John Oliver Secondary School **Mathematics Formula Sheet**

Name ______________________________ **Course** ________________ **Block**_____

Exponents:

$a^m \times a^n = a^{m+n}$ $a^m \div a^n = a^{m-n}$ $(a^m)^n = a^{mn}$ $(ab)^m = a^m b^m$

$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$ $a^{-m} = \frac{1}{a^m}$ $\sqrt[n]{x^m} = x^{\frac{m}{n}}$ $a^0 = 1$

Interest:

$I = Prt$

$A = P(1 + i)^n$

$A = P\left(1 + \frac{r}{n}\right)^{nt}$

Sequences and Series:

$t_n = ar^{n-1}$ $t_n = a + (n - 1)d$

$S_n = \frac{n}{2}(a + t_n) = \frac{n}{2}(a + l)$ $S_n = \frac{a(1 - r^n)}{1 - r}$ $S_n = \frac{a - rl}{1 - r}$

$S_n = \frac{n}{2}[2a + (n-1)d]$ $S_\infty = S = \frac{a}{1 - r}$

Measurement:

$P_{triangle} = a + b + c$ $P_{rectangle} = 2l + 2w$ $C_{circle} = 2\pi r = \pi d$

$A_{circle} = \pi r^2$ $A_{rectangle} = lw$ $A_{trapezoid} = \frac{1}{2}(b_1 + b_2)h$

$A_{triangle} = \frac{bh}{2}$ or $\frac{1}{2}ab\sin C$ or $\sqrt{s(s-a)(s-b)(s-c)}$ where $s = \frac{a+b+c}{2}$

$V_{rectangle} = lwh$ $V_{sphere} = \frac{4}{3}\pi r^3$ $V_{cylinder} = \pi r^2 h$

$V_{cone} = \frac{1}{3}\pi r^2 h$ $V_{pyramid} = \frac{1}{3}A_{base}h$ $V_{prism} = A_{base}h$

$SA_{cone} = \pi rs + \pi r^2$ $SA_{sphere} = 4\pi r^2$ $SA_{cylinder} = 2\pi r^2 + 2\pi rh$

$SA_{pyramid} = A_{base} + A_{sides}$ $SA_{right\ prism} = 2A_{base} + A_{sides}$

Coordinate Geometry:

$Equation_{line}$ $y = mx + b$ or $Ax + By + C = 0$

$Slope_{line} = m = \frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1}$

Distance Formula $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Quadratic Formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$Midpoint_{line} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

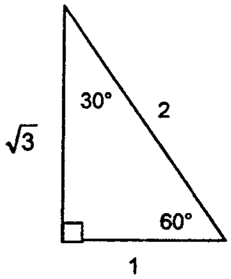
Point-Slope $Form_{line} = (y - y_1) = m(x - x_1)$

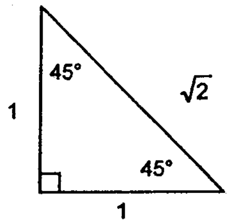
Trigonometry: Trig Ratios $\sin\theta = \frac{opp}{hyp} = \frac{y}{r}$, $\cos\theta = \frac{adj}{hyp} = \frac{x}{r}$, $\tan\theta = \frac{opp}{adj} = \frac{\sin}{\cos} = \frac{y}{x}$

Cosine Law $a = \sqrt{b^2 + c^2 - 2bcCosA}$ $\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

deg	0°	30°	45°	60°	90°
sin	$\frac{\sqrt{0}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{4}}{2}$
cos	$\frac{\sqrt{4}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{0}}{2}$
tan	$\frac{\sqrt{0}}{\sqrt{4}}$	$\frac{\sqrt{1}}{\sqrt{3}}$	$\frac{\sqrt{2}}{\sqrt{2}}$	$\frac{\sqrt{3}}{\sqrt{1}}$	$\frac{\sqrt{4}}{\sqrt{0}}$

Sin Law $\frac{SinA}{a} = \frac{SinB}{b} = \frac{SinC}{c}$





$\sin^2\theta + \cos^2\theta = 1$ $1 + \tan^2\theta = \sec^2\theta$ $1 + \cot^2\theta = \csc^2\theta$

$\sec\theta = \frac{1}{\cos\theta}$ $\csc\theta = \frac{1}{\sin\theta}$ $\cot\theta = \frac{1}{\tan\theta}$ $\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\cot\theta = \frac{\cos\theta}{\sin\theta}$

$\cos(\alpha + \beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$ $\sin(\alpha + \beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta$

$\cos(\alpha - \beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$ $\sin(\alpha - \beta) = \sin\alpha\cos\beta - \cos\alpha\sin\beta$

$\cos2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta$ $\sin2\theta = 2\sin\theta\cos\theta$

Probability and Statistics ${}_nP_r = \frac{n!}{(n-r)!}$ ${}_nC_r = \binom{n}{r} = \frac{n!}{r!(n-r)!}$ $t_{k+1} = {}_nC_k a^{n-k} b^k$

$P(\overline{A}) = 1 - P(A)$ $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ $P(A \mid B) = \frac{P(A \text{ and } B)}{P(B)}$

$P(A \text{ and } B) = P(A) \times P(B \mid A)$ $P(x) = {}_nC_x p^x q^{n-x}$ $\mu = \frac{\sum x_i}{n}$

$\sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{n}}$ $\mu = np$ $\sigma = \sqrt{npq} = \sqrt{np(1-p)}$ $z = \frac{x - \mu}{\sigma}$