Curriculum Outcome

(N1) Demonstrate an understanding of powers with integral bases (excluding base 0) and whole number exponents by: representing repeated multiplication using powers; using patterns to show that a power with an exponent of zero is equal to one; solving problems involving powers.

(N2) Demonstrate an understanding of operations on powers with integral bases (excluding base 0) and whole number exponents.

Student Friendly:
“What does an exponent do to a number"

Chapter 2

$4a^2b^3$

$(2)^4$

$(3a^2)^3$

POWERS

$-(a^2)^3$

5^3

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


Power
exponent
8^3
base

Exponents

- Exponents are shorthand for multiplication:
  $(5)(5) = 5^2$, $(5)(5)(5) = 5^3$.
- The "exponent" stands for however many times the term is being multiplied.

Exponent → 5^3 (3 times) $5 \times 5 \times 5 = 125$

- The term that's being multiplied is called the "base".

Base → 5^3


Song

Write each power as a product, then evaluate.

#1

a) 3^4

$= (3)(3)(3)(3)$

$= 81$

b) 5^3

$= (5)(5)(5)$

$= 125$

c) $\left(\frac{2}{3}\right)^3$

$= \left(\frac{2}{3}\right)\left(\frac{2}{3}\right)\left(\frac{2}{3}\right)$

$= \left(\frac{8}{27}\right)$

Write each product as a power, then evaluate.

#2

a) (4)(4)(4)

$= (4)^3$

$= 64$

b) (-6)(-6)(-6)(-6)(-6)

$= (-6)^5$

$= -7776$

$x^3 y^2$

$xxx\ yy$

Powers with a Twist

Can you see the difference?

Base: -4

Exponent: 2

$$(-4)^2$$

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

$$= 16$$

Base: 4

Exponent: 2

$$-4^2$$

$$-(4)(4)$$

$$= -16$$

Base: (-2)

Exponent: 3

$$-(-2)^3$$

$$-(-8)$$

Evaluate 8

Base: 2

Exponent: 5

$$-2^5$$

Evaluate -32

$(-1)^2 = (-1)(-1) = +1$

$(-1)^3 = (-1)(-1)(-1) = -1$

$(-1)^4 = (-1)(-1)(-1)(-1) = +1$

$(-1)^5 = (-1)$

Did you see a pattern??

$(-1)^{10247} = -1$ $(-1)^{29584} = +1$

$(-1)^{10247} = -1$ $(-1)^{29584} = 1$

- Evaluating powers when the base is negative...

  If the exponent is [redacted] the answer will be [redacted]

  If the exponent is [redacted] the answer will be [redacted]

Figure out if the answer is positive or negative: (Explain)

$$\frac{(-2)^{520} \times (-6)^{311}}{-(-4)^{66}} = \frac{(+) \times (-)}{(-)\ (+)}$$

$$= \frac{(-)}{(-)}$$

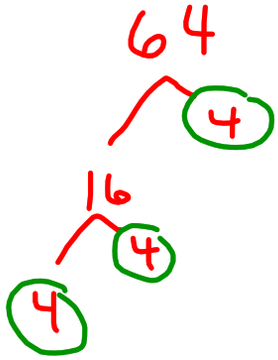
$$= +$$

$$\frac{-(-x)^{4} \times (-y)^{12}}{-r^{2}\,(-xy)^{5}} = \frac{(-)\,(+)(+)}{(-)(-)} = -\frac{(-)}{(+)} = -(-)$$

$(-)$ $+$ $(+)$ 12 4 2 5 $(-)$ $(-)$

$4^x = 64$

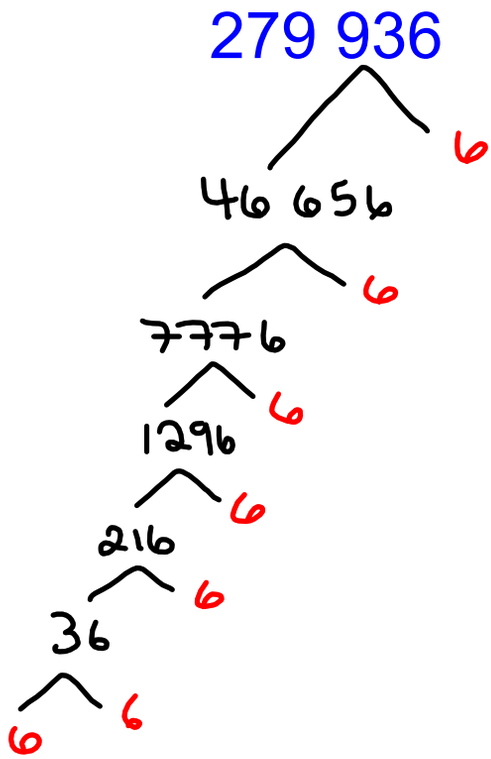
Write 64 as a power of 4



$4^3 = 64$

a) 4^2 b) 4^3 c) 4^4 d) 4^{-3}

Write 279 936 as a power of 6



6^7

Check out pages 55 and 56.

Please complete questions...

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7ace,8ace,9, 11, 12, 13,14