ALGEBRA 2 Sheet # 595
CHAPTER 7 AND 8 REVIEW

NAME: _____
Period: ____

DO THE BELOW REVIEW. SEE WEBSITE FOR ADDITIONAL INSTRUCTIONS.
ALSO STUDY WORKBOOK, AND ANY OTHER SHEETS, AND QUIZZES.
TURN THIS IN.

7.1 **NTH ROOTS AND RATIONAL EXPONENTS**

EXAMPLES You can evaluate nth roots using radicals or rational exponents.

Radical notation: $27^{-2/3} = \frac{1}{27^{2/3}} = \frac{1}{(\sqrt[3]{27})^2} = \frac{1}{3^2} = \frac{1}{9}$

Rational exponent notation: $27^{-2/3} = \frac{1}{27^{2/3}} = \frac{1}{(27^{1/3})^2} = \frac{1}{3^2} = \frac{1}{9}$

Evaluate the expression without using a calculator.

1. $\sqrt[4]{16}$ 2. $(\sqrt[3]{64})^2$ 3. $9^{-5/2}$ 4. $216^{1/3}$ 5. $\sqrt[5]{-32}$

6. Find the real nth root(s) of a if $n = 4$ and $a = 81$.) Find $\sqrt[4]{81}$
7. Find the real nth root(s) of a if $n = 5$ and $a = -1$.) Find $\sqrt[5]{-1}$
8. Find the real nth root(s) of a if $n = 7$ and $a = 0$.) Find $\sqrt[7]{0}$

7.2 PROPERTIES OF RATIONAL EXPONENTS

EXAMPLES You can use properties of rational exponents to simplify expressions.

$$\sqrt[3]{12} \cdot \sqrt[3]{4} = \sqrt[3]{12 \cdot 4} = \sqrt[3]{48} = \sqrt[3]{8 \cdot 6} = \sqrt[3]{8} \cdot \sqrt[3]{6} = 2\sqrt[3]{6}$$

$$\frac{(x^{1/2}y)^2}{x^{1/2}y^{3/4}} = \frac{x^{(1/2 \cdot 2)}y^2}{x^{1/2}y^{3/4}} = \frac{xy^2}{x^{1/2}y^{3/4}} = x^{(1 - 1/2)}y^{(2 - 3/4)} = x^{1/2}y^{5/4}$$

Simplify the expression. Assume all variables are positive.

9. $5^{1/4} \cdot 5^{-9/4}$ **10.** $(100^{1/3})^{3/4}$ **11.** $\sqrt[3]{\frac{16}{1000}}$ **12.** $5\sqrt[3]{17} - 4\sqrt[3]{17}$

13. $(81x)^{1/4}$ **14.** $\frac{(4x)^2}{(4x)^{1/2}}$ **15.** $\sqrt[6]{6x^6y^7z^{10}}$ **16.** $\sqrt[3]{4a^6} + a\sqrt[3]{108a^3}$

7.3 POWER FUNCTIONS AND FUNCTION OPERATIONS

EXAMPLES You can add, subtract, multiply, or divide any two functions f and g. You can also find the composition of any two functions.

Let $f(x) = 2x^{1/2}$ and $g(x) = x^4$

Addition: $f(x) + g(x) = 2x^{1/2} + x^4$

Multiplication: $f(x) \cdot g(x) = 2x^{1/2} \cdot x^4 = 2x^{9/2}$

Composition: $f(g(x)) = f(x^4) = 2(x^4)^{1/2} = 2x^2$

Let $f(x) = 2x - 4$ and $g(x) = x - 2$. Perform the indicated operation.

17. $f(x) + g(x)$ **18.** $f(x) - g(x)$ **19.** $f(x) \cdot g(x)$ **20.** $\frac{f(x)}{g(x)}$ **21.** $f(g(x))$

7.4 INVERSE FUNCTIONS

EXAMPLES You can find the inverse relation of any function. To verify that two functions are inverses of each other, show that $f(f^{-1}(x)) = f^{-1}(f(x)) = x$.

