

RATIONAL EXPONENTS

↑ Fraction

Rule #6 $x^{2/3} = \sqrt[3]{x^2}$

$$a^{m/n} = \sqrt[n]{a^m}$$

$$\sqrt[6]{f^2 g^5} \cdot \sqrt[6]{f^3 g}$$

$$= \sqrt[6]{f^2 g^5} \cdot \sqrt[6]{f^3 g^1}$$

$$= \sqrt[6]{f^{2+3} g^{5+1}}$$

$$f^1 g^1 \sqrt[6]{f^5 g^2}$$

$$\sqrt[3]{a^3 b} \cdot \sqrt[3]{a b^2}$$

$$a^{3/3} b^{1/3} \cdot a^{1/3} b^{2/3}$$

$$\sqrt[12]{a^9 b^3} \cdot \sqrt[12]{a^4 b^8}$$

$$= \sqrt[12]{a^{9+4} b^{3+8}}$$

$$a^1 \sqrt[12]{a^1 b^{11}}$$

EVALUATE. ← Answer is a #.

$$8^{1/3} = \sqrt[3]{81} = 2$$

$$81^{1/2} = \sqrt{81} = 9$$

$$16^{-3/4} = \frac{1}{\sqrt[4]{16^3}} = \frac{1}{2^3} = \frac{1}{8}$$

$$\left(\frac{x^2}{y^3}\right)^{-4} = \left(\frac{y^3}{x^2}\right)^4$$

$$32^{-1/5} = \frac{1}{\sqrt[5]{32}} = \frac{1}{2}$$

$$25^{3/2} = \sqrt{25^3} = 5^3 = 125$$


$$\left(\frac{49}{16}\right)^{-3/2} = \left(\frac{16}{49}\right)^{3/2}$$

$$= \sqrt{\left(\frac{16}{49}\right)^3}$$

$$= \left(\frac{4}{7}\right)^3 = \frac{64}{343}$$

Write as a single radical.

$$\sqrt[3]{\sqrt{x^1}} = (x^{1/4})^{1/3} = x^{1/12}$$



$$\sqrt[2]{\sqrt[3]{x^4}} = \sqrt[6]{x^4}$$

QUADRATIC FORM

$$x^2 + 2x - 3$$

$$x^4 + 2x^2 - 3$$

$$x^{10} + 2x^5 - 3$$

$$x^{243} + 2x^{113} - 3$$

Solve by factoring using the power on the middle term.
 $\frac{1}{8} \cdot 8 = 1$

$$b^{2/5} - b^{1/5} - 6 = 0$$

$$(b^{1/5} - 3)(b^{1/5} + 2) = 0$$

$$b^{1/5} - 3 = 0$$

$$b^{1/5} + 2 = 0$$

$$(b^{1/5})^5 = 3^5$$

$$(b^{1/5})^5 = (-2)^5$$

$$b = 243$$

$$b = -32$$

Solving Radical Equations

(Equations with roots)

$$5\sqrt[3]{x+7} - 10 = 15$$

$$5\sqrt[3]{x+7} = 25$$

$$\left(\sqrt[3]{x+7}\right)^3 = \left(5\right)^3$$

$$x+7 = 125$$

$$x = 118$$

- 1) Isolate the root
- 2) Raise both sides to the index

THE BIG MOMMA

$$\sqrt{2x-2} - \sqrt{3x-2} = -1$$

$$(\sqrt{2x-2})^2 = (\sqrt{3x-2} - 1)^2$$

$$\begin{array}{l} (1+2)^2 = 3^2 \\ 1+4 = 9 \end{array}$$

$$2x-2 = (\sqrt{3x-2} - 1)(\sqrt{3x-2} - 1) \leftarrow \text{FOIL!}$$

$$2x-2 = 3x-2 - \sqrt{3x-2} - \sqrt{3x-2} + 1$$

$$\begin{array}{l} 2x-2 = 3x-2 - 2\sqrt{3x-2} \\ -2x+2 \quad -2x+2 \end{array}$$

$$(2\sqrt{3x-2})^2 = (x+1)^2 \leftarrow \text{FOIL!}$$

$$4(3x-2) = x^2 + x + x + 1$$

$$12x-8 = x^2 + 2x + 1$$

$$0 = x^2 - 10x + 9$$

$$0 = (x-9)(x-1)$$

$$x-9=0 \quad x-1=0$$

$$x=9 \quad x=1$$

Check:

$$\sqrt{2x-2} - \sqrt{3x-2} = -1$$

$$x=1 \quad \sqrt{0} - \sqrt{1} = -1$$

$$0 - 1 = -1 \quad \checkmark$$

$$x=9 \quad \sqrt{16} - \sqrt{25} = -1$$

$$4 - 5 = -1$$

$$-1 = -1 \quad \checkmark$$

Last Step:
Check your answers!