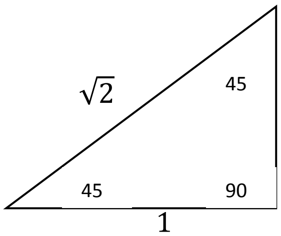
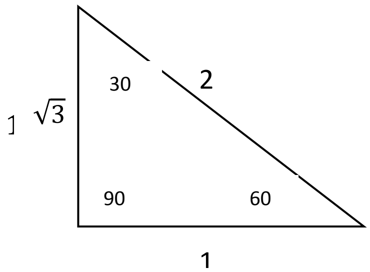
Useful Fact Sheet Module 3 – Alg.Trig I





Confunction Identities –

$sin\theta = \cos(90° - \theta)$	$cos\theta = \sin(90° - \theta)$
$tan\theta = \cot(90° - \theta)$	$cot\theta = \tan(90° - \theta)$
$sec\theta = \csc(90° - \theta)$	$csc\theta = \sec(90° - \theta)$

Bearing is the acute angle measured in degrees between the ray and the North-South line.

A Smart Trig Class

- *A*: All trig. functions are positive in QI
- *Smart*: Sine and its reciprocal, cosecant are positive in QII
- *Trig*: Tangent and its reciprocal, cotangent are positive in QIII
- *Class*: Cosine and its reciprocal, secant are positive in QIV

A **reference angle** is the positive acute angle θ' formed by the terminal side of θ and the x-axis.

Amplitude: If $|A| > 1$ then the curve is stretched, if $|A| < 1$ then the curve is shrunk. The amplitude (half the distance between the maximum and minimum values of the function) will be $|A|$, since distance is always positive.

The number $x = \frac{C}{B}$ is called the **phase shift**. If $\frac{C}{B} > 0$ then shift right. If $\frac{C}{B} < 0$ then shift left.

Amplitudes and Periods: The graph $y = Asin(Bx)$ has amplitude = $|A|$ overall period = $\frac{2\pi}{B}$ staring point: $x = \frac{C}{B}$

The constant D in the graphs formula causes vertical shifts in the graphs. These vertical shifts result in sinusoidal graphs **oscillating about the horizontal line $\boldsymbol{y = D}$** rather than about the x-axis, thus the maximum y is $D + |A|$ and the minimum is $D - |A|$

Finding exact values of $\boldsymbol{sin^{-1}(x)}$

1. Let $\theta = sin^{-1}x$
2. Rewrite $\theta = sin^{-1}x$ as $\sin(\theta) = x \ \ where \ \frac{-\pi}{2} \leq \theta \leq \frac{\pi}{2}$
3. Use the exact values of sin(x) to find the value of θ in $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$ that satisfies sin(θ)

Finding exact values of $\boldsymbol{cos^{-1}(x)}$

1. Let $\theta = cos^{-1}x$
2. Rewrite $\theta = cos^{-1}x$ as $\cos(\theta) = x \ \ where \ 0 \leq \theta \leq \pi$
3. Use the exact values of cos(x) to find the value of θ in $[0, \pi]$ that satisfies cos(θ)

Finding exact values of $\boldsymbol{tan^{-1}(x)}$

1. Let $\theta = tan^{-1}x$
2. Rewrite $\theta = tan^{-1}x$ as $\tan(\theta) = x \ \ where \ \frac{-\pi}{2} \leq \theta \leq \frac{\pi}{2}$
3. Use the exact values of tan(x) to find the value of θ in $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right]$ that satisfies tan(θ)

Sine Function and Inverse

$\sin(sin^{-1}(x)) = x$ for every $x \in [-1,1]$

$\sin^{-1}(sin(x)) = x$ for every $x \in [\frac{-\pi}{2}, \frac{\pi}{2}]$

Cosine Function and Inverse

$\cos(cos^{-1}(x)) = x$ for every $x \in [-1,1]$

$\cos^{-1}(cos(x)) = x$ for every $x \in [0, \pi]$

The Tangent Function and its Inverse

$\tan(tan^{-1}(x)) = x$ for every $x \in [-\infty, \infty]$

$\tan^{-1}(tan(x)) = x$ for every $x \in [\frac{-\pi}{2}, \frac{\pi}{2}]$

Simple harmonic motion:

$d = acos\omega t$ when the object is at its greatest distance from the resting position or $d = asin\omega t$ when the object is at resting position

Frequency *f* given by: $f = \frac{\omega}{2\pi}, \omega > 0$