

Multiplying Radical Expressions

Simplify.

$$\begin{aligned} 1) \quad & \sqrt{5} \cdot \sqrt{17} \cdot \sqrt{5} \\ & \sqrt{5 \cdot 17 \cdot 5} \\ & \sqrt{(5)^2 \cdot 17} \\ & 5\sqrt{17} \end{aligned}$$

Write all radicands under one square root.

Since there are a pair of 5's, you can write it as $(5)^2$

The 5 comes out.

$$\begin{aligned} 2) \quad & \sqrt{21} \cdot \sqrt{24} \\ & \sqrt{21 \cdot 24} \\ & \sqrt{7 \cdot 3 \cdot 4 \cdot 6} \\ & \sqrt{7 \cdot 3 \cdot (2)^2 \cdot 2 \cdot 3} \\ & 2\sqrt{7 \cdot (3)^2 \cdot 2} \\ & 3 \cdot 2\sqrt{7 \cdot 2} \\ & \boxed{6\sqrt{14}} \end{aligned}$$

Write all radicands under one square root.

Rewrite 21 and 24 into a set of factors.

Rewrite 4 as $(2)^2$ and 6 as $2 \cdot 3$

The 2 comes out and the pairs of 3's are rewritten as $(3)^2$.

The 3 comes out and multiplies the that is already out there.

Since the 7 and 2 under the square root can not simplify any further, multiply them together.

$$\begin{aligned} 3) \quad & 5\sqrt{35} \cdot 10\sqrt{14} \\ & 5 \cdot 10\sqrt{35 \cdot 14} \\ & 50\sqrt{5 \cdot 7 \cdot 2 \cdot 7} \\ & 50\sqrt{5 \cdot (7)^2 \cdot 2} \\ & 7 \cdot 50\sqrt{10} \\ & \boxed{350\sqrt{10}} \end{aligned}$$

The numbers outside multiply and the numbers under the square roots multiply.

Simplify the numbers outside. Rewrite the numbers inside as a set of factors.

A pair of 7's can be rewritten as $(7)^2$.

The 7 comes out. The 5 and 2 multiply since they can not simplify any further.

Simplify.