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

Box Model
Steps:
d, a, c, b

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

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

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

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)

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

Rearranged Formula $b = \frac{2\pi}{p}$

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

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

$y = \text{a}\tan(b(x-c)) + d$ $\quad$ $Period\ of\ tan: \frac{\pi}{|b|}$

Tan is Zero when sin is zero
Tan is Und when cos is zero

$p = \#\ squares \times value\ of\ square$

$If\ 6\ squares\ are\ \pi$
$One\ square\ is \frac{\pi}{6}$
$p = \#\ of\ squares \times \frac{\pi}{6}$

$ie\ \pi \div \#\ squares\ etc!$

x-intercepts/Domain Restrictions

x-intercepts:

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

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

$Domain$ $x \in \mathbb{R}$

$Range^*$: $d - |a| \le y \le d + |a|$

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

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

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

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

$Range^*$: $y \in \mathbb{R}$

Domain:

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

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

Transformations

$sinx = \cos(x-90)$ $\quad$ $\sin(-x) = -sinx$ $\quad$ $sinx = \cos(90-x)$ $\quad$ $secx = csc\theta(90-x)$
$cosx = sin(x+90)$ $\quad$ $\cos(-x) = cosx$ $\quad$ $cosx = \sin(90-x)$ $\quad$ $cscx = sec\theta(90-x)$
$sinx = \sin(180-x)$ $\quad$ $\tan(-x) = -tanx$ $\quad$ $tanx = \cot(90-x)$ $\quad$ $cotx = \tan(90-x)$
$cosx = \cos(360-x)$

Sine Graph $y = sinx$ $\quad$ Cosine Graph $y = cosx$ $\quad$ $y = -sinx$ $\quad$ $y = -cosx$