Mathematics 20-1 Formula Sheet

Sequences and Series

Arithmetic Sequence	**Geometric Sequence**
$t_n = t_1 + (n-1)d$	$t_n = t_1 r^{n-1}$
Arithmetic Series	**Geometric Series**
$S_n = \frac{n(t_1 + t_n)}{2}$ $S_n = \frac{n}{2}[2t_1 + (n-1)d]$	$S_n = \frac{t_1(r^n - 1)}{r-1}$ $S_n = \frac{rt_n - t_1}{r-1}$
	Convergent Geometric Series
	$S_\infty = \frac{t_1}{1-r}$

Quadratic Functions and Equations

Vertex Form	**Quadratic Formula**
$f(x) = a(x-p)^2 + q$	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Standard Form	**Discriminant**
$f(x) = ax^2 + bx + c$	$b^2 - 4ac$

Trigonometry

Primary Trigonometric Ratios

$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$$
$$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$
$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$$

Pythagorean Theorem

$$a^2 + b^2 = c^2$$
$$(\text{leg}_1)^2 + (\text{leg}_2)^2 = (\text{hypotenuse})^2$$

Cosine Law

$$a^2 = b^2 + c^2 - 2bc\cos A$$
$$b^2 = a^2 + c^2 - 2ac\cos B$$
$$c^2 = a^2 + b^2 - 2ab\cos C$$

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$
$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$
$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

Sine Law

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Rational Expressions and Equations

Distance, Speed, and Time

$d = st$ **OR** $\text{distance} = \text{speed} \cdot \text{time}$

$$s = \frac{d}{t} \qquad \text{speed} = \frac{\text{distance}}{\text{time}}$$

$$t = \frac{d}{s} \qquad \text{time} = \frac{\text{distance}}{\text{speed}}$$

Work Problems

$$\frac{1}{\text{time taken by } A} + \frac{1}{\text{time taken by } B} + \frac{1}{\text{time taken by } C} = \frac{1}{\text{time taken by } A,\ B,\ \text{and } C \text{ together}}$$