Name _____ Date _____

LESSON 6.1

Practice B

For use with pages 406–411

Rewrite the expression using rational exponent notation.

1. $\sqrt[3]{7}$
2. $(\sqrt[3]{6})^2$
3. $(\sqrt[5]{14})^4$
4. $(\sqrt[7]{-21})^3$
5. $(\sqrt[8]{11})^7$
6. $(\sqrt[9]{-2})^4$

Rewrite the expression using radical notation.

7. $17^{1/3}$
8. $44^{1/6}$
9. $33^{2/3}$
10. $9^{5/3}$
11. $(-28)^{7/5}$
12. $39^{4/7}$

Write the expression in two other ways, using radical notation and/or rational exponent notation.

13. $(\sqrt[5]{x})^2$
14. $(\sqrt[7]{x})^5$
15. $(\sqrt[5]{-y})^4$
16. $x^{2/5}$
17. $x^{6/5}$
18. $y^{0.6}$

Evaluate the expression without using a calculator.

19. $(\sqrt[3]{8})^2$
20. $(\sqrt[4]{16})^3$
21. $(\sqrt[4]{81})^4$
22. $36^{3/2}$
23. $4^{5/2}$
24. $(-32)^{3/5}$

Evaluate the expression using a calculator. Round the result to two decimal places when appropriate.

25. $\sqrt[3]{38}$
26. $\sqrt[6]{112}$
27. $\sqrt[7]{-215}$
28. $(241)^{1/5}$
29. $(-133)^{1/3}$
30. $(69)^{1/4}$

31. **Geometry** Find the radius of a sphere with a volume of 589 cubic centimeters.

Solve the equation. Round the result to two decimal places when appropriate.

32. $x^3 + 17 = 132$
33. $2x^5 + 73 = 53$
34. $(x + 3)^4 = 362$

In Exercises 35–38, use the following information.

Water and Ice Water, in its liquid state, has a density of 0.9971 gram per cubic centimeter. Ice has a density of 0.9168 gram per cubic centimeter. A cubic container is filled with 600 grams of liquid water. A different cubic container is filled with 600 grams of ice. Round the answers to two decimal places when appropriate.

35. Find the volume of the container filled with liquid water.

36. Find the length of the edges of the cubic container that is filled with liquid water.

37. Find the volume of the container filled with ice.

38. Find the length of the edges of the cubic container that is filled with ice.

Name _____ Date _____

LESSON 6.2

Practice B

For use with pages 412–419

Simplify the expression using the properties of radicals and rational exponents.

1. $7^{1/3} \cdot 7^{4/3}$
2. $\frac{4^{2/3}}{4^{1/3}}$
3. $(6^{2/3})^{3/4}$
4. $5^{1/4} \cdot 3^{1/4}$
5. $\sqrt[4]{2} \cdot \sqrt[4]{8}$
6. $\frac{\sqrt[4]{192}}{\sqrt[4]{6}}$
7. $\frac{11}{\sqrt[4]{11}}$
8. $\sqrt[3]{7} \cdot \sqrt[3]{49}$
9. $(3^{3/2})^2$
10. $\left(\frac{54}{64}\right)^{1/3}$
11. $\frac{\sqrt[4]{32}}{\sqrt[4]{2}}$
12. $\frac{\sqrt[5]{5}}{\sqrt[5]{27}}$

Simplify the expression. Assume all variables are positive.

13. $x^{5/3} \cdot x^{4/3}$
14. $\sqrt{x^{2/5}}$
15. $(x^{1/2})^{2/7}$
16. $\left(\frac{x^2}{27}\right)^{1/3}$
17. $\sqrt[3]{16x^4}$
18. $(x^{-3})^{2/5}$
19. $\frac{x^{7/5}}{x^{4/5}}$
20. $\frac{\sqrt[3]{64x^3y}}{4x^{-3}y}$
21. $x^5 \cdot x^{\sqrt{3}}$
22. $(x^{\sqrt{2}})^{3\sqrt{2}}$
23. $\frac{x^{4\sqrt{3}}}{2x^{2\sqrt{3}}}$
24. $(\sqrt[3]{x^4} \cdot \sqrt{x^5})^{-2}$

Perform the indicated operation. Assume all variables are positive.

25. $2\sqrt{27} - 3\sqrt{48}$
26. $2\sqrt{x} + 7\sqrt{x}$
27. $3(x^{1/2}y^3)^2 - (x^3y^{18})^{1/3}$
28. $4x^{\sqrt{3}} + x^{\sqrt{3}}$

Tell whether the following statements are *always*, *sometimes*, or *never* true for positive real numbers *a* and *b*.

