Period:



I can use properties of radicals to simplify radical expressions.

An expression with radicals is in simplest form if the following are true:

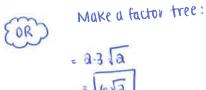
- No perfect square factors other than 1 are in the radicand.
- No fractions are in the radicand.
- No radicals appear in the denominator of a fraction.

We can use properties of radicals to help us simplify:

- o **Product Property:** $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$, when a and b are positive numbers
- O Quotient Property: $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$, when a and b are positive numbers

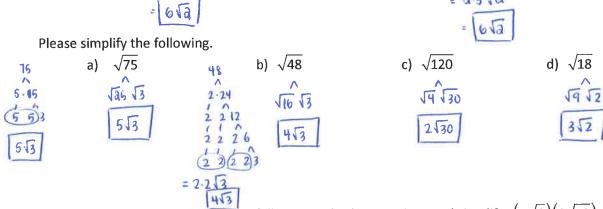
Example 1: Write $\sqrt{72}$ in simplest radical form.

Solution: Find biggest perfect square that goes into 73:



Circle pairs -pull pair OUT & multiply - Anything not circled Stays In

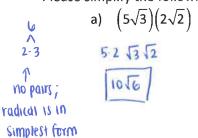
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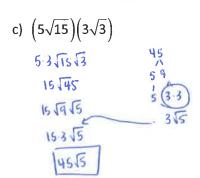


Example 2: Find the product of the following radical expressions and simplify; $(4\sqrt{6})(3\sqrt{10})$

Multiply the numbers outside the radical, multiply the numbers under the radical:

Please simplify the following.





(5)2 undo each other

Example 3: Square the following radical expression; $(3\sqrt{5})^2$

Solution: "Distribute" the power of 2 to each term

$$(3\sqrt{5})^2 = 3^2(\sqrt{5})^2$$

= 9-5 = 45

Please simplify the following.

a)
$$\left(\sqrt{7}\right)^2$$

b)
$$\left(2\sqrt{3}\right)^2$$

c)
$$\left(5\sqrt{2}\right)^{\frac{1}{2}}$$

Example 4: Please use the Quotient Property to simplify this example; $\frac{\sqrt{18}}{\sqrt{2}}$

Solution:

Rewrite as a single quotient under radical if possible, then reduce and simplify:

Please simplify the following.



a)
$$\sqrt{\frac{27}{16}}$$
 Cother way b) $\frac{2\sqrt{6}}{\sqrt{2}}$

b)
$$\frac{2\sqrt{6}}{\sqrt{2}}$$

c)
$$\frac{\sqrt{21}}{\sqrt{3}}$$

d)
$$\frac{\sqrt{24}}{\sqrt{6}}$$

Example 5: Rationalize the denominator for $\frac{8}{\sqrt{6}}$

Solution:

"Pop and drop" -> Pop the whole square root to the top and drop the sq. root symbol from the bottom

$$\frac{8}{\sqrt{6}}$$
 = $\frac{8\sqrt{6}}{6}$ $\frac{\sqrt{4\sqrt{6}}}{3}$

Please rationalize the following denominators and simplify.

a)
$$\frac{5}{\sqrt{2}}$$

b)
$$\frac{9}{\sqrt{3}}$$

c)
$$\frac{2\sqrt{5}}{\sqrt{7}}$$
 = $\frac{2\sqrt{5}\sqrt{7}}{7}$