$3 \cdot 3 \cdot 3 \cdot 3 = 3^4 = 81$

3^4 is an **Exponential Expression** , 4 is the exponent (sometimes called the power). 3 is the base of the exponent. The exponent counts the number of factors of the base are used in repeated multiplication.

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

For the exponential expression $\left(-\frac{2}{5}\right)^3$, $\left(-\frac{2}{5}\right)$ is the base of the exponent and 3 is the exponent.

There is a difference between -5^2 and $(-5)^2$. $\quad -5^2 = -(5^2) = -(5 \cdot 5) \quad$ & $\quad (-5)^2 = (-5)(-5) = 25$

$1.5^1 = 1.5 \qquad\qquad 5^0 = 1 \qquad\qquad \left(-\frac{3}{7}\right)^0 = 1 \qquad\qquad 0^0 = undefined$

$6^3 = \underline{\qquad} \qquad -2^6 = \underline{\qquad} \qquad (-3)^2 = \underline{\qquad} \qquad \left(\frac{4}{5}\right)^0 = \underline{\qquad} \qquad -5^3 = \underline{\qquad} \qquad \left(-\frac{1}{5}\right)^3 = \underline{\qquad}$

Order of Operations

Simplify expressions in the following order:
- If grouping symbols such as parentheses are present, simplify expressions within those first, starting with the inner most grouping.
- If fraction bars are present, simplify the numerator and the denominator separately.
- Evaluate exponents
- Perform multiplication and division in order from the left to the right.
- Perform addition and subtraction in order from left to right.

Note: Grouping can be expressed using "( )","[ ]", "{ }", or $\dfrac{????}{???}$, or $\sqrt{?????}$.

$22 - 16 \div 2^3$
$22 - 16 \div 8$
$22 - 2$
20

$\dfrac{3(10-6)}{|-2|}$
$\dfrac{3(4)}{|-2|}$
$\dfrac{12}{2}$
6

$10\left[(7-3)^2 - 6\right]$
$10\left[(4)^2 - 6\right]$
$10[16 - 6]$
$10[10]$
100

$\dfrac{6 \cdot \left[11 + \left(\dfrac{12}{9-5}\right)^2\right]}{10^2 \div \sqrt{25} - 8}$

$\dfrac{6 \cdot \left[11 + \left(\dfrac{12}{4}\right)^2\right]}{100 \div 5 - 8} = \dfrac{6 \cdot \left[11 + (3)^2\right]}{20 - 8}$

$\dfrac{6 \cdot [11 + 9]}{12}$

$\dfrac{6 \cdot [20]}{12} = \dfrac{120}{12} = 10$

Algebraic Expressions:

$5x$ means $5 \cdot x$ (**Never write** $x5$) $4(2x-1)$ means $4 \cdot (2x-1)$ $\qquad\qquad 4m^3n$ means $4 \cdot m^3 \cdot n$

Order of Operations

Simplify expressions in the following order:
- If grouping symbols such as parentheses are present, simplify expressions within those first, starting with the inner most grouping.
- If horizontal fraction lines are present, simplify the numerator and the denominator separately.
- Evaluate exponents
- Perform multiplication and division in order from the left to the right.
- Perform addition and subtraction in order from left to right.

Note: Grouping can be expressed using "$($ $)$","$[$ $]$", "$\{$ $\}$", or $\dfrac{????}{???}$, or $\sqrt{?????}$.

$12+28\div4$ $\qquad$ $10\times2-15\div5$ $\qquad$ $22+2\cdot9-30$ $\qquad$ $40\div5\cdot2+15$ $\qquad$ $16-10\cdot4\div8$

$36-30\div6\cdot5+9$ $\qquad$ $6\cdot8-24\div3+10$ $\qquad$ $63\div9+23-3\cdot8$ $\qquad$ $10-6+2\cdot12\div6$

$2(8-5)-4$ $\qquad$ $8+2(11-4)$ $\qquad$ $2(12-4)-60\div(6+4)$ $\qquad$ $8+2\left[2+3(10-4)\right]$

$\dfrac{2+3(11-7)}{22-2(7+3)}$ $\qquad$ $\dfrac{4(8+3)-14}{2(7-3)+7}$ $\qquad$ $\dfrac{2(22-19)+3(10+2)}{20+\left[3(18+4)-63\right]\div3}$

$-12-18\div 3^2$
$-12-18\div 9$
$-12-2$
-14

$$\frac{5(4-10)}{|-10|}$$
$$\frac{5(-6)}{|-10|}$$
$$\frac{-30}{10}$$
$$-3$$

$-8\left[(1-5)^3+24\right]$
$-8\left[(-4)^3+24\right]$
$-8[-64+24]$
$-8[-40]$
320

$$\frac{8\cdot\left[9+\left(\dfrac{-4}{7-9}\right)^2\right]}{-6^2\div 4-\sqrt{16}}$$

$$\frac{8\cdot\left[9+\left(\dfrac{-4}{-2}\right)^2\right]}{-36\div 4-4}=\frac{8\cdot\left[9+(2)^2\right]}{-36\div 4-4}$$

$$\frac{8\cdot[9+4]}{-9-4}$$

$$\frac{8\cdot[13]}{-13}=\frac{104}{-13}=-8$$

$8+32\div\left(^-4\right)$

$^-10\div 2-2\cdot\left(^-5\right)$

$^-18+\left(^-54\right)\div(-9)+3$

$10\cdot\left(^-4\right)\div\left(^-2\right)+13$

$2-10\cdot 4\div\left(^-8\right)$

$^-36+\left(^-10\right)\cdot 6\div\left(^-2\right)-9$

$^-6\cdot\left(^-8\right)+\left(^-24\right)\div 3-\left(^-10\right)$

$90\div 9+\left(^-4\right)-3\cdot\left(^-8\right)$

$10-12+\left(^-2\right)\cdot\left(^-15\right)\div\left(^-6\right)$

$5(6-9)-10$

$6-2\left[11+\left(^-4\right)\right]$

$2(10-18)+20\div\left(^-6+4\right)$

$^-18+2\left[^-2+3\left(^-12+10\right)\right]$

$$\frac{^-36-3\left(^-1-6\right)}{7+2(7-13)}$$

$$\frac{^-4\left(5-\left(^-3\right)\right)+30}{^-2(3-8)-11}$$