

Warm Up Questions

- 1.** Arrange these numbers in order from least to greatest. Describe your strategy.

$$\sqrt[3]{4}, 4^{\frac{3}{2}}, 4^2, \left(\frac{1}{4}\right)^{\frac{3}{2}}$$

- 2.** Evaluate.

i) $16^{1.5}$

ii) $81^{0.75}$

iii) $(-32)^{0.8}$

iv) $36^{0.5}$

v) $1.21^{1.5}$

- 1.** Arrange these numbers in order from least to greatest. Describe your strategy.

$$\sqrt[3]{4}, 4^{\frac{3}{2}}, 4^2, \left(\frac{1}{4}\right)^{\frac{3}{2}}$$

$$4^{1/3}, 4^{3/2}, 4^2, 4^{-3/2}$$

Least to Greatest

$$4^{-3/2}, 4^{1/3}, 4^{3/2}, 4^2$$

Evaluate.

- i)** $16^{1.5}$ **ii)** $81^{0.75}$
iii) $(-32)^{0.8}$ **iv)** $36^{0.5}$
v) $1.21^{1.5}$

$$\begin{aligned} \text{i) } 16^{3/2} &= (\sqrt{16})^3 \\ &= 4^3 \\ &= 64 \end{aligned}$$

$$\begin{aligned} \text{ii) } 81^{3/4} &= (\sqrt[4]{81})^3 \\ &= 3^3 \\ &= 27 \end{aligned}$$

$$\begin{aligned} \text{iii) } (-32)^{4/5} &= (\sqrt[5]{-32})^4 \\ &= (-2)^4 \\ &= 16 \end{aligned}$$

$$\begin{aligned} \text{iv) } 36^{1/2} &= \sqrt{36} \\ &= 6 \end{aligned}$$

$$\begin{aligned} \text{v) } 1.21^{3/2} &= (\sqrt{1.21})^3 \\ &= 1.1^3 \\ &= 1.331 \end{aligned}$$



Powers with Negative Exponents

$$x^{-n} = 1/x^n \quad \text{AND} \quad 1/x^n = x^{-n} \quad x \neq 0$$

Flip It and Turn the Exponent Positive



Let's Give it a Try!

a) 3^{-2}

$$= \frac{1}{3^2}$$
$$= \frac{1}{9}$$



b) $(4/5)^{-2}$

$$\left(\frac{5}{4}\right)^2$$
$$= \frac{5^2}{4^2}$$
$$= \frac{25}{16}$$



c) $(1/2)^{-2}$

$$\left(\frac{2}{1}\right)^2$$
$$= \frac{2^2}{1^2}$$
$$= \frac{4}{1}$$

$$\text{d) } (-5)^{-3}$$

$$= \left(\frac{1}{-5}\right)^3$$

$$= \frac{1^3}{(-5)^3}$$

$$= -\frac{1}{125}$$

$$\text{e) } 8^{-2/3}$$

$$= \frac{1}{8^{2/3}} \quad \begin{array}{l} \text{exp} \\ \swarrow \\ \text{root} \end{array}$$

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

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

$$= \frac{1}{4}$$

$$\text{f) } (1/9)^{-3/2}$$

$$\left(\frac{1}{9}\right)^{3/2}$$

$$(9)^{3/2} \quad \begin{array}{l} \text{exp} \\ \swarrow \\ \text{root} \end{array}$$

$$(\sqrt{9})^3$$

$$(3)^3$$

$$= 27$$

g) $(8/27)^{-2/3}$

$$\begin{aligned} &= \left(\frac{27}{8} \right)^{\frac{2}{3} \leftarrow \text{exp.}} \\ &= \frac{(\sqrt[3]{27})^2}{(\sqrt[3]{8})^2} \\ &= \frac{3^2}{2^2} \\ &= \frac{9}{4} \end{aligned}$$

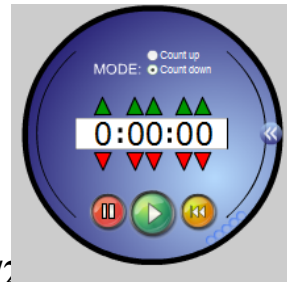
h) $(-125)^{-1/3}$

$$\begin{aligned} &= \left(\frac{1}{-125} \right)^{\frac{1}{3} \leftarrow \text{exp.}} \\ &= \frac{1}{\sqrt[3]{-125}} \\ &= \frac{1}{-5} \end{aligned}$$

i) $(-14/5)^0$

$$= 1$$

Try These !!



a) $144^{-1/2}$

b) $(9/64)^{-1/2}$

c) $81^{-3/2}$

a) $(-64)^{-1/3}$

b) $(100/49)^{-3/2}$

c) $0.36^{-1/2}$

Try These !!

a) $144^{-1/2}$

$$= 1/144^{1/2}$$

$$= 1/\sqrt{144}$$

$$= 1/12$$

b) $(9/64)^{-1/2}$

$$= (64/9)^{1/2}$$

$$= \sqrt{64} / \sqrt{9}$$

$$= 8/3$$

c) $81^{-3/2}$

$$= 1/81^{3/2}$$

$$= 1/(\sqrt{81})^3$$

$$= 1/9^3$$

$$= 1/729$$

a) $(-64)^{-1/3}$

$$= (1/-64)^{1/3}$$

$$= (1 / -64)^{1/3}$$

$$= 1 / -4$$

b) $(100/49)^{-3/2}$

$$= (49/100)^{3/2}$$

$$= (\sqrt{49})^3 / (\sqrt{100})^3$$

$$= 7^3 / 10^3$$

$$= 343/1000$$

c) $0.36^{-1/2}$

$$= 1/0.36^{1/2}$$

$$= 1/\sqrt{0.36}$$

$$= 1/0.6$$