29. $a^{\sqrt{b}} = 0$
30. $-\sqrt[3]{a} = \sqrt[3]{-a}$

Write the expression in simplest form. Assume all variables are positive.

31. $\sqrt[4]{3x^7y^9z^3}$
32. $\sqrt{x^3y^4z} \cdot \sqrt{xyz^4}$
33. $\sqrt[3]{\frac{81x^2y^3}{8xy^4z}}$

34. **Circumference** The equatorial circumference of Earth is 4.01×10^4 kilometers. One kilometer is equivalent to 3.94×10^4 inches. What is the equatorial circumference of Earth in inches?

35. **Swimming Pool** A wooden deck and a circular swimming pool cover an area of 514.16 square feet of the lawn. The rectangular deck is 20 feet wide and 10 feet long. What is the radius of the pool?

Name _____ Date _____

LESSON 6.3

Practice B

For use with pages 422–428

Let $f(x) = 7x^{1/2} - 2$, $g(x) = -x^{1/2} + 4$ and $h(x) = -4x^{1/2} + 1$. Perform the indicated operation.

1. $f(x) + g(x)$
2. $f(x) + h(x)$
3. $h(x) + g(x)$
4. $f(x) - g(x)$
5. $h(x) - f(x)$
6. $g(x) - h(x)$

Let $f(x) = 4x^2$, $g(x) = -3x^{4/3}$ and $h(x) = x^{1/2}$. Perform the indicated operation.

7. $f(x) \cdot g(x)$
8. $f(x) \cdot h(x)$
9. $h(x) \cdot g(x)$
10. $\frac{f(x)}{g(x)}$
11. $\frac{h(x)}{f(x)}$
12. $\frac{h(x)}{g(x)}$

Let $f(x) = 2x + 3$, $g(x) = \frac{3}{x+1}$ and $h(x) = \frac{x+5}{2}$. Perform the indicated operation.

13. $f(g(x))$
14. $g(h(x))$
15. $f(h(x))$
16. $g(f(x))$
17. $h(f(x))$
18. $g(g(x))$

Let $f(x) = 3x + 2$, $g(x) = 2x^2$ and $h(x) = \frac{-4}{x+3}$. State the domain of the operation.

19. $f(x) + g(x)$
20. $h(x) - f(x)$
21. $h(x) \cdot g(x)$
22. $\frac{g(x)}{f(x)}$
23. $h(g(x))$
24. $f(g(x))$

In Exercises 25–29, use the following information.

Computer Sale You have a coupon for \$200 off the price of a personal computer. When you arrive at the store, you find that the computers are on sale for 20% off. Let x represent the original price of the computer.

25. Use a function notation to describe your cost, $f(x)$, using only the coupon.
26. Use a function notation to describe your cost, $g(x)$, with only the 20% discount.
27. Form the composition of the functions f and g that represents your cost if you use the coupon first, then take the 20% discount.
28. Form the composition of the functions f and g that represents your cost if you use the discount first, then use the coupon.
29. Would you pay less for the computer if you used the coupon first or took the 20% discount first?

Name _____ Date _____

LESSON 6.4

LESSON 6.4

Practice B

For use with pages 432–439

Find an equation for the inverse relation.

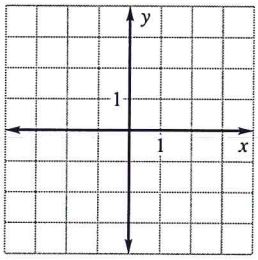
1. $y = 2x + 1$
2. $y = \frac{1}{3}x$
3. $y = 6x - 3$
4. $y = -4x + 6$
5. $y = \frac{1}{2} - \frac{2}{3}x$
6. $y = x^2 + 2$

Verify that *f* and *g* are inverse functions.

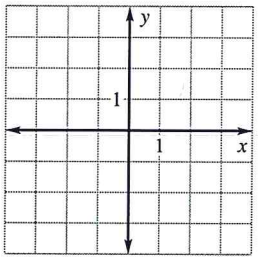
7. $f(x) = x + 4; g(x) = x - 4$
8. $f(x) = 7x; g(x) = \frac{1}{7}x$
9. $f(x) = x^5; g(x) = \sqrt[5]{x}$
10. $f(x) = 2x - 4; g(x) = \frac{1}{2}x + 2$
11. $f(x) = 3 - x; g(x) = 3 - x$
12. $f(x) = x^2 + 5, x \geq 0; g(x) = \sqrt{x - 5}$

Graph the function *f*. Then use the horizontal line test to determine whether the inverse of *f* is a function.

