1-5 Adding, Subtracting, and Multiplying Radical expressions

Product Property of Radicals

If $\sqrt[n]{a}$ and $\sqrt[n]{b}$ are real numbers, and $n \geq 2$ is an integer, then

$$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{ab}$$

3 6 18

$\sqrt{3} \cdot \sqrt{9} =$

We can prove this using rational exponents.

Note: $\sqrt{a+b} \neq \sqrt{a} + \sqrt{b}$

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Simplify

$\sqrt{5} \cdot \sqrt{3} = \sqrt{15}$

3 5

$\sqrt[3]{2} \cdot \sqrt[3]{13} = \sqrt[3]{26}$

$\sqrt{3} + \sqrt{5}$

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Multiply

$$\sqrt[5]{6c} \cdot \sqrt[5]{7c^2} = \sqrt[5]{42c^3}$$

$$c^1 \cdot c^2 = c^3$$

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You try

$$\sqrt{11} \cdot \sqrt{7} = \sqrt{77}$$

$$\sqrt[4]{6} \cdot \sqrt[4]{7} = \sqrt[4]{42}$$

$$\sqrt[7]{5p^1} \cdot \sqrt[7]{4p^3}$$

$$\sqrt[7]{20p^4}$$

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Multiply and Simplify Assuming all variables are greater then or equal to zero.

$\sqrt{3}\cdot\sqrt{15}$

$= \sqrt{45}$ $\boxed{3\sqrt{5}}$

$3\sqrt[3]{4x}\cdot\sqrt[3]{2x^4}$

$2\cdot 3\sqrt[3]{8x^5}$ $\boxed{6x\sqrt[3]{x^2}}$

$\sqrt[4]{27a^2b^5}\cdot\sqrt[4]{6a^3b^6}$

$\sqrt[4]{162a^5b^{11}}$ $\boxed{3ab^2\sqrt[4]{2ab^3}}$

27 6

9 3 3 2

3 3

aaaaa

bbbb bbbb bbb

Feb 23-7:10 AM

You try

$\sqrt{6}\cdot\sqrt{8} = \sqrt{48}$ $\boxed{4\sqrt{3}}$

6 8

2 3 4 2

2 2

$4\sqrt[3]{8a^2b^5}\cdot\sqrt[3]{6a^2b^4}$

$4\sqrt[3]{48a^4b^9}$

8 6

4 2 2 3

2 2

$4\cdot 2ab^3\sqrt[3]{6a}$

$= \boxed{8ab^3\sqrt[3]{6a}}$

Feb 23-7:12 AM

Quotient Property of Radicals

If $\sqrt[n]{a}$ and $\sqrt[n]{b}$ are real numbers, $b \neq 0$, $n \geq 2$ is an integer, then

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

We can prove this using rational exponents.

Feb 23-7:14 AM

Simplify Assuming all variables are greater then or equal to zero.

$$\sqrt{\frac{18}{25}} \qquad \sqrt[3]{\frac{6z^3}{125}} \qquad \sqrt[4]{\frac{10a^2}{81b^4}}$$

Feb 23-7:20 AM

You try

$$\sqrt{\frac{13}{49}} \qquad \sqrt[3]{\frac{27p^3}{8}} \qquad \sqrt[4]{\frac{3q^4}{16}}$$

Feb 23-8:24 AM

Simplify Assuming all variables are greater then or equal to zero.

$$\frac{\sqrt{24a^3}}{\sqrt{6a}} \qquad \frac{-2\sqrt[3]{54a}}{\sqrt[3]{2a^4}}$$

$$\frac{\sqrt[3]{-375x^2y}}{\sqrt[3]{3x^{-1}y^7}}$$

Feb 23-8:25 AM

You try

$$\frac{\sqrt{12a^5}}{\sqrt{3a}}$$

$$\frac{\sqrt[3]{-24x^2}}{\sqrt[3]{3x^{-1}}}$$

$$\frac{\sqrt[3]{250a^5b^{-2}}}{\sqrt[3]{2ab}}$$

Feb 23-8:27 AM

7.5 Rationalizing Radical Expressions

Rationalize the denominator of each expression:
Assume all variables are positive.

$$\frac{1}{\sqrt{7}}$$

$$\frac{\sqrt{5}}{\sqrt{12}}$$

$$\frac{2}{3\sqrt{2x}}$$

Mar 2-9:50 AM

You Try

$$\frac{1}{\sqrt{3}}$$

$$\frac{\sqrt{5}}{\sqrt{8}}$$

$$\frac{5}{\sqrt{10x}}$$

Mar 2-9:56 AM

Add the following

$$5\sqrt{2x}+9\sqrt{2x}$$

$$3\sqrt[3]{10}+7\sqrt[3]{10}-5\sqrt[3]{10}$$

Feb 24-9:59 AM

You Try

$$9\sqrt{13y}+4\sqrt{13y}$$

$$\sqrt[4]{5}+9\sqrt[4]{5}-3\sqrt[4]{5}$$

Feb 24-10:03 AM

Add or subtract as indicated. Assume all variables are real numbers greater then or equal to zero

$$3\sqrt{12}+7\sqrt{3}$$

Feb 24-10:04 AM

Add or subtract as indicated. Assume all variables are real numbers greater then or equal to zero

$$3x\sqrt{20x}-7\sqrt{5x^3}$$

$$3\sqrt{5}+7\sqrt{13}$$

Feb 24-10:05 AM

You try

$$7\sqrt{10}-6\sqrt{3}$$

$$4\sqrt{14}-3\sqrt{8}$$

$$-5x\sqrt[3]{54x}+7\sqrt[3]{2x^4}$$

Feb 24-10:06 AM

Add or subtract as indicated. Assume all variables are real numbers greater then or equal to zero

$$\sqrt[3]{16x^4} - 7x\sqrt[3]{-2x} + \sqrt[3]{54x}$$

Feb 24-10:06 AM

You try

$$\sqrt[3]{8z^4} - 2z\sqrt[3]{-27z} + \sqrt[3]{125z}$$

Feb 24-10:10 AM

Multiply and simplify

$$\sqrt{5}\left(3-4\sqrt{5}\right)$$

$$\sqrt[3]{2}\left(3+\sqrt[3]{4}\right)$$

Feb 24-10:17 AM

You try

$$\sqrt{6}\left(3-5\sqrt{6}\right)$$

$$\sqrt[3]{12}\left(3-\sqrt[3]{2}\right)$$

Feb 24-10:20 AM