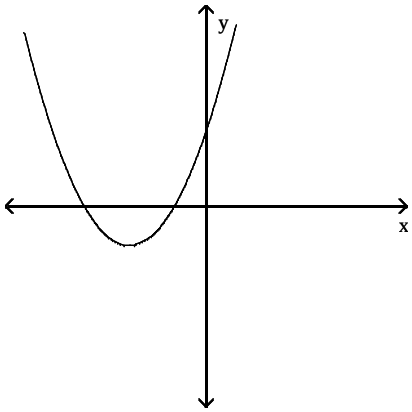

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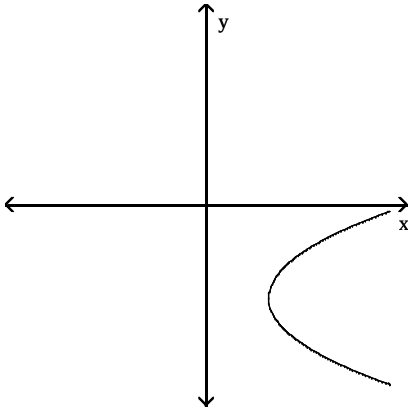

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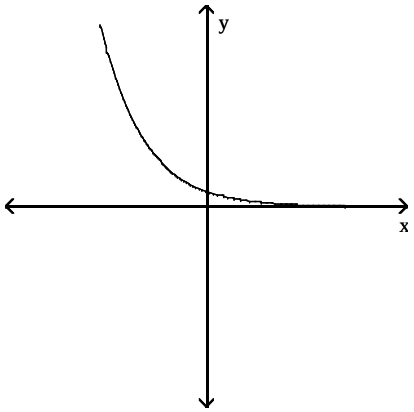

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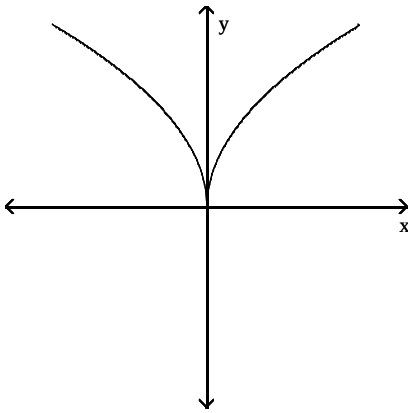

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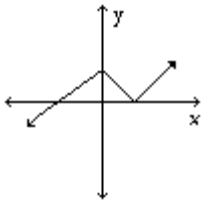

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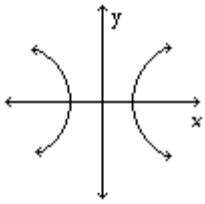

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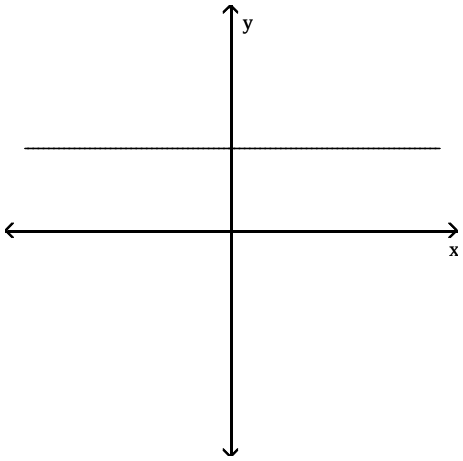

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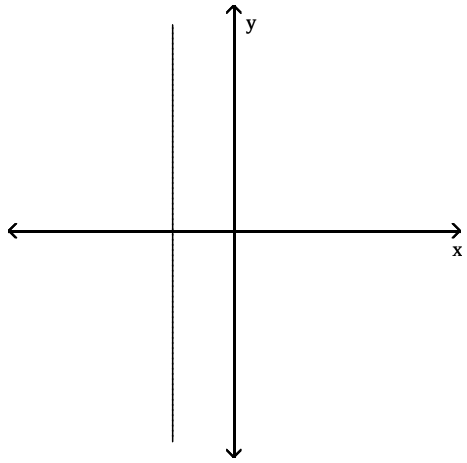


Solve.

81) The monthly cost of a certain long distance service is given by the linear function $C(t) = 0.06t + 4.95$, where C(t) is in dollars and t is the amount of minutes used in a month. Find and interpret C(140).

82) The polynomial $P(x) = 0.45x - 83$ models the relationship between the number of pretzels x that a certain vendor sells and the profit the vendor makes. Find and interpret P(500).

83) A rocket is 29 feet from a satellite when it begins accelerating away from the satellite at a constant rate of 18 feet per second per second. The distance, in feet, between the rocket and the satellite is given by the polynomial $P(t) = 9t^2 + 29$, where t is the number of seconds since the rocket started accelerating. Find and interpret P(4).

84) The function $W(g) = 0.56g^2 - 0.09g + 10.4$ models the average weight in ounces for a mouse who is fed g grams of a special food per day. Use the function to find and interpret W(16).

