

Do the following as indicated.

Find the root. Assume that all variables represent nonnegative real numbers.

1) $-\sqrt{144}$

2) $\sqrt[3]{-1000}$

3) $-\sqrt[4]{256}$

4) $\sqrt[5]{\frac{1024x^5}{y^{20}}}$

Simplify. Assume that all variables represent any real number.

5) $\sqrt{x^2 + 4x + 4}$

6) $\sqrt{(x + 7)^2}$

Identify the domain and then graph the function.

7) $f(x) = \sqrt{x} - 2$

8) $f(x) = \sqrt{x - 1}$

Use radical notation to write the expression. Simplify if possible.

9) $81^{1/4}$

10) $64^{-3/2}$

11) $16^{5/4}$

12) $8^{-4/3}$

13) $\left(\frac{8}{27}\right)^{2/3}$

14) $243^{-4/5}$

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

15) $\frac{x^{2/3} \cdot x^{4/5}}{x^{-2/7}}$

16) $\frac{(2x^{5/7})^7}{x^{3/5}}$

Use rational exponents to simplify the following.

17) $\sqrt[12]{x^2}$

18) $\sqrt[8]{(x - 7)^4}$

19) $\sqrt[10]{y^4 z^{10}}$

Perform indicated operations. Simplify, if possible.

20) $\sqrt[4]{x} \cdot \sqrt{x}$

21) $\sqrt[5]{5} \cdot \sqrt{3}$

22) $\sqrt{18} \cdot \sqrt{98}$

23) $\sqrt[3]{5x^2} \cdot \sqrt[3]{49}$

24) $\sqrt{9} + \sqrt{98} + \sqrt{81} + \sqrt{32}$

25) $\sqrt{162} - 3\sqrt{32} - 3\sqrt{98}$

26) $\sqrt{\frac{2}{25}} + \sqrt{\frac{8}{9}}$

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

28) $\sqrt{2}(\sqrt{10} + \sqrt{2})$

29) $(3\sqrt{5} + 6)(5\sqrt{5} + 3)$

$$30) (6\sqrt{3} - 7)^2$$

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

$$31) \sqrt{\frac{32x^2y}{49}}$$

$$32) \sqrt{72}$$

$$33) \sqrt[3]{192}$$

$$34) \sqrt[3]{216x^4y^5}$$

Rationalize the denominator and simplify.

$$35) \frac{\sqrt{5}}{\sqrt{13}}$$

$$36) \sqrt[3]{\frac{10}{9}}$$

$$37) \frac{3}{\sqrt{5} - 5}$$

$$38) \frac{\sqrt{2} - \sqrt{3}}{\sqrt{2} + \sqrt{3}}$$

$$39) \frac{3\sqrt{5} + \sqrt{15}}{6\sqrt{5} - \sqrt{15}}$$

Solve.

$$40) \sqrt[3]{3x + 1} - 4 = 0$$

$$41) \sqrt{x} - 2 = \sqrt{x + 32}$$

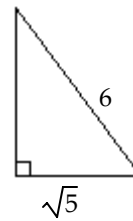
$$42) \sqrt{5x + 9} - 6 = 0$$

$$43) x - \sqrt{22x + 11} = -6$$

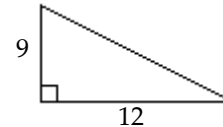
$$44) \sqrt{x + 1} = \sqrt{x + 5}$$

Use the Pythagorean theorem to find the unknown side of the right triangle.

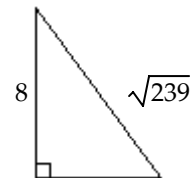
45)



46)



47)



Write in terms of i.

$$48) -\sqrt{-279}$$

$$49) \sqrt{-136}$$

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

$$50) (3 + 5i) - (-8 + i)$$

$$51) (24 - 4i)(6 + i)$$

$$52) (7 - 8i)^2$$

$$53) (1 + 5i)(1 - 5i)$$

$$54) (9 - 63i)(7 - i)$$

$$55) \frac{8 - 3i}{4 + i}$$

$$56) \frac{3 + 2i}{3 - 2i}$$

Solve.

