Objective: Simplify	/ Radical	Expressions	with	variable	radicands
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Concept

Properties of n th Roots						
For $a>0$ and $b>0$						
Words	Numbers	Algebra				
Product Property of Roots : The <i>n</i> th root of a product is equal to the product of the <i>n</i> th roots.	$\sqrt[3]{16} = \sqrt[3]{8} \cdot \sqrt[3]{2} = 2\sqrt[3]{2}$	$\sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b}$				
Quotient Property of Roots: The n th root of a quotient is equal to the quotient of the n th roots.	$\sqrt{\frac{16}{25}} = \frac{\sqrt{16}}{\sqrt{25}} = \frac{4}{5}$	$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$				
Inverse Property of Powers of Roots	$\sqrt[3]{(2)^3} = 2$ and $\sqrt{(6)^2} = 6$	$\sqrt[n]{(b)^n} = b$				

$$= 4\sqrt{6^5}$$

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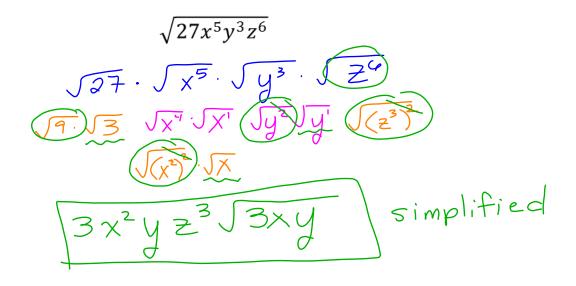
$$= 6\sqrt{4}$$

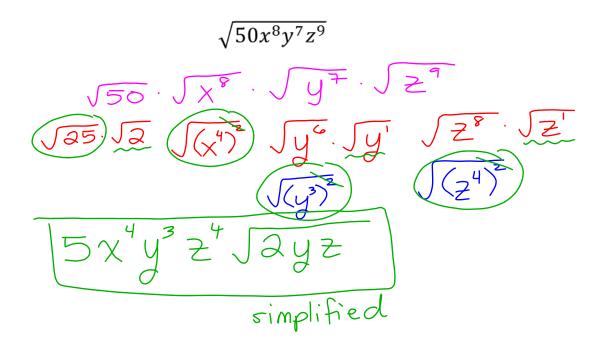
$$= 6\sqrt{4}$$
Simplified

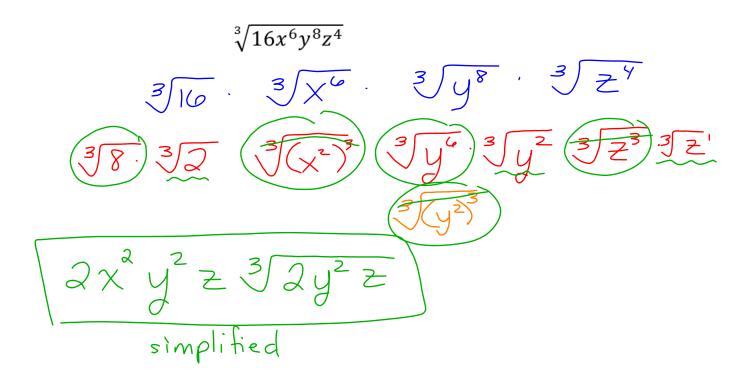
$$= \sqrt[8]{x^{11}}$$

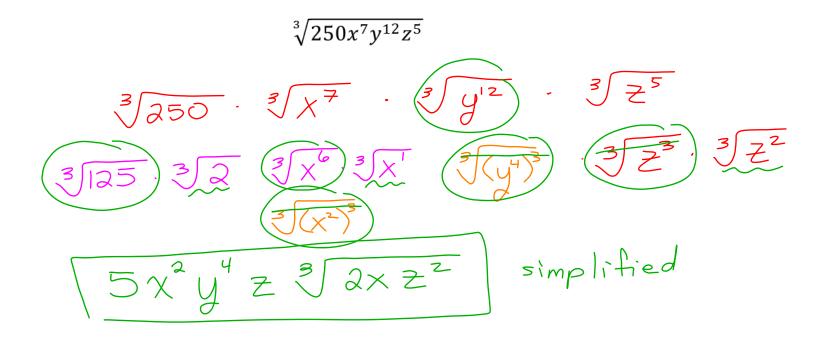
$$= \sqrt[8]{x} \cdot \sqrt[8]{x^3}$$

$$= \sqrt[8]{x^3}$$
simplified









Closure

How is simplifying $\sqrt{24}$ different from simplifying $\sqrt[3]{24}$?

To simplify $\sqrt{24}$ you would use the factors of $\sqrt{4} \cdot \sqrt{6}$ because 4 is a perfect square.

To simplify $\sqrt[3]{24}$ you would use the factors of $\sqrt[3]{8} \cdot \sqrt[3]{3}$ because 8 is a perfect cube.