Integral Exponents

Definitions and Terms

Exponent – Says how many times to multiply a number with itself

42 = 4 x 4 = 16 “4 to the 2nd power, 4 squared”

3^3 = 3 x 3 x 3 = 27 “3 to the 3rd power, 3 cubed”

54 = 5 x 5 x 5 x 5 = 625 “5 to the 4th power, 5 raised to the power of 4”

Exponents make it easier to write large numbers

Base – The lower portion of a term with an exponent

52 5 is the base, 2 is the exponents

x4 x is the base, 4 is the exponent

Coefficient – The leading constant of a term with an exponent

3x2 3 is the coefficient, x is the base, 2 is the exponent

5x5 5 is the coefficient, x is the base, 5 is the exponent

Negative Exponents

Negative Exponent – Says how many times to divide 1 by the number

8-1 = = 0.125

5-3 = = 0.008 OR

5-3 = = = = 0.008

General Rule:

|  |  |  |
| --- | --- | --- |
| Negative Exponent | Reciprocal of Positive Exponent | Answer |
| 4-2 |  | = 0.0625 |
| 10-3 |  | = 0.001 |
| (-2)-3 |  | = -0.125 |

0 or 1 Exponent

If exponent is 1, then you have the number itself ex: 91 = 9

If exponent is 0, then you get 1 ex: 90 = 1

If 00, then you say it is “indeterminate”

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| Example: Powers of 3 | | |
| 33 | 1 x 3 x 3 x 3 | 27 |
| 32 | 1 x 3 x 3 | 9 |
| 31 | 1 x 3 | 3 |
| 30 | 1 | 1 |
| 3-1 |  |  |
| 3-2 |  |  |
| 3-3 |  |  |

|  |  |
| --- | --- |
| Law | Example |
| x1 = x | 61 = 6 |
| x0 = 1 | 70 = 1 |
| x-1 = 1/x | 4-1 = 1/4 |
|  |  |
| xmxn = xm+n | x2x3 = x2+3 = x5 |
| xm/xn = xm-n | x6/x2 = x6-2 = x4 |
| (xm)n = xmn | (x2)3 = x2×3 = x6 |
| (xy)n = xnyn | (xy)3 = x3y3 |
| (x/y)n = xn/yn | (x/y)2 = x2 / y2 |
| x-n = 1/xn | x-3 = 1/x3 |
| And the law about Fractional Exponents: | |
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