57) $(x + 2)^2 = 28$

58) $x^2 + 3x - 9 = 0$ (Use method of completing the square)

59) $4x^2 + 24x + 35 = 0$ (Use method of completing the square)

60) $2x^2 = -8x - 3$

61) $4x^2 + 1 = 3x$

62) $9x^2 + 24x = -14$

63) $x - \sqrt{3x} = 2$

64) $\frac{5}{x-1} + \frac{x}{x+1} = \frac{7}{x^2-1}$

65) $x^4 - 34x^2 - 72 = 0$

66) $x^{2/3} - 6x^{1/3} + 8 = 0$

67) $2x^{2/3} - 13x^{1/3} - 24 = 0$

68) $x^3 - 12x + x^2 - 12 = 0$

Solve the inequality. Graph the solution set and write the solution set in interval notation.

69) $x^2 - 4x - 12 < 0$

70) $x(x + 3)(x - 4) > 0$

71) $3x^2 - 5x \geq 8$

72) $\frac{x-1}{x+5} > 0$

73) $\frac{5}{x-2} < 1$

74) $\frac{(x-3)(x+3)}{x} \leq 0$

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

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

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

77) $f(x) = (x + 2)^2 + 1$

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

79) $f(x) = 3(x + 4)^2 + 1$

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

81) $f(x) = -x^2 - 6x - 5$

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

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

Solve.

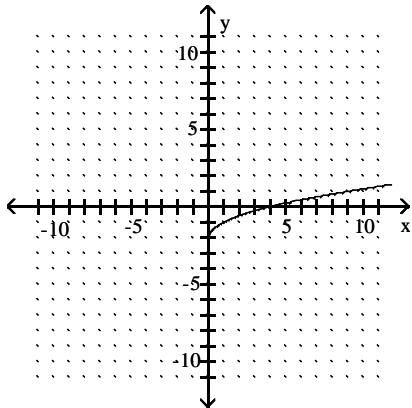
84) The cost in millions of dollars for a company to manufacture x thousand automobiles is given by the function $C(x) = 3x^2 - 30x + 175$. Find the number of automobiles that must be produced to minimize the cost.

85) An arrow is fired into the air with an initial velocity of 96 feet per second. The height in feet of the arrow t seconds after it was shot into the air is given by the function $h(x) = -16t^2 + 96t$. Find the maximum height of the arrow.

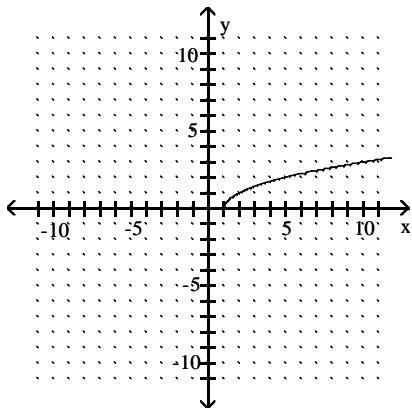
Answer Key

Testname: 125EXAM4REVIEW

- 1) -12
- 2) -10
- 3) -4
- 4) $\frac{4x}{y^4}$
- 5) $|x + 2|$
- 6) $|x + 7|$
- 7) $[0, \infty)$



- 8) $[1, \infty)$



- 9) 3
- 10) $\frac{1}{512}$
- 11) 32
- 12) $\frac{1}{16}$
- 13) $\frac{4}{9}$
- 14) $\frac{1}{81}$
- 15) $x^{184/105}$
- 16) $128x^{22/5}$
- 17) $x^{1/6}$
- 18) $(x - 7)^{1/2}$
- 19) $y^{2/5}z$

