

## WARM UP CHECK ANSWERS p. 368

### EXERCISES

Simplify each expression. Use only positive exponents.

- |  |   |   |
|--|---|---|
| 1. $(3a^2)(4a^6)$ $12a^8$                            | 2. $(-4x^2)(-2x^{-2})$ $8$                              | 3. $(4x^3y^5)^2$ $16x^6y^{10}$                          |
| 4. $(2x^{-5}y^4)^3$ $\frac{8y^{12}}{x^{15}}$         | 5. $\frac{8a^5}{2a^2}$ $4a^3$                           | 6. $\frac{6x^7y^5}{3x^{-1}}$ $2x^8y^5$                  |
| 7. $\frac{(4x^2)^0}{2xy^5}$ $\frac{1}{2xy^5}$        | 8. $\left(\frac{3x^2}{2}\right)^2$ $\frac{9x^4}{4}$     | 9. $(-6m^2n^2)(3mn)$ $-18m^3n^3$                        |
| 10. $(3x^4y^5)^{-3}$ $\frac{1}{27x^{12}y^{15}}$      | 11. $\frac{(2r^{-1}s^2t^0)^{-2}}{2rs}$ $\frac{r}{8s^5}$ | 12. $x^5(2x)^3$ $8x^8$                                  |
| 13. $\frac{x^4x^{-2}}{x^{-5}}$ $x^7$                 | 14. $\frac{(12x^2y^6)^2}{8x^4y^7}$ $18y^5$              | 15. $(4p^2q)(p^2q^3)$ $4p^4q^4$                         |
| 16. $\frac{4x^3}{2x}$ $2x^2$                         | 17. $(p^2)^{-2}$ $\frac{1}{p^4}$                        | 18. $\frac{-15x^4}{3x}$ $-5x^3$                         |
| 19. $\frac{r^2s^3t^4}{r^2s^4t^{-4}}$ $\frac{t^8}{s}$ | 20. $\frac{xy^2}{2} \cdot \frac{6x}{y^2}$ $3x^2$        | 21. $(s^2t)^3(st)$ $s^7t^4$                             |
| 22. $(3x^{-3}y^{-2})^{-2}$ $\frac{x^6y^4}{9}$        | 23. $(h^4k^5)^0$ $1$                                    | 24. $\frac{s^2t^3}{r} \cdot \frac{sr^3}{t}$ $r^2s^3t^2$ |

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Simplify:

$$1) \frac{6x^7y^{-5}}{2x^{-2}y} = \frac{3x^9}{y^6} \quad 2) (x^2y^3)^4(xy) \quad \cancel{x^2y^3} \quad x^9y^{13}$$

$$(x^8y^{12})(xy)$$

$$3) \text{ Solve: } \sqrt{3^2} = \frac{\sqrt{9}}{3} = 3 \quad \sqrt{(x)^2} = x \quad \sqrt{x^4} = x^2 \quad \sqrt{3^4} = \sqrt{(3^2)^2} = 3^2 = 9$$

$$4) \text{ Can you find: } \sqrt{x^6} = x^3 \quad \sqrt{x^8} = x^4 \quad \sqrt{x^{10}} = x^5$$

Is there a pattern?

Jan 19-10:43 AM

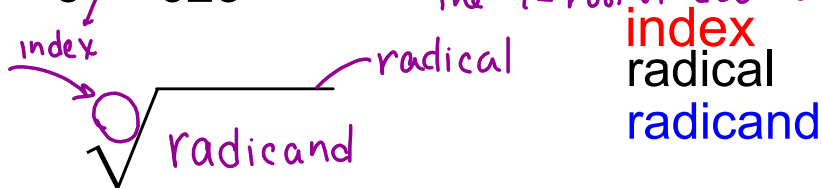
## 7.1 Roots and Radicals

Since  $5^2 = 25$  We say....  
the square root of 25 is 5

$$5^3 = 125$$

$$5^4 = 625$$

the cube root of 125 is 5  
the 4<sup>th</sup> root of 625 is 5



Principal Square Root is always the positive root.

