

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:

"Powers of tens and the ZERO exponent"



Warm Up
Grade 9



Write the following as a repeated multiple and evaluate

a) $-(-7)^5$

$-(-7)(-7)(-7)(-7)(-7)$
 $-(-16807)$
16807

b) $(-3)^5$

$-(3)(3)(3)(3)(3)$
-243

c) -2^6

$-(2)(2)(2)(2)(2)(2)$
-64

d) $-(-4)^2(6)^3$

$-(-4)(-4)(6)(6)(6)$
 $-(16)(216)$
-3456

Write as a power then evaluate

a) $(-4)(-4)(4)(4)(-5)(-5)$

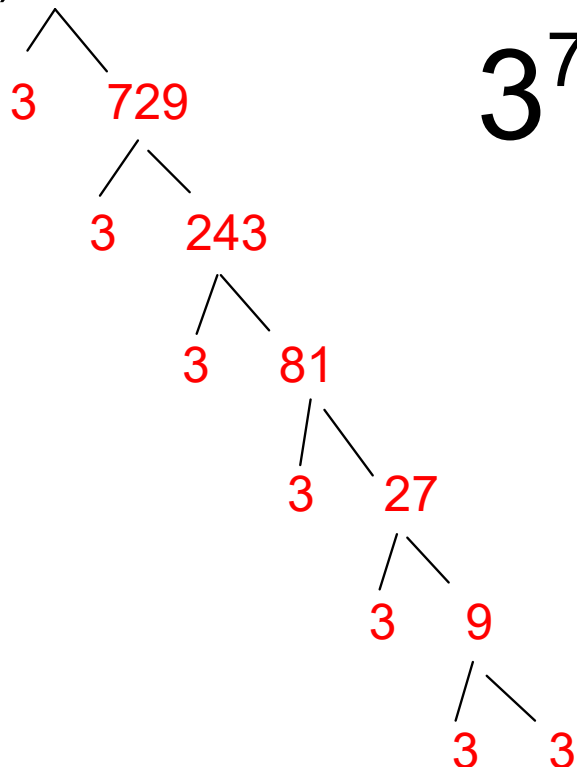
$(-4)^2(4)^2(-5)^2$
 $(16)(16)(25)$
6400

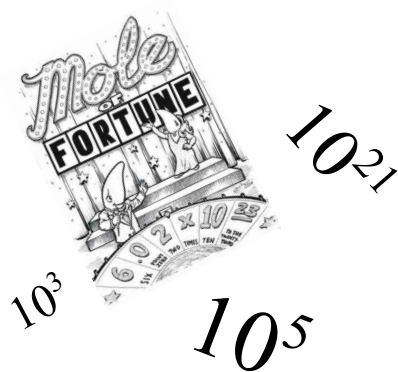
b) $-(3)(3)(-7)(-7)(-7)$

$-(3)^2(-7)^3$
 $-(9)(-343)$
 $-(-3087)$
3087

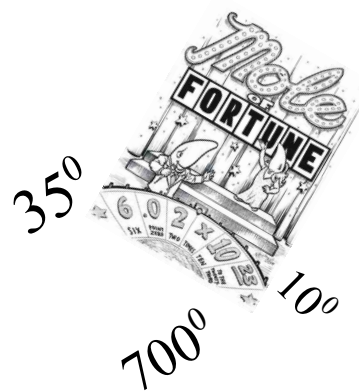
Write as a base of 3

a) 2187






Section 2.2



Powers of Ten and the Zero Exponent



 Avogadro's number = 6.0221415×10^{23}

 The speed of light = $2.99\ 792\ 458 \times 10^8$ m / s

 Temperature of the Sun's Core = 1.5×10^7 °C
since 15000000 kelvin = 14999726.85 degree Celsius

Light years = 4.96×10^{12} km

Distance related to Powers of 10
 <http://vimeo.com/819138>

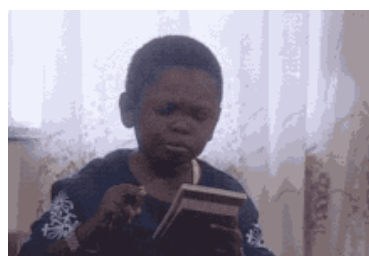
Please use your calculator to evaluate the following:

$$2^0 = 1$$

$$13^0 = 1$$

$$199^0 = 1$$

$$(-6)^0 = 1$$



What do you notice?



Zero Exponent LAW

Any number raised to the power of
ZERO is equal to 1

$$x^0 = 1$$



Zero Exponent LAW

$$x^0 = 1$$

-Easy rule but watch for NEGATIVES

Examples:

$$(-6)^0 = 1$$

$$-6^0 = -1$$

$$-(-6)^0 = -1$$

Read this number to me

426

Four hundred
Twenty
Six

In elementary school you may have expressed it in this form

$$400 + 20 + 6$$

$$(4 \times 100) + (2 \times 10) + (6 \times 1)$$

Powers of 10

page 59

Number in Words	Standard Form	Power
One billion	1 000 000 000	10^9
One hundred million	100 000 000	10^8
Ten million	10 000 000	10^7
One million	1 000 000	10^6
One hundred thousand	100 000	10^5
Ten thousand	10 000	10^4
One thousand	1 000	10^3
One hundred	100	10^2
Ten	10	10^1
One	1	10^0

*Image taken from "Math Makes Sense 9"
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Writing Numbers Using Powers of Ten

Standard form



Write 96 713 as a power of 10

10^4	10^3	10^2	10^1	10^0
Ten Thousands	Thousands	Hundreds	Tens	Ones

Expanded form:

$$90\ 000 + 6\ 000 + 700 + 10 + 3$$

Powers of ten form:

$$(9 \times 10^4) + (6 \times 10^3) + (7 \times 10^2) + (1 \times 10^1) + (3 \times 10^0)$$

7 605 404 Standard form

Write in powers of ten form:

$$(7 \times 10^6) + (6 \times 10^5) + (5 \times 10^3) + (4 \times 10^2) + (4 \times 10^0)$$

$$(5 \times 10^4) + (3 \times 10^3) + (6 \times 10^2) + (4 \times 10^0)$$

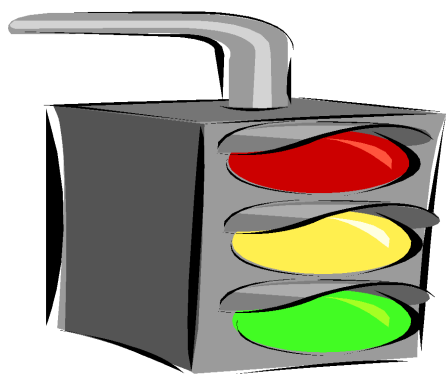
Write in standard form:

10^4	10^3	10^2	10^1	10^0
5	3	6	0	4

$$(6 \times 10^0) + (2 \times 10^5) + (7 \times 10^6) + (5 \times 10^2) + (9 \times 10^4)$$

Write in standard form:

10^6	10^5	10^4	10^3	10^2	10^1	10^0
7	2	9	0	5	0	6



Class/Homework

Page 61-63

Questions

4(a, b)

5(a, b, c, d)

6(a, c, e)

8(a, c, e)

9(a, c, e)

10 all

11

13

Attachments

200.webp