- 20) $\sqrt[4]{x^3}$
- 21) $\sqrt[10]{6075}$
- 22) 42
- 23) $\sqrt[3]{245x^2}$
- 24) $11\sqrt{2} + 12$
- 25) $-24\sqrt{2}$
- 26) $\frac{13\sqrt{2}}{15}$
- 27) $3\sqrt[3]{y} - 4\sqrt[3]{2y}$
- 28) $2\sqrt{5} + 2$
- 29) $93 + 39\sqrt{5}$
- 30) $157 - 84\sqrt{3}$
- 31) $\frac{4x\sqrt{2y}}{7}$
- 32) $6\sqrt{2}$
- 33) $4\sqrt[3]{3}$
- 34) $6xy\sqrt[3]{xy^2}$
- 35) $\frac{\sqrt{65}}{13}$
- 36) $\frac{\sqrt[3]{30}}{3}$
- 37) $-\frac{3\sqrt{5} + 15}{20}$
- 38) $2\sqrt{6} - 5$
- 39) $\frac{7 + 3\sqrt{3}}{11}$
- 40) $-\frac{65}{3}$
- 41) \emptyset
- 42) $\frac{27}{5}$
- 43) 5
- 44) $x = 4$
- 45) $\sqrt{31}$
- 46) 15
- 47) $5\sqrt{7}$
- 48) $-3i\sqrt{31}$
- 49) $2i\sqrt{34}$
- 50) $11 + 4i$
- 51) 148
- 52) $-15 - 112i$
- 53) 26

Answer Key

Testname: 125EXAM4REVIEW

54) $-450i$

55) $\frac{29}{17} - \frac{20}{17}i$

56) $\frac{5}{13} + \frac{12}{13}i$

57) $-2 - 2\sqrt{7}, -2 + 2\sqrt{7}$

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

59) $-\frac{5}{2}, -\frac{7}{2}$

60) $\frac{-4 - \sqrt{10}}{2}, \frac{-4 + \sqrt{10}}{2}$

61) $\frac{3 - i\sqrt{7}}{8}, \frac{3 + i\sqrt{7}}{8}$

62) $\frac{-4 - \sqrt{2}}{3}, \frac{-4 + \sqrt{2}}{3}$

63) $\frac{7 + \sqrt{33}}{2}$

64) $-2 - \sqrt{6}, -2 + \sqrt{6}$

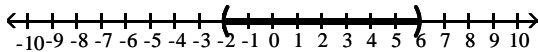
65) $-6, 6, -i\sqrt{2}, i\sqrt{2}$

66) 8, 64

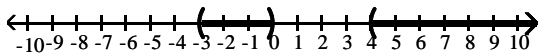
67) 512, $-\frac{27}{8}$

68) $-1, -2\sqrt{3}, 2\sqrt{3}$

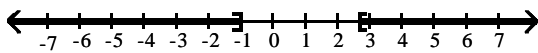
69) $(-2, 6)$



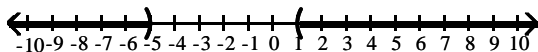
70) $(-3, 0) \cup (4, \infty)$



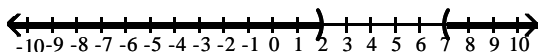
71) $(-\infty, -1] \cup [\frac{8}{3}, \infty)$