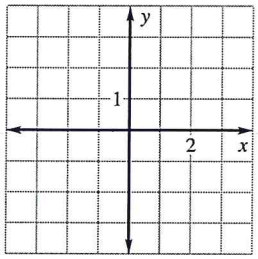
13. $f(x) = 2x + 1$



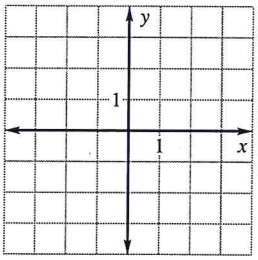
14. $f(x) = -x - 2$



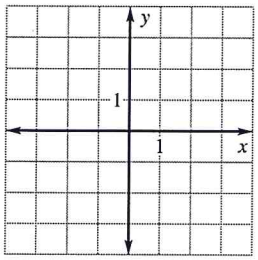
15. $f(x) = \frac{1}{2}x^2 - 1$



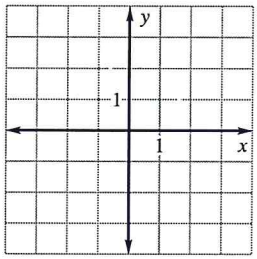
16. $f(x) = -x^2 + 3, x \geq 0$



17. $f(x) = \frac{1}{4}x^3$



18. $f(x) = |x| + 1$



19. **Temperature Conversion** The formula to convert temperatures from degrees Celsius to Fahrenheit is $F = \frac{9}{5}C + 32$. Write the inverse function, which converts temperatures from Fahrenheit to Celsius. What is the Celsius temperature that is equal to 94 degrees Fahrenheit?

20. **Sale Price** A department store is having a storewide 20% discount sale. The sale price S of an item that has a regular price of R is $S = R - 0.2R$. Write the inverse function. What is the regular price for an item that is on sale for $38.40?

Name _____ Date _____

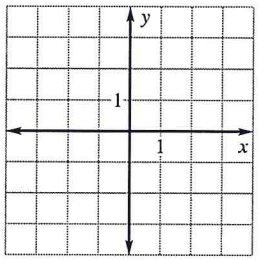
LESSON 6.5

Practice B

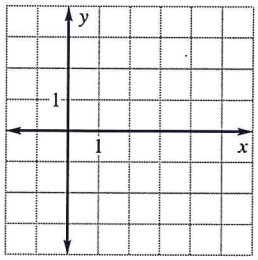
For use with pages 440–445

Graph the square root function. Then state the domain and range.

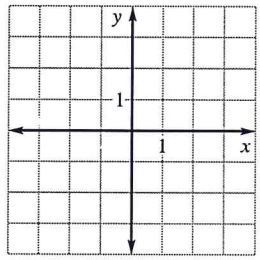
1. $f(x) = \sqrt{x} - 2$



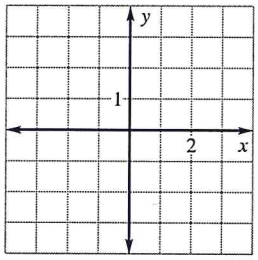
2. $f(x) = \sqrt{x - 2}$



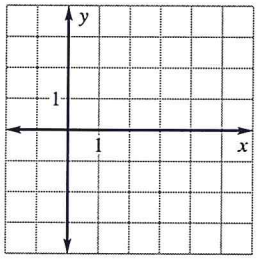
3. $f(x) = 3\sqrt{x + 1}$



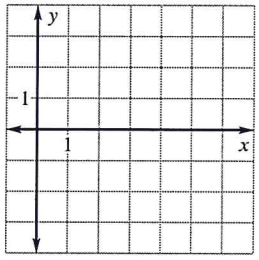
4. $f(x) = \sqrt{x + 2} - 2$



5. $f(x) = \sqrt{x - 1} + 1$

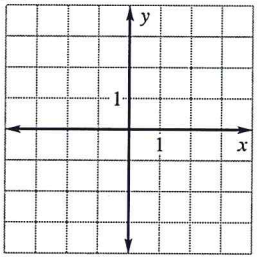


6. $f(x) = -\sqrt{x - 3}$

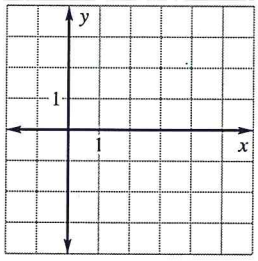


Graph the cube root function. Then state the domain and range.

