



- 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:

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

Please simplify the following.

a) $\sqrt{75}$

b) $\sqrt{48}$

c) $\sqrt{120}$

d) $\sqrt{18}$

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.

a) $(5\sqrt{3})(2\sqrt{2})$

b) $(3\sqrt{6})(4\sqrt{2})$

c) $(5\sqrt{15})(3\sqrt{3})$

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

Solution:

Please simplify the following.

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

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

c) $(5\sqrt{2})^2$

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) $\sqrt{\frac{27}{16}}$

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:

Please rationalize the following denominators and simplify.

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

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

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