1) $\left\{\pm\frac{\sqrt{91}}{13}\right\}$
2) $\left\{\pm\frac{\sqrt{65}}{13}\right\}$
3) $\left\{\pm\frac{9\sqrt{7}}{7}\right\}$
4) $\{-8 \pm 2\sqrt{6}\}$
5) $\{-5 \pm 2\sqrt{10}\}$
6) $\left\{\pm\frac{5}{7}\right\}$
7) $\left\{\pm\frac{\sqrt{33}}{11}\right\}$
8) $\left\{\pm\frac{\sqrt{91}}{7}\right\}$
9) $\{\pm\sqrt{7}\}$
10) $\left\{\frac{-2 \pm \sqrt{7}}{3}\right\}$
11) $\{6\}$
12) $\{7, 0\}$
13) $\{6\}$
14) $\left\{\frac{-5 \pm \sqrt{7}}{2}\right\}$
15) $\left\{\frac{-4 \pm \sqrt{6}}{5}\right\}$
16) $\{3, 0\}$
17) $\left\{\frac{-7 \pm i\sqrt{167}}{18}\right\}$
18) $\left\{\frac{-5 \pm i3\sqrt{19}}{14}\right\}$
19) $\left\{\frac{-1 \pm i\sqrt{7}}{2}\right\}$
20) $\{-6 \pm i\sqrt{10}\}$
21) $\{-9 \pm 12i\sqrt{11}\}$
22) $\left\{\frac{9 \pm i\sqrt{143}}{16}\right\}$
23) Downward
24) Upward
25) Downward
26) Upward
27) Downward
28) Downward
29) (5, –51)
30) (–4, 25)

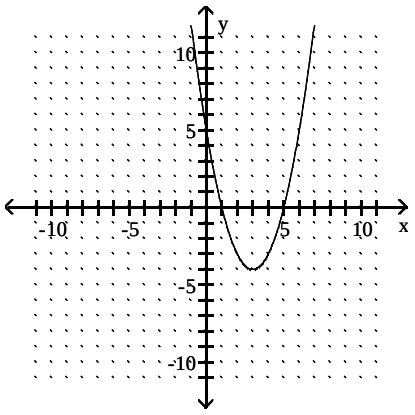
31) $\left(\frac{5}{2}, -\frac{17}{4}\right)$

32) (–5, 83)

33) $\left(-3, -9\right)$

34) (1, 4)

35)



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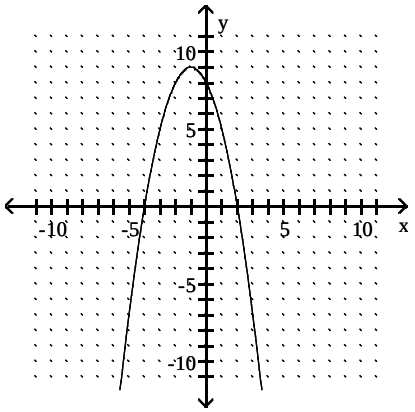

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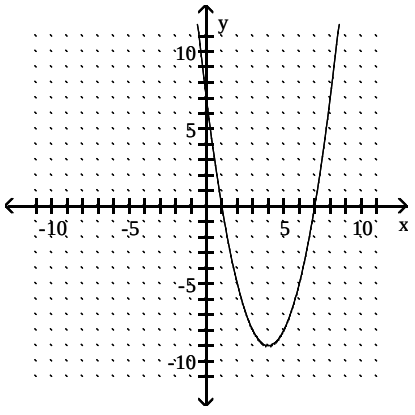

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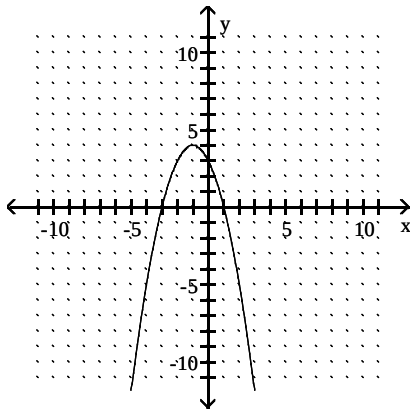

39) 350 pretzels
40) 4 thousand automobiles
41) 300 pretzels
42) 5 thousand automobiles
43) 5 seconds; 400 feet
44) 4 seconds; 256 feet
45) 300 pretzels
46) 2 thousand automobiles
47) Domain: {–7, 5, 10, –9}; range: {0}
48) Domain: {–4, –5, –2, 12, 2}; range: {–8, –13, –9, –15, –11}
49) Domain: {8, –8, –2, 7}; range: {–1, 4, –8, –4, 1}
50) Domain: {–4, 5, 1}; range: {4, 8, –9, 3}
51) Domain: {8, –3, 1, 10}; range: {3, 9, 8, –5}
52) Domain: {4, 1, 6, –5}; range: {0}
53) Not a function
54) Not a function
55) Not a function
56) Not a function
57) Function
58) Function
59) 14
60) 17
61) 20
62) –4
63) –5
64) 12
65) 11
66) 60
67) 264
68) 14
69) –1
70) –1
71) Not a function
72) Function
73) Function
74) Not a function
75) Function

76) Function
77) Function
78) Not a function
79) Function
80) Not a function
81) 13.35; it costs $13.35 to use 140 minutes of a certain long distance service in a month.
82) 142; $142 is the profit the vendor makes from selling 500 pretzels.
83) 173; after 4 seconds, the distance between the rocket and the satellite is 173 feet.
84) 152.32; when a mouse is fed 16 grams of the special food per day, its average weight is 152.32 ounces.