# Algebra
## ASVAB dump Sheet

Achievable

## Foundational math

**Division quick rules:**

- When multiplying or dividing by 1, the answer is the original number.
- When multiplying any number by zero, the answer is zero.
- You can divide zero by a number; the answer will be zero.
- When dividing by zero, the answer is undefined.
  - $(0/K$ to have zero on top)
  - $(N/0$ to have zero on the bottom)

**Fractions**

- $\frac{\text{part}}{\text{whole}}$
- Multiply- straight across
- Adding or subtracting- denominators must match
- Divide- keep, change, flip

**Order of operations:**

- **P** - Parenthesis
- **E** - Exponents
- **M & D** - Multiplication & Division
- **A & S** - Addition & Subtraction

**Inequalities**

- Less than $<$
- Less than or equal to $\leq$
- Greater than $>$
- Greater than or equal to $\geq$

## Pre-Algebra

**Long division**

- Divide
- Subtract
- Multiply
- Bring Down

**Improper fraction**

- Numerator is larger than denominator

## Algebra

**Absolute value**

- The distance a number is from zero.
- There will be **TWO** solutions!

**Proportions**

- Ratios that are equal
- Solve by cross-multiplication

**Exponents**

| Name | Rules | Example |
|---|---|---|
| Zero exponent rule | $a^0 = 1$ | $2^0 = 1$ |
| Product rule | $a^b * a^c = a^{b+c}$ | $2^3 * 2^4 = 2^7$ |
| Quotient rule | $\frac{a^b}{a^c} = a^{b-c}$ | $\frac{2^4}{2^3} = 2^1$ |
| Power of power rule | $(a^b)^c = a^{b*c}$ | $(2^4)^3 = 2^{12}$ |
| Power of product rule | $(ab)^c = a^c b^c$ | $(2b)^3 = 2^3 b^3$ |
| Negative exponent rule | $a^{-b} = \frac{1}{a^b}$ | $2^{-3} = \frac{1}{2^3}$ |

## Roots

**Converting roots to exponents**

Here's how to convert from radical to exponential form: $\sqrt[c]{a^b} = a^{\frac{b}{c}}$

**Square roots to memorize**

$\sqrt{1}=1$ $\sqrt{16}=4$ $\sqrt{49}=7$ $\sqrt{100}=10$
$\sqrt{4}=2$ $\sqrt{25}=5$ $\sqrt{64}=8$ $\sqrt{121}=11$
$\sqrt{9}=3$ $\sqrt{36}=6$ $\sqrt{81}=9$ $\sqrt{144}=12$

**Cube roots to memorize**

$\sqrt[3]{1}=1$ $\sqrt[3]{27}=3$ $\sqrt[3]{125}=5$
$\sqrt[3]{8}=2$ $\sqrt[3]{64}=4$