

Algebra Ch. 9

Algebra 9-7: Square Roots & Products

Warm-Up

1. Find the following approximations on your calculator.

a. $\sqrt{9} \cdot \sqrt{4}$

$3 \cdot 2$
 $\textcircled{6}$

b. $\sqrt{2} \cdot \sqrt{18} = 6$

$\sqrt{36} = 6$

c. $\sqrt{6} \cdot \sqrt{6} = 6$

$\sqrt{36} = 6$

d. $\sqrt{36} = 6$

$= 6$

2. Which of the following is equal to $\sqrt{10}$? $\approx 3.1622 \dots$

a. ~~$5\sqrt{2}$~~
 ~~$7.07 \dots$~~

\textcircled{b} $\sqrt{2} \cdot \sqrt{5} = \sqrt{10}$
 3.1622

\textcircled{c} $\sqrt{2} \cdot 5 = \sqrt{10}$
 $3.16 \dots$

d. ~~$2\sqrt{5}$~~
 ~~4.47~~

3. $\sqrt{160} = \sqrt{? \cdot 10}$

$? = 16$

4. $\sqrt{300} = \sqrt{30} \sqrt{10}$

$= \sqrt{10} \sqrt{300}$

$= \sqrt{5} \sqrt{60}$

$= \sqrt{2} \sqrt{150}$

$= \sqrt{3} \sqrt{100} = \sqrt{100} \sqrt{3} = \boxed{10\sqrt{3}}$

List of perfect squares

1	225
4	256
9	289
16	324
25	361
36	400
49	
64	
81	
100	
121	
144	
169	
196	

Algebra 9-7 Square Root and Products



When **simplifying** radicals, look for perfect squares that go into your radicand (the number under the radical).

A perfect square is a number that is whole after you square root it.

List all perfect squares.

see above

Property	Example
Product (<u>mult.</u>) of Square Roots	$\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}$ $\sqrt{3} \cdot \sqrt{2} = \sqrt{6}$

$\sqrt{\text{largest perfect square}} \cdot \sqrt{\text{other factor}}$

$$\sqrt{27} = \sqrt{9} \sqrt{3} = \boxed{3\sqrt{3}}$$

largest perfect square

other factor

Examples

$\sqrt{49} = 7$ Review $\sqrt{m^2} = m$ $\sqrt{y^2} = y$
 $\sqrt{36} = 6$

Simplify numbers 1-6.

1. $\sqrt{50}$ $\sqrt{25}\sqrt{2}$
 $\boxed{5\sqrt{2}}$

2. $\sqrt{50} + \sqrt{18}$
 $\sqrt{25}\sqrt{2} + \sqrt{9}\sqrt{2}$
 $5\sqrt{2} + 3\sqrt{2}$
 $8\sqrt{2}$

3. $\sqrt{8m} \cdot \sqrt{2n} = \sqrt{16mn}$
 $\sqrt{16}\sqrt{m}\sqrt{n}$
 $\boxed{4\sqrt{mn}}$

4. $\sqrt{25x^2y^2}$
 $\sqrt{25}\sqrt{x^2}\sqrt{y^2}$
 $\boxed{5xy}$

5. $\frac{6 + \sqrt{28}}{2}$
 $\frac{6 + \sqrt{4}\sqrt{7}}{2}$
 $\frac{6 + 2\sqrt{7}}{2}$

$\frac{6}{2} + \frac{2\sqrt{7}}{2}$
 $\boxed{3 + \sqrt{7}}$

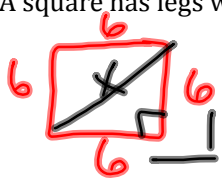
6. $\sqrt{12a} \cdot \sqrt{3b^2}$
 $\sqrt{36ab^2}$
 $\sqrt{36}\sqrt{a}\sqrt{b^2}$
 $6\sqrt{a}b$
 $\boxed{6b\sqrt{a}}$

7. Solve for y. $(2y)^2 = 432$

$$\sqrt{(2y)^2} = \sqrt{432} \quad \left| \quad y = \frac{\pm \sqrt{432}}{2} = \frac{\pm \sqrt{144 \cdot 3}}{2}$$

$$\frac{2y}{2} = \frac{\pm \sqrt{432}}{2} \quad \left| \quad \frac{\pm 12\sqrt{3}}{2}$$

8. A square has legs with lengths of 6 inches each. Find the **exact** length of the diagonal.



$$\begin{cases} a^2 + b^2 = c^2 \\ 6^2 + 6^2 = x^2 \\ 36 + 36 = x^2 \end{cases} \quad \left| \quad \sqrt{72} = x^2 \right.$$

$$\pm \sqrt{72} = \pm \sqrt{72} = \pm \sqrt{36 \cdot 2}$$

$$= \boxed{\pm 6\sqrt{2}}$$

9. One solution to a quadratic equation is $\frac{4 + \sqrt{18}}{2}$. Simplify the solution.

$$\frac{4 + \sqrt{18}}{2} = \frac{4 + \sqrt{9 \cdot 2}}{2} = \boxed{\frac{4 + 3\sqrt{2}}{2}}$$

Assignment: 9-7 #'s 2-4, 6-8, 11-14, 16-26 Even