C12 - 5.0 - Trigonometric Functions Review *(h,k)(c,d)

$y = \text{a}\sin(b(x-h)) + k$ $\quad$ $y = \text{a}\cos(b(x-h)) + k$

$$y = a\sin(b(x-c)) + d$$

$d = \frac{|max + min|}{2}$

$Amplitude: |a|$ $\quad$ $Period: p = \frac{2\pi}{|b|}$ $\quad$ $Phase\ Shift: c$ $\quad$ $Horizontal\ center\ line: d$

Remember: Factor the brackets so x has a coefficient of 1

Sin starts on the y-axis on the CENTRE LINE and goes up/down

Cos starts on the y-axis on the TOP/(BOTTOM) line and goes down/(up)

$$y = \text{a}\tan(b(x-c)) + d$$

$Period\ of\ tan: \frac{\pi}{b}$ $\quad$ Tan is Zero when sin is zero
Tan is und when cos is zero

x-intercepts/Domain Restrictions

x-intercepts:

$sinx: b(x-c) = \pi n, n \in I$

$cosx: b(x-c) = \frac{\pi}{2} + \pi n, n \in I$

$tanx: b(x-c) = \pi n, n \in I$

Domain:

$\frac{\square}{sinx}: b(x-c) \neq \pi n, n \in I$

$\frac{\square}{cosx}: b(x-c) \neq \frac{\pi}{2} + \pi n, n \in I$

$Range$:

$d - |a| \leq y < d + |a|$

$a = \left|\frac{(max - min)}{2}\right|$

$d = \frac{(max + min)}{2}$

"b" multiplies the # of original solutions between $0 \leq \theta \leq 2\pi$

$d = min + |a|$
$d = max - |a|$

Rearranged Formula

$y = \text{asin}\left(\frac{2\pi}{p}(x-c)\right) + d$ $\quad$ $b = \frac{2\pi}{p}$ $\quad$ $y = a\sin\left(\frac{2\pi(x-c)}{p}\right) + d$

Transformations

$sinx = \cos(x - 90)$

$cosx = sin(x + 90)$

$sinx = \cos(90 - x)$

$cosx = \sin(90 - x)$

$tan\theta = \cot(90 - \theta)$

$sec\theta = csc\theta(90 - \theta)$

$csc\theta = sec\theta(90 - \theta)$

$cot\theta = \tan(90 - \theta)$

$\sin(-x) = -sinx$

$\cos(-x) = cosx$

$\tan(-x) = -tanx$