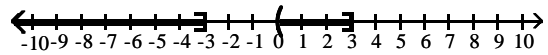
72) $(-\infty, -5) \cup (1, \infty)$



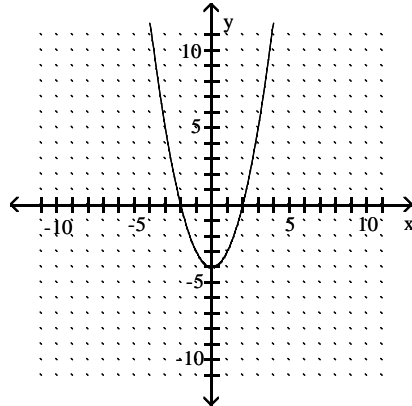
73) $(-\infty, 2) \cup (7, \infty)$



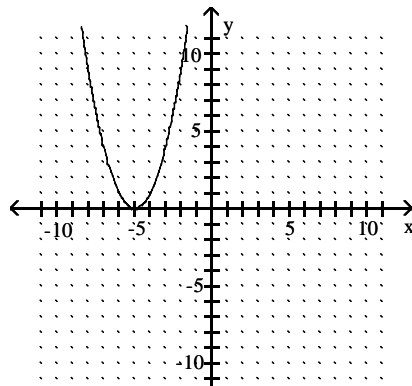
74) $(-\infty, -3] \cup (0, 3]$



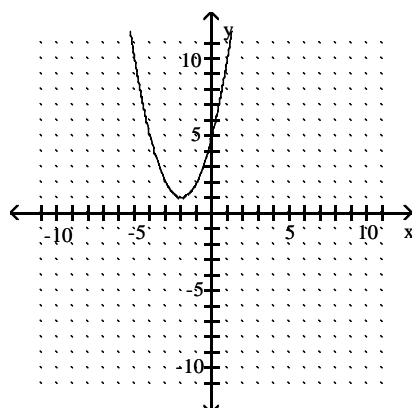
75) vertex $(0, -4)$; axis $x = 0$



76) vertex $(-5, 0)$; axis $x = -5$



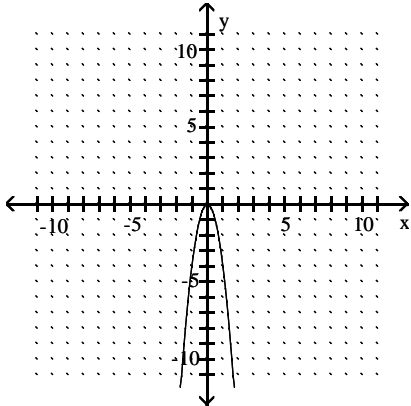
77) vertex $(-2, 1)$; axis $x = -2$



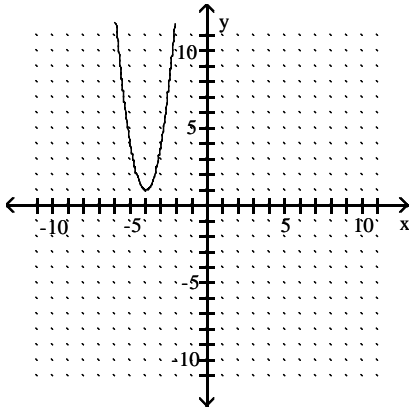
Answer Key

Testname: 125EXAM4REVIEW

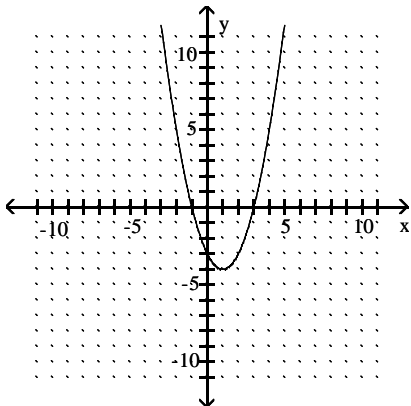
78) vertex $(0, 0)$; axis $x = 0$



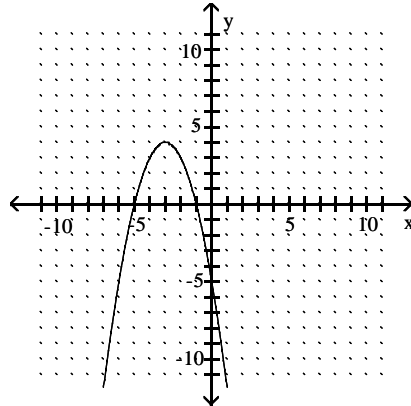
79) vertex $(-4, 1)$; axis $x = -4$



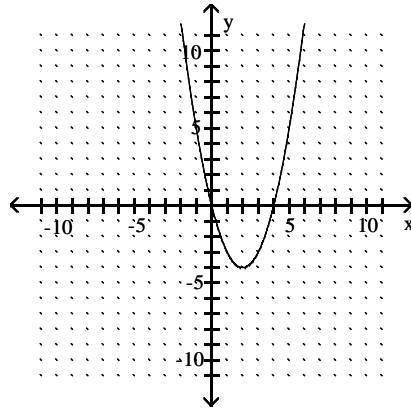
80)



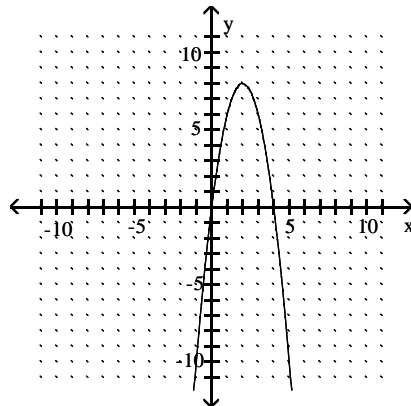
81)



82)



83)



84) 5 thousand automobiles

85) 144 ft