

2.4 - Order of Operations.docx

September 10, 2021 11:44 AM

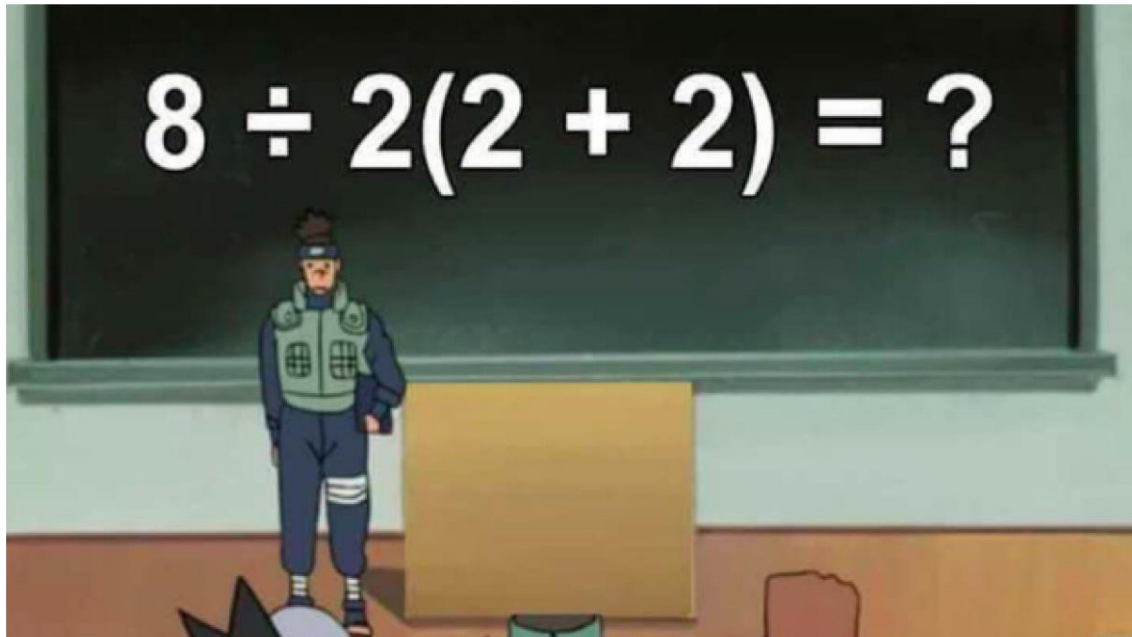


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Order of Operations (BEDMAS)

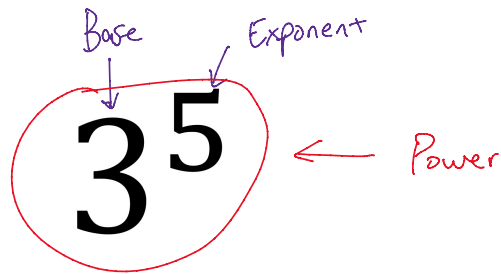


Question: How do you know which mathematical operation to solve this equation?

Answer: We use BEDMAS!

<p>B = Brackets E = Exponents D = Division M = Multiplication A = Addition S = Subtraction</p>	<p>Steps to BEDMAS:</p> <ol style="list-style-type: none">1. Calculate all operations <u>INSIDE</u> brackets FIRST.2. Simplify all <u>exponent</u> expressions.3. Do multiplication and division as they occur from left to right.4. Do addition and subtraction as they occur from left to right.
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Quick Review on Exponents:



This is read as: three to the power of 5

Question: What is the difference between $(-2)^6$ and -2^6 ?

$$(-2)^6 = (-2) \times (-2) \times (-2) \times (-2) \times (-2) \times (-2) = 64$$

$$-2^6 = -(2^6) = -(2)(2)(2)(2)(2)(2) = -64$$

Fact: Anything raised to the power of 0 is equal to 1.

Examples: $1^0 = 1$, $(-99)^0 = 1$, $(1000000)^0 = 1$

Example:

Bracket
Exponent
Division
Multiplication
Addition
Subtraction

$$\begin{aligned} & -2[3(2-4)^3 - (6-4)^2] && \text{first simplify brackets} \\ = & -2[3(-2)^3 - (2)^2] && \text{then simplify exponents} \\ & && (-2)^3 = (-2) \times (-2) \times (-2) \\ & && (2)^2 = (2) \times (2) \\ = & -2[3(-8) - (4)] \\ = & -2[-24 - 4] && \text{solve inside brackets} \\ = & -2[-28] && \text{multiply} \\ = & \underline{\underline{56}} \end{aligned}$$

Example:

$$\begin{aligned} & \frac{3^3 - 3}{-3} - \frac{15 \cdot 5^2}{5} \\ = & \frac{27 - 3}{-3} - \frac{15 \times 25}{5} && \text{simplify numerators} && 3^3 = 3 \times 3 \times 3 = 27 \\ & && && 5^2 = 5 \times 5 = 25 \\ = & \frac{24}{-3} - \frac{375}{5} && \text{continue to simplify numerators so} \\ & && \text{we can divide our fractions.} \\ = & -8 - 75 && \text{subtract} \\ = & \underline{\underline{-83}} \end{aligned}$$

Practice:

$$\frac{-3(5-7)^2 - 5 \cdot 4}{(-2)^3 \cdot 5 - 8 \cdot (1-4)}$$

$$= \frac{-3(-2)^2 - 5 \times 4}{(-2)^3 \times 5 - 8(-3)}$$

$$= \frac{-3(4) - 5 \times 4}{(-8) \times 5 - 8(-3)}$$

$$= \frac{-12 - 20}{-40 + 24}$$

$$= \frac{-32}{-16}$$

$$= \underline{2}$$

$$\frac{(-2)^3 - 3^2 + (-1)^6}{-2^5 \div (-32) \div (-4)}$$

$$= \frac{(-8) - 9 + 1}{-32 \div (-32) \div (-4)}$$

$$= \frac{(-8) - 9 + 1}{1 \div (-4)}$$

$$= \frac{(-8) - 9 + 1}{\left(\frac{-1}{4}\right)}$$

$$= -4[-8 - 9 + 1]$$

$$= -4[-16]$$

$$= \underline{64}$$

Simplify brackets

Simplify exponents

$$(-2)^2 = (-2) \times (-2) = 4$$

$$(-2)^3 = (-2) \times (-2) \times (-2) = -8$$

Simplify numerators and denominators

So we can divide fraction

Simplify exponents

$$-32 \div (-32) = \frac{-32}{-32} = 1$$

$$1 \div (-4) = \frac{-1}{4}$$

A fraction in the denominator can be flipped up so that the denominator of the fraction is multiplied with the numerator