

M10 - 4.5 - Fraction Exponents/Radical/Root Form Notes

Change from exponential form to radical/root form. Simplify if necessary.

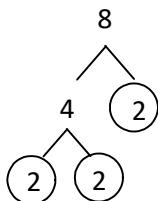
$$5^{\frac{3}{4}} = \sqrt[4]{5^3}$$

Check on Calculator
 $5^{\frac{3}{4}} = 3.34 = \sqrt[4]{5^3}$ ✓

$$x^{\frac{2}{3}} = \sqrt[3]{x^2}$$

$$8^{\frac{1}{3}} = \sqrt[3]{8^1} = 2$$

Check on Calculator
 $8^{\frac{1}{3}} = 2 = \sqrt[3]{8^1}$ ✓



$$\frac{\sqrt[3]{8}}{2} = \frac{\sqrt[3]{2 \times 2 \times 2}}{2}$$

$$\sqrt[3]{8} = 2$$

$$x^{\frac{m}{n}} = \sqrt[n]{x^m}$$

$8^{\frac{2}{3}} = \sqrt[3]{8^2}$ $2^2 = 4$ Change to Radical/Root Form Cube Root 1st Square 2nd $\sqrt[3]{8} = 2$ Check on Calculator $8^{\frac{2}{3}} = 4$ ✓	OR	$8^{\frac{2}{3}} = \sqrt[3]{8^2}$ $8^2 = 64$ $\sqrt[3]{64} = 4$ Change to Radical/Root Form Square 1st Cube Root 2nd Easier to Root 1st $\sqrt[3]{64} = 4$
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$$\frac{(-27)^{\frac{4}{3}}}{\sqrt[3]{(-27)^4}} = \frac{(-3)^4}{81}$$

Change to Radical/Root Form
 Cube Root 1st
 Square 2nd
 $\sqrt[3]{-27} = -3$

Check on Calculator
 $(-27)^{\frac{4}{3}} = 81$ ✓

Simplify by exponents laws. Answer in root form.

$$(2^{\frac{1}{2}})(2^{\frac{1}{4}}) = 2^{\frac{3}{4}} = \sqrt[4]{2^3} = \sqrt[4]{8}$$

Add Exponents
 $\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$

Check on Calculator

$(2^{\frac{1}{2}})(2^{\frac{1}{4}}) = 1.68 = \sqrt[4]{8}$ ✓

$(3)^{\frac{3}{2}} \div (3)^{\frac{3}{5}} = 2.69 = \sqrt[10]{3^9}$ ✓

$(\sqrt[2]{2^3})^{\frac{1}{4}} = 1.30 = \sqrt[8]{2^3}$ ✓

$$(3)^{\frac{3}{2}} \div (3)^{\frac{3}{5}} = (3)^{\frac{9}{10}} = \sqrt[10]{3^9}$$

Subtract Exponents
 $\frac{3}{2} - \frac{3}{5} = \frac{9}{10}$

$$(\sqrt[2]{2^3})^{\frac{1}{4}} =$$

$$\frac{(2^{\frac{3}{2}})^{\frac{1}{4}}}{2^{\frac{3}{8}}} = \frac{2^{\frac{3}{8}}}{2^{\frac{3}{8}}}$$

Multiply Exponents

Check Answer
 $(\sqrt[2]{2^3})^{\frac{1}{4}} = 1.30 = \sqrt[8]{2^3}$

$$\sqrt[8]{2^3} = \sqrt[8]{8}$$

$$\frac{(-27x^9y^{-3})^{\frac{4}{3}}}{\sqrt[3]{(-27)^4x^{12}y^{-4}}}$$

$$9 \times \frac{4}{3} = 12$$

$$-3 \times \frac{4}{3} = -4$$

$$\sqrt[3]{(-27)^4} = (-3)^4 = 81$$

$$\frac{(-27a^3)^{\frac{1}{3}}}{(-27)^{\frac{1}{3}}a^{3 \times \frac{1}{3}}}$$

$$\frac{-3a}{8^{\frac{1}{3}}}$$

$$\frac{(5x^3)^{\frac{1}{2}}}{\sqrt[2]{5^1} \sqrt[2]{x^3}} = \sqrt{5x^3}$$

$$\frac{81x^{12}}{y^4}$$

$$\frac{-3a}{2}$$

$$x\sqrt{5x}$$