

Bellwork

1. What is a composite number?

A number that has more factors than 1 and itself.

EX. 6 is a composite number since 1, 2, 3, and 6 are its factors.

2. What is a prime number?

A number that has the factors 1 and itself only.

EX. 47 is a prime number since only 1 and 47 are its factors.

3. What is a perfect square?

Any number that when you take the square root will result in an integer value.

EX. 100 is a perfect square because $\sqrt{100} = 10$

4. What does it mean to take the square root of a given number?

Finding the number times itself that = the number under the radical.

Simplifying Square Roots

What is given:

A radical expression, specifically a square root expression, that could potentially be reduced and simplified.

What the answer will look like:

$$a\sqrt{b}$$

Where a = any real number

b = a number with no perfect square factor remaining in it

Multiplication Property of Radicals

If we have a composite number c , with factors a and b ,

$$\text{Then } \sqrt{c} = \sqrt{a \cdot b} = \sqrt{a} \cdot \sqrt{b}$$

NOTE: This property is the key to simplifying radical expressions!

Decimal solutions **WILL NOT** be accepted!

Simplifying Radical Expressions

Procedure:

1. Factor the number that is under the radical. (Create the U)
2. Identify the set of factors that have the largest perfect square.
3. Apply the Multiplication Property of radicals to this set of factors.
(Placing the perfect square in front.)
4. Take the square root of the perfect square.
5. Multiply that number by any number that is already outside of the radical to start.

Examples

Simplify each of the given Square Roots:

$1. \sqrt{320}$ $= \sqrt{64 \cdot 5}$ $= \sqrt{64} \cdot \sqrt{5}$ $= \boxed{8\sqrt{5}}$	<p><u>Factor out 320</u> 1 and 320 2 and 160 4 and 80 Use: 5 and 64 8 and 40 10 and 32 16 and 20</p>	$2. 9\sqrt{147}$ $= 9 \cdot \sqrt{49 \cdot 3}$ $= 9 \cdot \sqrt{49} \cdot \sqrt{3}$ $= 9 \cdot 7 \cdot \sqrt{3}$ $= \boxed{63\sqrt{3}}$	<p><u>Factor out 147</u> 1 and 147 Use: 3 and 49 7 and 21</p>
$3. -\sqrt{75}$ $= -1 \cdot \sqrt{25 \cdot 3}$ $= -1 \cdot \sqrt{25} \cdot \sqrt{3}$ $= -1 \cdot 5 \cdot \sqrt{3}$ $= \boxed{-5\sqrt{3}}$	<p><u>Factor out 75</u> 1 and 75 Use: 3 and 25 5 and 15</p>	$4. -6\sqrt{20}$ $= -6 \cdot \sqrt{4 \cdot 5}$ $= -6 \cdot \sqrt{4} \cdot \sqrt{5}$ $= -6 \cdot 2 \cdot \sqrt{5}$ $= \boxed{-12\sqrt{5}}$	<p><u>Factor out 20</u> 1 and 20 2 and 10 Use: 4 and 5</p>