Radical functions

$$f(x) = \sqrt{x} \quad \leftarrow \text{square root}$$

$$\sqrt[3]{x} \quad \leftarrow \text{cube root}$$

$$\sqrt[8]{x} \quad \leftarrow 8\text{th root}$$

ex2) $\sqrt{25} = 5$

$\sqrt{\dfrac{25}{64}} = \dfrac{5}{8}$

$-\sqrt{64} = -8$

$\sqrt{.0049} = .07$

ex 5)

$$\sqrt{36x^2} = 6|x|$$

$$\sqrt{36} \sqrt{x^2}$$

$x = -2$

$$\sqrt{36(-2)^2} = 6x$$

$$\sqrt{36(4)} = 6(-2)$$

$6(2)$

$12 \neq -12$

$$\sqrt{(x+1)^2} = |x+1|$$

$$\sqrt{x^2 + 4} = \text{Done} \quad \text{can't simplify}$$

$$\sqrt{x^2 - 8x + 16} = \sqrt{(x-4)^2} = |x-4|$$

$(x-4)(x-4)$

$$\sqrt{x^2-4} = \text{Done}$$
$$(x-2)(x+2)$$

$$\sqrt{200} = 10\sqrt{2}$$

$$\sqrt{2} \cdot \sqrt{100}$$

$$\sqrt{200} = 2 \cdot 5\sqrt{2} = 10\sqrt{2}$$
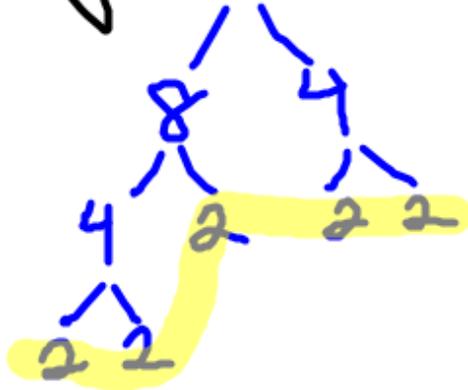
2   100

10   10

2 5   5 2

$$\sqrt[3]{-8y^3}$$

$$\sqrt[3]{-8} \quad \sqrt[3]{y^3}$$

$$-2 \quad y$$

$$\sqrt[5]{32} = 2$$

$$\sqrt[3]{125x^6y^5}$$

$$5 \ x^{6/3} \ y^{5/3} \leftarrow 12/3$$

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

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

Rule

$$\sqrt[4]{81x^{12}y^{16}} = 3|x^3|y^4$$

$$x^{1/2} = \sqrt[2]{x^1} = \sqrt{x}$$

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

$$(-8)^{1/3} = \sqrt[3]{-8} = -2$$

$$\sqrt[5]{7ab} = (7ab)^{1/5}$$

$$\sqrt[7]{\frac{x^3 y}{4}} = \left(\frac{x^3 y}{4}\right)^{1/7}$$

$$\sqrt{9^4} = 9^{4/2} = 9^2 = 81$$

$$\sqrt[6]{(5x)^3} = (5x)^{3/6} = (5x)^{1/2} = \sqrt{5x}$$

Exponent Rules

1) $a^m \cdot a^n = a^{m+n}$

2) $\dfrac{a^m}{a^n} = a^{m-n}$

3) $(a^m)^n = a^{mn}$

4) $a^0 = 1$

5) $a^{-m} = 1/a^m$

6) $(ab)^m = a^m b^m$

$$q^{-1/2} = \frac{1}{q^{1/2}} = \frac{1}{\sqrt{q}} = \frac{1}{3}$$

$$4x^{-2/3} \, y^{1/5} = \frac{4y^{1/5}}{x^{2/3}}$$

$$\left(\frac{3r}{7s}\right)^{-5/2} = \frac{(3r)^{-5/2}}{(7s)^{-5/2}} = \left(\frac{7s}{3r}\right)^{5/2}$$

$$3^{1/5} \cdot 3^{2/5} = 3^{1/5 + 2/5} = 3^{3/5}$$

$$\left(a^{-1/3} \, b^{2/5}\right)^{1/2} = a^{-1/6} \, b^{2/10}$$

$$= \frac{b^{1/5}}{a^{1/6}}$$

$$\left(\sqrt[3]{ab^2c}\right)^{12} =$$

$$\left(\left(ab^2c\right)^{1/3}\right)^{12}$$

$$\left(ab^2c\right)^4 = a^4b^8c^4$$

$$\sqrt{\sqrt[3]{x}} = \sqrt{(x)^{1/3}} = \left[(x)^{1/3}\right]^{1/2}$$

$$= x^{1/6}$$