

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

Box Model

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

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

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

Amplitude: $|a|$

Period: $p = \frac{2\pi}{|b|}$

Phase Shift: c

Horizontal center line: d

Steps:
 d, a, c, b

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)

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

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

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

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

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

Period of tan: $\frac{\pi}{|b|}$

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

$p = \# \text{ squares} \times \text{value of square}$

If 6 squares are π
One square is $\frac{\pi}{6}$

ie $\pi \div \# \text{ squares etc!}$

$p = \# \text{ of squares} \times \frac{\pi}{6}$

x-intercepts/Domain Restrictions

x-intercepts:

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

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

Domain $x \in \mathbb{R}$

$$\text{Range}^*: d - |a| \leq y \leq d + |a|$$

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

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

$$d = \min + |a|$$

$$d = \max - |a|$$

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

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

Domain:

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

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

Transformations

$$\sin x = \cos(x - 90)$$

$$\sin(-x) = -\sin x$$

$$\sin x = \cos(90 - x)$$

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

$$\cos x = \sin(x + 90)$$

$$\cos(-x) = \cos x$$

$$\cos x = \sin(90 - x)$$

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

$$\sin x = \sin(180 - x)$$

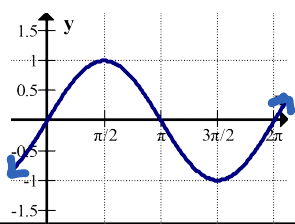
$$\tan(-x) = -\tan x$$

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

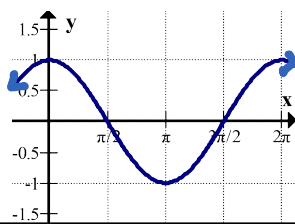
$$\cot x = \tan(90 - x)$$

$$\cos x = \cos(360 - x)$$

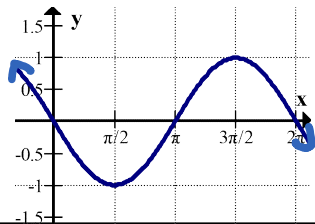
Sine Graph $y = \sin x$



Cosine Graph $y = \cos x$



$y = -\sin x$



$y = -\cos x$