$f(x) = y = 2x - 5$

$x = 2y - 5$

$x + 5 = 2y$

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

$f(g(x)) = f(f^{-1}(x)) = 2\left(\frac{1}{2}x + \frac{5}{2}\right) - 5 = x + 5 - 5 = x$

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

Find the inverse function.

22. $f(x) = -2x + 1$ **23.** $f(x) = \frac{x+2}{3}$ **24.** $f(x) = 5x^3 + 7$

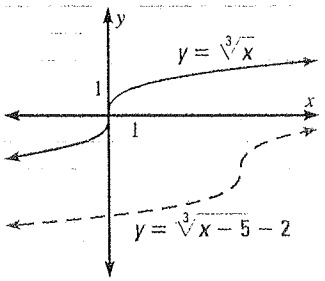
25. Verify that $f(x) = 2x+3$ and $g(x) = \frac{x-3}{2}$ are inverse functions.

7.5

GRAPHING SQUARE ROOT AND CUBE ROOT FUNCTIONS

EXAMPLE You can graph a square root function by starting with the graph of $y = \sqrt{x}$. You can graph a cube root function by starting with the graph of $y = \sqrt[3]{x}$.

To graph $y = \sqrt[3]{x - 5} - 2$, first sketch $y = \sqrt[3]{x}$ (shown in red). Then shift the graph right 5 units and down 2 units. From the graph of $y = \sqrt[3]{x - 5} - 2$, you can see that the domain and range of the function are both all real numbers.



Graph the function.

27. $y = \sqrt{x} + 6$

28. $y = -2(x - 3)^{1/2}$

7.6

SOLVING RADICAL EQUATIONS

EXAMPLES You can solve equations that contain radicals or rational exponents by raising each side of the equation to the same power.

$\sqrt{x - 4} = 6$

$(\sqrt{x - 4})^2 = 6^2$ Square each side.

$x - 4 = 36$

$x = 40$

$4x^{2/3} = 100$

$x^{2/3} = 25$

$(x^{2/3})^{3/2} = 25^{3/2}$ Raise each side to $\frac{3}{2}$ power.

$x = 125$

Solve the equation. Check for extraneous solutions.

30. $\sqrt{2x + 5} = 3$

31. $\sqrt[3]{5x + 3} - \sqrt[3]{4x} = 0$

32. $\sqrt{4x} = x - 8$

CHAPTER 7 REVIEW

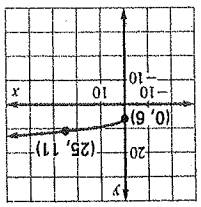
1. 2 3. $\frac{1}{243}$ 5. -2

7. -1 9. $\frac{1}{25}$ 11. $\frac{\sqrt[3]{2}}{5}$ 13. $3x^{1/4}$ 15. $xyz\sqrt[6]{6yz^4}$ 17. $3x - 6$

17. $3x - 6$ 19. $2x^2 - 8x + 8$ 21. $2x - 8$ 23. $3x - 2$

$x \geq 0$ 25. Both compositions equal x.

27.



$x \geq 0$; $y \geq 6$

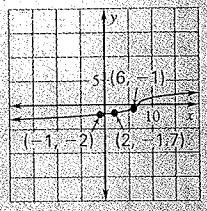
31. -3

MORE

Ch. 7 ANSWERS

2	16
4	6
6	± 3
8	0
10	$10^{1/2} = \sqrt{10}$
12	$\sqrt[3]{17}$
14	$8x^{3/2} = 8\sqrt{x}\,x$
15	$xyz^6\sqrt{6yz^4}$
16	$4a^2\sqrt[3]{4}$
18	$x-2$
20	2
22	$f^{-1}(x) = -\frac{1}{2}x + \frac{1}{2}$
24	$f^{-1}(x) = \sqrt[3]{\frac{x-7}{5}}$
26	→
28	→
30	2. $\sqrt{2-2+5} = \sqrt{9} = 3$. ✓
32	16

26.



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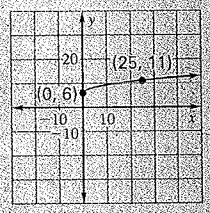

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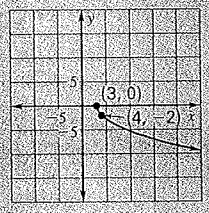

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