Jan 19-11:07 AM

Find all the real square roots.

$$1) \sqrt{49} = 7 \quad 2) \sqrt{\frac{64}{144}} = \frac{\sqrt{64}}{\sqrt{144}} = \frac{8}{12} = \frac{2}{3} \quad 3) \sqrt{.0049} = .07$$

Find all the real cube roots.

$$4) \sqrt[3]{-27} = -3 \quad 5) \sqrt[3]{0.125} = .5 \quad 6) \sqrt[3]{\frac{-1}{8}} = \frac{\sqrt[3]{-1}}{\sqrt[3]{8}} = \frac{-1}{2}$$

Find each real root.

$$7) -\sqrt{36} = -6 \quad 8) \sqrt[3]{-64} = -4 \quad 9) \sqrt[4]{81} = 3 \quad \sqrt[4]{9^2} = \sqrt[4]{3^2 \cdot 3^2} = \sqrt[4]{3^4} = 3$$

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## Perfect Cubes to Know!!!!

|          |          |           |           |            |
|----------|----------|-----------|-----------|------------|
| <b>1</b> | <b>8</b> | <b>27</b> | <b>64</b> | <b>125</b> |
| $1^3$    | $2^3$    | $3^3$     | $4^3$     | $5^3$      |

Powers of 4 you should know

|       |       |       |       |
|-------|-------|-------|-------|
| $1^4$ | $2^4$ | $3^4$ | $4^4$ |
| 1     | 16    | 81    | 256   |

Know perfect squares 1-15

Jan 6-8:48 AM

## Rules for Roots

$$\sqrt[n]{a \cdot b} = \sqrt[n]{a} \cdot \sqrt[n]{b}$$

$$(\sqrt[n]{a})^m = \sqrt[n]{a^m} = a^{\frac{m}{n}}$$

power

roots



Jan 5-4:28 PM

NO ABSOLUTE VALUE NEEDED.

Simplify each radical.

10)  $\sqrt{36x^2} = \sqrt{36} \cdot \sqrt{x^2} = 6x$  groups of 3

11)  $\sqrt[3]{-64x^6} = \sqrt[3]{-64} \cdot \sqrt[3]{x^6} = -4x^2$  (XXX)(XXX)  
↓ x<sup>1/3</sup> √  
 x<sup>2</sup>

12)  $\sqrt[4]{x^{20}y^4} = \sqrt[4]{x^{20}} \cdot \sqrt[4]{y^4}$  5 groups of 4  
1 group of 4 x<sup>5</sup>y

13)  $\sqrt[5]{-n^{15}} = -n^3$

14)  $\sqrt[2]{144x^8y^{10}z^{12}} = 12x^4y^5z^6$

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HW 7.1  
 p. 372 #9-53 odd  
 (skip 45)

Find all the real square roots of each number.

1. 225      2. 0.0049      3.  $-\frac{1}{121}$       4.  $\frac{64}{169}$

Find all the real cube roots of each number.

5. -64      6. 0.125      7.  $-\frac{27}{216}$       8. 0.000343

Find all the real fourth roots of each number.

9. 16      10. -16      11. 0.0081      12.  $\frac{10,000}{81}$

Find each real-number root.

13.  $\sqrt{36}$       14.  $-\sqrt{36}$       15.  $\sqrt{-36}$       16.  $\sqrt{0.36}$   
 17.  $-\sqrt[3]{64}$       18.  $\sqrt[3]{-64}$       19.  $-\sqrt[4]{81}$       20.  $\sqrt[4]{-81}$

Simplify each radical expression. Use absolute value symbols when needed.

21.  $\sqrt{16x^2}$       22.  $\sqrt{0.25x^6}$       23.  $\sqrt{x^8y^{18}}$       24.  $\sqrt{64b^{48}}$   
 25.  $\sqrt[3]{-64a^3}$       26.  $\sqrt[3]{27y^6}$       27.  $\sqrt[4]{x^8y^{12}}$       28.  $\sqrt[5]{32y^{10}}$



**Geometry** The formula for the volume of a sphere is  $V = \frac{4}{3}\pi r^3$ . Find the radius to the nearest hundredth of a sphere with each volume.

29. 10 in.<sup>3</sup>      30. 20 ft.<sup>3</sup>      31. 0.45 cm.<sup>3</sup>      32. 0.002 mm.<sup>3</sup>

Find the

33.  $x^2 =$

37. Arrar  
to gre

Simplify e

39.  $\sqrt[3]{0.1}$

43.  $\sqrt[4]{16c}$

47.  $\sqrt[5]{-y}$

51.  $\sqrt{(x -$

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