


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

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

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I picked 3 as my base

Exponent	Power	Repeated Multiplication	Standard Form
4	3^4	$3 \times 3 \times 3 \times 3$	81
3	3^3	$3 \times 3 \times 3$	27
2	3^2	3×3	9
1	3^1	3	3

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Let's Try Base 10

Exponent	Power	Repeated Multiplication	Standard Form
4	10^4	$10 \times 10 \times 10 \times 10$	10000
3	10^3	$10 \times 10 \times 10$	1000
2	10^2	10×10	100
1	10^1	10	10


What do you notice ?????


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Therefore:

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

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Let's jump back in time..... 

$\frac{5^2}{5^2}$ $= \frac{25}{25}$ $= 1$	<p style="text-align: center;">Use Exponent Rules:</p> $\frac{5^2}{5^2}$ $= 5^0$ $= 1$ 
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Solve:

$$\left(\sum_{k=0}^n \binom{5}{6} 8^4 5^{n-k} \right)^0$$

= 1



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Any number (except 0) with an exponent 0 will equal 1

$2^5 = 32$
 $2^5 = 32$
 $= 2^0 =$ Why???

$2^0 = 1$
 $13^0 = 1$
 $199^0 = 1$
 $(-6)^0 = 1$

Zero Exponent LAW
 A power with an integer base, not including 0, and an exponent of 0 is equal to 1





$(\text{smiley face})^0 = 1$

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Try this

Evaluate each expression




a) $5^0 = 1$ b) $-(-5)^0 = -1$ c) $(-5)^0 = 1$ d) $-5^0 = -1$

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Writing Numbers Using Powers of Ten

A place value chart may help

Write 96713 as a power of 10



Ten Thousands	Thousands	Hundreds	Tens	Ones
90 000	6000	700	10	3

$96713 = 90\,000 + 6000 + 700 + 10 + 3$

$= (9 \times 10\,000) + (6 \times 1000) + (7 \times 100) + (1 \times 10) + (3 \times 1)$

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

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You Try !!!!

98,452

$= 90\,000 + 8000 + 400 + 50 + 2$

$= (9 \times 10\,000) + (8 \times 1000) + (4 \times 100) + (5 \times 10) + (2 \times 1)$

$= (9 \times 10^4) + (8 \times 10^3) + (4 \times 10^2) + (5 \times 10^1) + (2 \times 10^0)$

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Write 85602 as a power of 10

85602 =

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Write 65023 as a power of 10

65023 =

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PRACTICE TIME



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- # 4(a, b)
- # 5(a, b, c, d)
- #6(a, c, e)
- #8(a, c, e)
- #9(a, c, e)
- #10 all
- #11
- #13

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