Accuplacer Study Modules

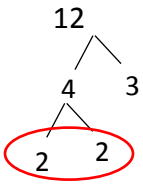
TOPIC: **Simplifying Radical Expressions**

Khan Academy Link: https://www.khanacademy.org/math/algebra-home/pre-algebra/exponents-radicals/radical-radicals/v/understanding-square-roots

Sample Problem #1: Simplify $\sqrt{12x^3}$

Note 1: To simplify a square root expression you need to identify all the perfect squares in the problem and then take the square root of each. Anything that is not a perfect square remains in the radical.

Note 2: This problem can be handled in two different ways. The first method requires more mental math while the second method is more visual.

Method 1 – Knowing Perfect Squares		**Method 2 – Using a Factor Tree**	
Simplify $\sqrt{12x^3}$		Simplify $\sqrt{12x^3}$	
$\sqrt{4} \cdot \sqrt{3} \cdot \sqrt{x^2} \cdot \sqrt{x}$	Rewrite the expression using the largest perfect squares for both the coefficient and the variables.		Use a factor tree to split the coefficient apart until you have all prime factors. Circle all pairs of numbers.
$2 \cdot \sqrt{3} \cdot x \cdot \sqrt{x}$	Evaluate the perfect squares.	$2 \cdot \sqrt{3}$	Having two of a number represents a perfect square. Placing ONE of this number outside the radical represents taking a square root. Any number that isn't paired up or split up remains inside the radical.
$2 \cdot x \cdot \sqrt{3} \cdot \sqrt{x}$	Rearrange the values so that the perfect squares are in front and anything in a radical is at the end.	$x^3 = x \cdot x \cdot x$ $x \cdot \sqrt{x}$	You can simplify the x's using the same method as you did above.
$2x\sqrt{3x}$	Multiply the terms.	$2x\sqrt{3x}$	In the last step you just put it all together!

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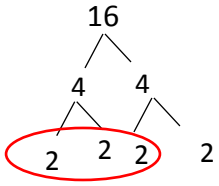
Sample Problem #1: Simplify $\sqrt[3]{16x^5y^2}$

Note: When dealing with any root other than a square root, the method is the same but in this problem you need to look for perfect *cubes* if using Method 1, and if you are using Method 2 you must circle groups of 3.

Khan Academy link for this type of problem: https://www.khanacademy.org/math/algebra-home/pre-algebra/exponents-radicals/cube-root-tutorial/v/finding-cube-roots

<table>
<tr><th colspan="2">Method 1 – Knowing Perfect Squares</th><th colspan="2">Method 2 – Using a Factor Tree</th></tr>
<tr><td colspan="2">Simplify $\sqrt[3]{16x^7y^2}$</td><td colspan="2">Simplify $\sqrt[3]{16x^7y^2}$</td></tr>
<tr><td>$\sqrt[3]{8}\cdot\sqrt[3]{2}\cdot\sqrt[3]{x^6}\cdot\sqrt[3]{x}\cdot\sqrt[3]{y^2}$</td><td>Rewrite the expression using the largest perfect cubes for both the coefficient and the variables.</td><td> 
</td><td>Use a factor tree to split the coefficient apart until you have all prime factors. Circle all sets of three numbers.</td></tr>
<tr><td>$2\cdot\sqrt[3]{2}\cdot x^2\cdot\sqrt[3]{x}\cdot\sqrt[3]{y^2}$</td><td>Evaluate the perfect cubes.</td><td>$2\cdot\sqrt[3]{2}$</td><td>Having three of a number represents a perfect cube. Placing ONE of this number outside the radical represents taking a cube root. Any number that isn't grouped up or split up remains inside the radical.</td></tr>
<tr><td>$2\cdot x^2\cdot\sqrt[3]{2}\cdot\sqrt[3]{x}\cdot\sqrt[3]{y^2}$</td><td>Rearrange the values so that the perfect squares are in front and anything in a radical is at the end.</td><td>$x^7 = x\cdot x\cdot x\cdot x\cdot x\cdot x\cdot x$
$y^2 = y\cdot y$
$x\cdot x\cdot\sqrt[3]{xy^2}$</td><td>You can simplify the variables using the same method as you did above.</td></tr>
<tr><td>$2x^2\sqrt[3]{2xy^2}$</td><td>Multiply the terms.</td><td>$2x^2\sqrt[3]{2xy^2}$</td><td>In the last step you just put it all together!</td></tr>
</table>

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Instructions: Simplify each expression.

1. $\sqrt{20a^5b^2}$	2. $\sqrt{50x^3y}$
3. $\sqrt[3]{24x^6y^3}$	4. $\sqrt[4]{32a^6b^5}$