

Adding, Subtracting, and Dividing Radical Expressions

Adding and Subtracting Radical Expressions

$$\text{ex: } 3\sqrt{5} + 8\sqrt{5} =$$

Ex 1.

Simplify by combining like radical terms, if possible:

$$9\sqrt[3]{7} - 6x\sqrt[3]{7} + 12\sqrt[3]{7} =$$

$$7\sqrt[4]{3x} - 2\sqrt[4]{3x} + 2\sqrt[3]{3x} =$$

$$3\sqrt{20} + 5\sqrt{45} =$$

$$8\sqrt{5} - 6\sqrt{2} =$$

$$5\sqrt[3]{x^2y} + \sqrt[3]{27x^5y^4} =$$

Dividing Radical Expressions

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}} \quad (\text{for } b \neq 0)$$

Why?

Ex 2.

Simplify (assume any variables are positive):

$$\sqrt[3]{\frac{24}{125}} =$$

$$\sqrt{\frac{9x^3}{y^{10}}} =$$

Ex 3.

Simplify, if possible. Assume any variables are positive.

$$\frac{\sqrt{40x^5}}{\sqrt{2x}} =$$

$$\frac{\sqrt{50xy}}{2\sqrt{2}} =$$

$$\frac{\sqrt[3]{48x^7y}}{\sqrt[3]{6xy^{-2}}} =$$

Practice

1. Simplify by combining like radical terms, if possible:

a) $8\sqrt{17} - 5\sqrt{19} - 6\sqrt{17} + 4\sqrt{19}$

b) $6\sqrt{7} - \sqrt[3]{x} + 2\sqrt{7} + 5\sqrt[3]{x}$

2. Simplify. Assume any variables are positive.

a) $5\sqrt{12} + \sqrt{75}$

b) $8\sqrt{45x^3} + \sqrt{5x}$

c) $\sqrt[3]{81x^4} - \sqrt[3]{24x}$

d) $\sqrt{\frac{19}{25}}$

e) $\sqrt{\frac{50x^3}{81y^8}}$

f) $\sqrt[4]{\frac{13y^7}{x^{12}}}$

3. Simplify, if possible. Assume any variables are positive.

a) $\frac{\sqrt{200}}{\sqrt{10}}$

b) $\frac{\sqrt{x^7 y^6}}{\sqrt{x^3 y^2}}$

c) $\sqrt{\frac{54a^7 b^{11}}{3a^{-4} b^{-2}}}$

d) $\frac{\sqrt[3]{250x^5 y^3}}{\sqrt[3]{2x^3}}$

e) $\frac{\sqrt[3]{x^2+7x+12}}{\sqrt[3]{x+3}}$

Q: When can you add two to eleven and get one as the correct answer?