

ALGEBRAIC FORMULAS

Factoring:

- Common factor: $ax+bx=x(a+b)$
- Difference of squares: $a^2-b^2=(a+b)(a-b)$
- Perfect square trinomial: $a^2-2ab+b^2=(a+b)^2$
- Quadratic trinomial: $ax^2+bx+c=(mx+n)(px+q)$

Linear Equations:

- The general form of a linear equation is $y=mx+b$, where m is the slope and b is the y-intercept.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

- Slope formula:
- Point-slope form $y-y_1=m(x-x_1)$
- Slope-intercept form: $y=mx+b$
- Standard form: $Ax+By=C$

Quadratic Equations:

- Quadratic formula:
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
- Vertex form: $y=a(x-h)^2+k$
- Factored form: $y=a(x-r_1)(x-r_2)$
- Completing the square: $x^2+bx+c=(x+\frac{b}{2})^2-(\frac{b}{2})^2+c$

Exponential Equations:

- Exponential growth: $A=P(1+r)^t$
- Exponential decay: $A=P(1-r)^t$
- Compound interest: $A=P(1+\frac{r}{n})^{nt}$

Radicals:

- Simplifying radicals: $\sqrt{ab}=\sqrt{a} \times \sqrt{b}$
- Multiplying radicals: $\sqrt{a} \times \sqrt{b} = \sqrt{ab}$
- Dividing radicals: $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$
- Rationalizing denominators: $\frac{1}{\sqrt{a}} = \frac{\sqrt{a}}{a}$

Logarithms:

- Logarithmic properties:
- $\log_b(xy)=\log_b(x)+\log_b(y),$
- $\log_b(\frac{x}{y})=\log_b(x)-\log_b(y),$
- $\log_b(x^n)=n \times \log_b(x)$

- $\log_b(x) = \frac{\log(x)}{\log(b)}$

Arithmetic Sequences:

- $a_n = a_1 + (n-1)d$
- $S_n = \frac{n}{2}(a_1 + a_n)$

Geometric Sequences:

- $a_n = a_1 \times r_{n-1}$
- $S_n = \frac{a_1(1-r^n)}{1-r}$