6.2 Multiplying and Dividing Radical Expressions

You can simplify the product of radicals that have the same index

\[ \sqrt{2} \times \sqrt{3} = \sqrt{2 \times 3} = \sqrt{6} \]
\[ \frac{\sqrt{4}}{\sqrt{5}} = \frac{2}{\sqrt{5}} \]
\[ \frac{\sqrt{4} \times \sqrt{5}}{\sqrt{3} \times \sqrt{5}} = \frac{2 \times \sqrt{5}}{\sqrt{3} \times \sqrt{5}} = \frac{2}{\sqrt{3}} \]

You can multiply and divide under the radical!!

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Combining Radical Expressions: Products

If \( \sqrt[n]{a} \) and \( \sqrt[m]{b} \) are real numbers, then \( \sqrt[n]{a} \times \sqrt[m]{b} \) must be the same to multiply

\[ \sqrt[n]{a} \times \sqrt[m]{b} = \sqrt[n]{ab} \]

1) \( \frac{\sqrt{4}}{\sqrt{2}} = \)

2) \( \frac{\sqrt{7}}{\sqrt{7}} = \)

3) \( \frac{\sqrt{5}}{\sqrt{2}} = \)

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Write all radicals in simplest form.

1) \( \sqrt{24} = \)

2) \( \frac{\sqrt{24}}{3} = \)

3) \( \frac{\sqrt{54}}{x^3} = \)

4) \( \frac{\sqrt{128}}{x^2} = \)

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Simplifying a Product

What is the simplest form of:

1) \( \sqrt{72x^3y^2} \times \sqrt{10xy^3} = \)

2) \( \sqrt{45x^5y^3} \times \sqrt{35xy^4} = \)

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Combining Radical Expressions: Quotients

If \( \sqrt[n]{a} \) and \( \sqrt[m]{b} \) are real numbers, and \( b \neq 0 \), then:

\[ \frac{\sqrt[n]{a}}{\sqrt[m]{b}} = \sqrt[n]{\frac{a}{b}} \]

1) \( \frac{\sqrt{18x^5}}{\sqrt{2x^3}} = \)

2) \( \frac{\sqrt{162y^5}}{\sqrt{3y^2}} = \)

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Combining Radical Expressions: Quotients

If \( \sqrt[n]{a} \) and \( \sqrt[m]{b} \) are real numbers, and \( b \neq 0 \), then:

\[ \frac{\sqrt[n]{a}}{\sqrt[m]{b}} = \sqrt[n]{\frac{a}{b}} \]

3) \( \frac{\sqrt{50x^6}}{\sqrt{2x^4}} = \)

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Another way to simplify the radical expression is to Rationalize the Denominator.

\[ \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \]

How???

\[ \frac{1}{\sqrt[3]{2}} \]

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Simplify by: Rationalizing the Denominator.

\[ \frac{\sqrt[3]{7x}}{\sqrt[3]{5y^2}} \]

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Simplify by: Rationalizing the Denominator.

\[ \frac{\sqrt[3]{5x^2}}{12y^2z} = \]

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53) 6 cm²

58) 4 3/5

64) \( \frac{5\sqrt{14x}}{21x} \)

66) \( \frac{2\sqrt{25x}}{x} \)

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53) 6 cm²

58) 4 3/5

64) \( \frac{5\sqrt{14x}}{21x} \)

66) \( \frac{2\sqrt{25x}}{x} \)

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37) about 79.01 ft.

about 44.44 ft.

38) 0.5

40) 0.2

42) 2|c|

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