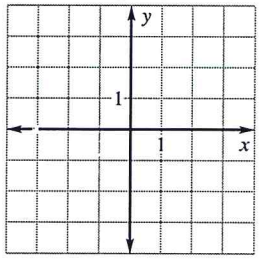
7. $f(x) = \sqrt[3]{x} + 1$



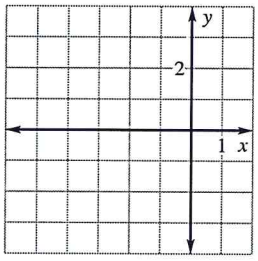
8. $f(x) = \sqrt[3]{x - 4}$



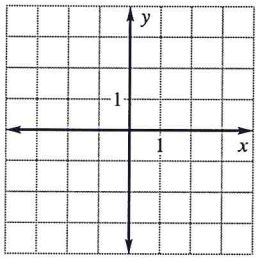
9. $f(x) = 3\sqrt[3]{x}$



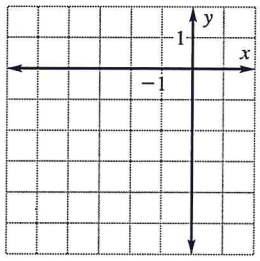
10. $f(x) = \sqrt[3]{x + 2}$



11. $f(x) = -\sqrt[3]{x} - 1$



12. $f(x) = \sqrt[3]{x + 2} - 2$



In Exercises 13 and 14, use the following information.

Speed of Sound The speed of sound in feet per second through air of any temperature measured in Celsius is given by $V = \frac{1087\sqrt{t + 273}}{16.52}$, where t is the temperature.

13. Identify the domain and range of the function.

14. What is the temperature of the air if the speed of sound is 1250 feet per second?

Name _____ Date _____

LESSON 6.6

Practice B

For use with pages 446–453

Solve the equation. Check your solution.

1. $\sqrt{x} + 3 = 12$
2. $x^{1/2} - 4 = 1$
3. $3\sqrt{x+2} = 6$
4. $(2x-3)^{1/2} + 2 = 2$
5. $5\sqrt{3x} = 15$
6. $3\sqrt{4-3x} = 21$
7. $7 - \sqrt{x-4} = -6$
8. $\sqrt{3x+4} + \frac{3}{2} = 3$
9. $2(x-1)^{1/2} - 3 = 7$

Solve the equation. Check your solution.

10. $\sqrt[3]{x} + 1 = -2$
11. $4\sqrt[3]{x} + 2 = 0$
12. $\sqrt[3]{2x+7} = 5$
13. $(x+4)^{1/3} - 2 = -6$
14. $8\sqrt[3]{x} + 3 = 11$
15. $3x^{1/3} - 2 = -4$
16. $-2\sqrt[3]{2x+5} + 7 = 15$
17. $\frac{1}{2}(5x+1)^{1/3} + \frac{5}{2} = 4$
18. $6\sqrt[3]{x-3} + 2 = \frac{1}{2}$

Solve the equation. Check for extraneous solutions.

19. $x^{5/3} = 243$
20. $x^{3/2} + 3 = 11$
21. $2x^{5/3} = -64$
22. $(x-2)^{3/4} = 8$
23. $(2x+12)^{2/3} - 3 = 13$
24. $(3x+21)^{4/3} + 9 = 90$

Solve the equation algebraically or graphically. Check for extraneous solutions.

25. $\sqrt{x-3} = \sqrt{2x-7}$
26. $\sqrt{x+3} = \sqrt{4x-8}$
27. $\sqrt[3]{4x-9} = \sqrt[3]{2x-4}$
28. $\sqrt[4]{3x+3} = \sqrt[4]{2x-7}$
29. $\sqrt{x} + 1 = \sqrt{3x-3}$
30. $\sqrt[3]{3x+9} = \sqrt[3]{x+6}$
31. $x + 2 = \sqrt{2x+7}$
32. $\sqrt{2x+3} = 1 + \sqrt{x+1}$

In Exercises 33–35, use the following information.

Velocity The velocity of a free falling object is given by $V = \sqrt{2gh}$, where V is velocity (in meters per second), g is acceleration due to gravity (in meters per second squared) and h is the distance (in meters) the object has fallen. The value of g depends on which body/planet is attracting the object. If an object hits the surface with a velocity of 30 meters per second, from what height was it dropped in each of the following situations?

33. You are on Earth where $g = 9.81$ m/s^2.
34. You are on the Moon where $g = 1.57$ m/s^2.
35. You are on Mars where $g = 3.72$ m/s^2.