Pre-calculus Reference Sheet B

Exponents					
Exponential function			$f(x) = ab^x$, where $a \neq 0$		
$b^n b^m = b^{m+n}$		$\frac{b^m}{b^n} = b^{m-n}$		$(b^m)^n = b^{mn}$	
$b^0 = 1$		$b^{-x} = \frac{1}{b^x}$		$b^{x/y} = \sqrt[y]{b^x}$	
Logarithms					
Common log	$\log x = log_{10} x$			$b^x = a$	
Natural log	$lnx = log_e x$			$log_b a = x$	
Change of base	$log_a x = \frac{log_b x}{log_b a}$, where $a, b \neq 0$			$\log_a a^x = x$	
Imaginary numbers					
$i = \sqrt{-1}$			$i^2 = -1$		
Interest					
Simple	$I = prt$	Compound	$A = P(1 + \frac{r}{n})^{nt}$	Continuously compounding	$A = Pe^{rt}$
Quadratics and parabolas					
Standard form	$f(x) = ax^2 + bx + c$		Vertex form	$f(x) = \mathrm{a}(x-h)^2 + \mathrm{k}$	
Zeros (X-intercepts)	$(x, 0)$		Y-intercept	$(0, y)$	
Quadratic formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}, a \neq 0$			Vertex	(h, k)
Trigonometry					
Reciprocal identities	$\cot x = \frac{1}{\tan x} = \frac{\cos x}{\sin x}$		Pythagorean identities	$cos^2\theta + sin^2\theta = 1$ $1 + tan^2 x = sec^2 x$ $1 + cot^2 x = csc^2 x$	
Sum and difference identities	$\sin x \pm y = \sin x \cos y \pm \cos x \sin y$ $\cos x \pm y = \cos x \cos y \pm \sin x \sin y$ $\tan x + y = \frac{\tan x \pm \tan y}{1 \pm \tan x \tan y}$			$\sin\theta$	$\frac{o}{h}$
Pythagorean theorem	$a^2 + b^2 = c^2$			$\cos\theta$	$\frac{a}{h}$
Law of sines	$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$			$\tan\theta$	$\frac{o}{a}$
Law of cosines	$c^2 = a^2 + b^2 - 2ab\cos C$			$\tan\theta = \frac{\sin\theta}{\cos\theta}$	
Rational functions					
Standard form	$f(x) = \frac{1}{x}, where\ x \neq 0$		Extraneous solutions	$\frac{n}{d}, and\ d = 0$	
Holes	$\frac{(x+1)(x-2)}{(x-3)(x+1)}$		Vertical asymptotes	$\frac{(x+1)(x-2)}{(x-3)(x+1)}$	
Lines					
Linear function	$f(x) = mx + b$		Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$	
Distance formula	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$		Midpoint of a line segment	$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	
Circles					
General equation of a circle	$r^2 = (x-h)^2 + (y-k)^2$		Circumference	$C = 2\pi r$	
Area	$A = \pi r^2$		Degrees to radians	$360° = 2\pi$	