

$$\sqrt{144 + 25}$$

Simplify

12.2 day)

$$3^2 = 3 \cdot 3$$

$$\frac{3^{12}}{3^{12}} = 3^0 = 1$$

$$3^{-2} = \frac{1}{3^2}$$

$$9^{\frac{1}{2}} = (3 \cdot 3)^{\frac{1}{2}} = 3^1$$

$$36^{\frac{1}{2}} = (6 \cdot 6)^{\frac{1}{2}} \rightarrow 6^1$$

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

new notation

$$y = 2x - 1$$

$$f(x) = 2x - 1$$

function  
notation

$$9^{\frac{1}{2}} = \sqrt[2]{9^1}$$

number

$$\frac{1}{2}$$

fractional

$$0.5$$

decimal

$$50\%$$

percent

Simplify

fractional notation

$(\sqrt[3]{8})^2$  - index

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

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

radical notation

$\sqrt[3]{64} = \sqrt[3]{4^3}$

$\sqrt[3]{64} = 4$

$\sqrt[3]{8^2} = \sqrt[3]{(2^3)^2} = \sqrt[3]{2^6} = \sqrt[3]{64} = 4$

$$\begin{array}{r} 16^{\frac{3}{4}} \\ (2^4)^{\frac{3}{4}} \\ 2^3 \\ 2 \\ \hline 8 \end{array}$$

$\left( \sqrt[4]{16} \right) \rightarrow 2^3$

$125^{\frac{2}{3}}$   
clicker

$(\sqrt[3]{125})^2$

$5^2$   
 $25$

$$(25)^{\frac{2}{3}}$$

$$125^{\frac{2}{3}} \quad (2/3)$$

$$(25)^{\frac{1}{2}}$$

X<sup>4</sup>

{

$$\begin{aligned} & 2\sqrt[3]{8} \\ & 8^{\frac{1}{3}} \\ & 2\sqrt{2} \end{aligned}$$

$$-5^2 \quad (-5)^2$$

$$-25 \quad +25$$

$$\left( \sqrt[4]{-81} \right)^3$$

Annotations:

- $\sqrt[4]{-81}$  is circled in red.
- $(-81)^{3/4}$  is circled in blue.
- $4$  is circled in red above the radical symbol.
- $81$  is circled in blue below the radical symbol.
- $3$  is circled in red above the exponent.
- A circle containing "not real" is drawn next to the expression.

$$= \sqrt[3]{-27}$$

The original value  $-27$  is crossed out.

$$(-81)^{3/4}$$

Annotations:

- $81$  is circled in blue.
- $3/4$  is circled in blue.
- $3$  is circled in red.
- A circle containing "not real" is drawn next to the expression.
- $-27$  is circled in red.

Handwritten text: Clicker

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

$$16^{-\frac{1}{2}} \rightarrow \frac{1}{16^{\frac{1}{2}}} = \frac{1}{\sqrt{16}} = \frac{1}{4}$$

$$\frac{1}{81^{\frac{5}{4}}} = \frac{1}{(\sqrt[4]{81})^5} = \frac{1}{(3)^5} = \frac{1}{3^5} = \frac{1}{243}$$

↙

$$81 = (3)^4$$

Clicker

$$(-8)^{-\frac{2}{3}}$$

$$(-8)^{\frac{1}{3}} \rightarrow (\sqrt[3]{-8})^2 \rightarrow \frac{1}{(-2)^2}$$

~~$\cancel{x} \rightarrow \frac{1}{4}$~~

$$\text{?} \quad \cancel{\left(\frac{8}{125}\right)^{-\frac{2}{3}}}$$

$$\begin{aligned} \left(\frac{8}{125}\right)^{-\frac{2}{3}} &\rightarrow \left(\frac{125}{8}\right)^{\frac{2}{3}} \\ \left(\sqrt[3]{\frac{125}{8}}\right)^2 &\rightarrow \left(\frac{5}{2}\right)^2 \rightarrow 25/4 \end{aligned}$$

clicker

$$\begin{aligned} (-64)^{\frac{2}{3}} &= \sqrt[3]{(-64)^2} = \sqrt[3]{(-4)^2} \\ &= +\frac{1}{16} \end{aligned}$$

$$2x^{\frac{1}{4}}$$

write in  
radical  
notation

$$2\sqrt[4]{x}$$

$$(2x)^{\frac{1}{4}}$$



$$\sqrt[4]{2x}$$

$$(3^2 x^5 y^5)^{\frac{1}{3}}$$



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

$$3^{\frac{2}{3}} x^{\frac{5}{3}} y^{\frac{5}{3}}$$



$$4 \cdot x^{\frac{1}{3}} \cdot y^{\frac{2}{3}} \cdot z^{\frac{2}{3}} \rightarrow 4 \sqrt[3]{x^2 y z^2}$$

Change to  
fractional  
notation

$$\sqrt[5]{2x^{\frac{11}{5}}y^2} \rightarrow 2^{\frac{1}{5}} x^{\frac{11}{5}} y^{\frac{2}{5}}$$

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

fractional

$$\rightarrow 3x^{\frac{2}{3}} y^{\frac{3}{3}} z^{\frac{4}{3}}$$