

ANNOUNCEMENT: TERM 3 TEST FRI 12 APR!

FRI 5 APR 2019

REVIEW OF POWERS

Definition of power with positive exponent

$2^3 = 1 \cdot 2 \cdot 2 \cdot 2 = 8$

$5^2 = 1 \cdot 5 \cdot 5 = 25$

$7^1 = 1 \cdot 7 = 7$

$13^0 = 1$

MULTIPLY 1 BY THE BASE

Definition of power w/ negative exponent

DIVIDE 1 BY THE BASE

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

$$5^{-2} = \frac{1}{2^2} = \frac{1}{2 \cdot 2}$$

$$7^{-3} = \frac{1}{7^3} = \frac{1}{7 \cdot 7 \cdot 7}$$

$$13^{-4} = \frac{1}{13^4} = \frac{1}{13 \cdot 13 \cdot 13 \cdot 13}$$

Definition of
Power with
FRACTIONARY
exponent

$$32^{\frac{1}{5}} = \sqrt[5]{32} = 2 \quad \text{Because } 2^5 = 1 \cdot \underbrace{2 \cdot 2}_4 \cdot \underbrace{2 \cdot 2}_4 = 32$$

$$256^{\frac{1}{4}} = \sqrt[4]{256} = 4 \quad \text{Because } 4^4 = 1 \cdot \underbrace{4 \cdot 4}_{16} \cdot \underbrace{4 \cdot 4}_{16} = 16^2 = 256$$

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

$$9^{\frac{1}{2}} = \sqrt{9} = 3 \quad \text{Because } 3^2 = 9$$

Square root
(not 2nd root!)

Question what does it mean

$$128^{-\frac{1}{7}}?$$

This is a power.

The base is 128

The exponent is $-\frac{1}{7}$

The exponent is

1) Negative

2) & fractionary

$$128^{-\frac{1}{7}} = \frac{1}{128^{\frac{1}{7}}} = \frac{1}{\sqrt[7]{128}} = \frac{1}{2}$$

Because exponent is fractionary

Because exponent is negative

HOW TO USE THE CALCULATOR

Look for key $\sqrt[x]{}$ or $\sqrt[x]{y}$

1) Type first 7

2) then 128 & enter

RULES OF POWERS

• $b^{e_1} \cdot b^{e_2} = b^{e_1 + e_2}$ [Product of powers w/ the same base = power w/ that base & exponent = sum of exponents]

$2^3 \cdot 2^5 = 2^{3+5} = 2^8 = 256$

• $\frac{b^{e_1}}{b^{e_2}} = b^{e_1 - e_2}$ [Quotient of powers w/ = base = power w/ that base & exponent = exponent of numerator - exponent of denominator]

$\frac{3^5}{3^2} = 3^{5-2} = 3^3 = 27$

• $(b^{e_1})^{e_2} = b^{e_1 \cdot e_2}$

$(2^3)^4 = 2^{3 \cdot 4} = 2^{12} = 4096$

$$\bullet \left(\frac{a}{b} \right)^e = \frac{a^e}{b^e} \quad \left[\begin{array}{l} \text{The power of a quotient is} \\ \text{the quotient of powers} \end{array} \right]$$

$$\left(\frac{2}{5} \right)^3 = \frac{2^3}{5^3} = \frac{8}{125}$$

$$\bullet (a \cdot b)^e = a^e \cdot b^e \quad \left[\begin{array}{l} \text{The power of a product is} \\ \text{the product of powers} \end{array} \right]$$

$$(3 \cdot 5)^2 = 3^2 \cdot 5^2 = 9 \cdot 25 = 225$$