# Helpful Things to Memorize

08/08/25

This stuff isn't on the GED formula sheet. It's things you'll need to be able to do to pass the test.

## Order of Operations:

**P** → **P**arenthesis or grouping symbols { [ (**do inner-most grouping first**) ] }
**E** → **E**xponents **and Roots**
**M** → **M**ultiplication
**D** → **D**ivision
} whichever comes first – in order from left to right.
**A** → **A**ddition
**S** → **S**ubtraction
} whichever comes first – in order from left to right.

*Multiplication and division are on the same level of importance. Do them left to right in the order they appear (not M before D just because of the order in the acronym and list). Same for addition and subtraction.*

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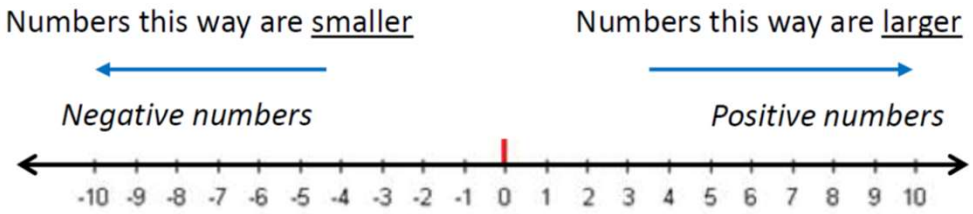
**Numbers on the number line**




For example:

- 4 is larger than -2 because it is further to the right. 4 > -2
- -10 is smaller than -5 because it is further to the left. -10 < -5

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**Signed numbers:**

Multiplication and Division: if the signs are different, the answer is negative

Addition and Subtraction:

**Rule 1**: Subtracting like signs, add the absolute values of the numbers and keep the negative sign.

-6 – 4 = -10 - 70 – 40 = -110

**Rule 2**: Subtracting a negative is same as adding a positive.

-6 – (-6) = -6 + 6 = 0 -34 – (-22) = -12 -3 –(-6) = 3

**Rule 3**: Unlike signs, find the difference of the absolute values, keep the sign of the larger number.

25+(-10) = 15 -30 + 10 = -20 155 + (-90) = 65

## Laws of Exponents

Some of these are tricky. No idea why these aren't on the formula sheet.

$a^1 = a$ ⟵ *ANY non-zero number to the first power = the number*

**Examples:** $x^1 = x$ $7^1 = 7$

$a^0 = 1$ ⟵ *ANY number to the zero power = 1*

**Examples:** $5^0 = 1$ $x^0 = 1 \quad (\text{as long as } x \neq 0)$

$(3a^2b)^0 = 1$

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$a^m \cdot a^n = a^{m+n}$

**Examples:** $(x^5)(x^2) = x^{5+2} = x^7$

$(2^3)(2^4) = 2^{3+4} = 2^7 = 128$

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$\frac{a^m}{a^n}$ **= $a^{m-n}$**

**Examples:** $\frac{x^7}{x^3} = x^{7-3} = x^4$

$\frac{5^6}{5^2} = 5^{6-2} = 5^4 = 625$

✅ **Test taking tip**: Suppose when taking the test, you freeze up and can't remember the rule. Make yourself a simple example and you'll see the rule.

$\frac{x^4}{x^2}$ means $\frac{x \cdot x \cdot x \cdot x}{x \cdot x}$ = $\frac{\not{x} \cdot \not{x} \cdot x \cdot x}{\not{x} \cdot \not{x}} = x \cdot x = x^2$

***There's the rule: for division, subtract the exponents (4 – 2 = 2)***

Similarly:

$x^3 \times x^2$ is $x \cdot x \cdot x \cdot x \cdot x = x^5$

***There's the rule: for multiplication, add the exponents (3 + 2 = 5)***

## Laws of Exponents (continued)

$a^{-n} = \frac{1}{a^n}$ A negative exponent says "put it in the denominator and change the sign"

**Examples:** $x^{-2} = \frac{1}{x^2}$ $x^{-1} = \frac{1}{x}$

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And, if negative fractional exponents show up (completely unfair), try to remember these examples:

- $x^{\frac{1}{2}} = \sqrt{x}$
- $x^{\frac{1}{3}} = \sqrt[3]{x}$
- $x^{\frac{2}{3}} = \sqrt[3]{x^2}$

**Key idea**: A fractional exponent means **a root**.

✅ Tip: Say aloud — *"Bottom of the fraction is the root. Top is the power."*

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The formula for **simple interest**, I, is on the GED formula sheet. But there are a few key things to remember.

$$I = P \cdot r \cdot t$$

**P**, principal, is the amount being considered, usually in dollars
**r**, the interest rate, will be an annual rate, usually expressed as a %. ***Convert it to a decimal to use it in the equation.***
**t,** is the time. It may be expressed in weeks or months or some other unit of time, but ***you must convert it to its equivalent in years to use it in the equation***.

Always ***pay attention to what the question is asking.*** Sometimes it will be interest, other times it might be something like how much is paid back on a loan (which would be principal + interest).

**Example:** Andy borrows $2,500 from his sister for 18 months at 6% simple interest. How much interest will he pay on the loan?

Write the rate as a decimal. 6% = 6/100 = 0.06
Convert the months to the equivalent in years.
18 months = 1.5 years

i = prt = ($2,500)(0.06)(1.5) = $225

**Distributive property of multiplication and division examples:**

$$5(x+2) = 5 \cdot x + 5 \cdot 2 = 5x + 10$$

$$(x-2)(x+5) = (x)(x) + (x)(5) + (-2)(x) + (-2)(5)$$
$$= x^2 + 5x - 2x - 10 = x^2 + 3x - 10$$

$$\frac{5x^2 + 10x + 30}{5} = \frac{5x^2}{5} + \frac{10x}{5} + \frac{30}{5} = x^2 + 2x + 6$$

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Factorial (!): $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$
$3! = 3 \times 2 \times 1 = 6$

Good to understand, but can also be done using the "prb" key on the TI-30XS calculator, third option in the menu.

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## Scientific Notation

Scientific notation expresses a number as the product of a number, between at least 1 and less than 10, and a power of 10. This make it easier to write very large and very small numbers.

| Common name | Decimal form | Power of 10 | Scientific Notation |
|---|---|---|---|
| *One millionth* | 0.000001 | $10^{-6}$ | $1\times10^{-6}$ |
| *One thousandth* | 0.001 | $10^{-3}$ | $1\times10^{-3}$ |
| *One hundredth* | 0.01 | $10^{-2}$ | $1\times10^{-2}$ |
| *One tenth* | 0.1 | $10^{-1}$ | $1\times10^{-1}$ |
| *One* | 1 | $10^{0}$ | $1\times10^{0}$ |
| *Ten* | 10 | $10^{1}$ | $1\times10^{1}$ |
| *One hundred* | 100 | $10^{2}$ | $1\times10^{2}$ |
| *One thousand* | 1,000 | $10^{3}$ | $1\times10^{3}$ |
| *One million* | 1,000,000 | $10^{6}$ | $1\times10^{6}$ |
| *One billion* | 1,000,000,000 | $10^{9}$ | $1\times10^{9}$ |
| *One trillion* | 1,000,000,000,000 | $10^{12}$ | $1\times10^{12}$ |

**Scientific notation examples:** **$2.13 \times 10^3 = 2{,}130$**

**$7.5 \times 10^{-4} = 0.00075$**

**$9.8 \times 10^6 = 9{,}800{,}000$**