Hwa Chong Institution 华侨中学
Mathematics (SMTP)

Name: _____ ( ) Class: _____ Date: __ __ __

MA304.5.2 – Trigonometric Graphs

At the end of this unit, you should be able to

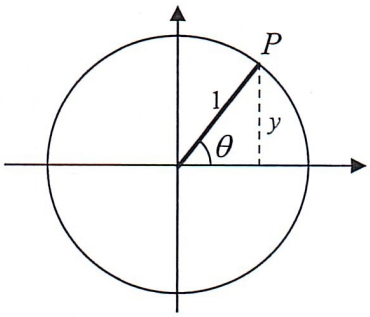
- **sketch the three standard graphs of sine, cosine and tangent**
- **understand and find the period and amplitude of trigonometric graphs**

We will first look at the graphs of the three basic functions of trigonometric ratios.

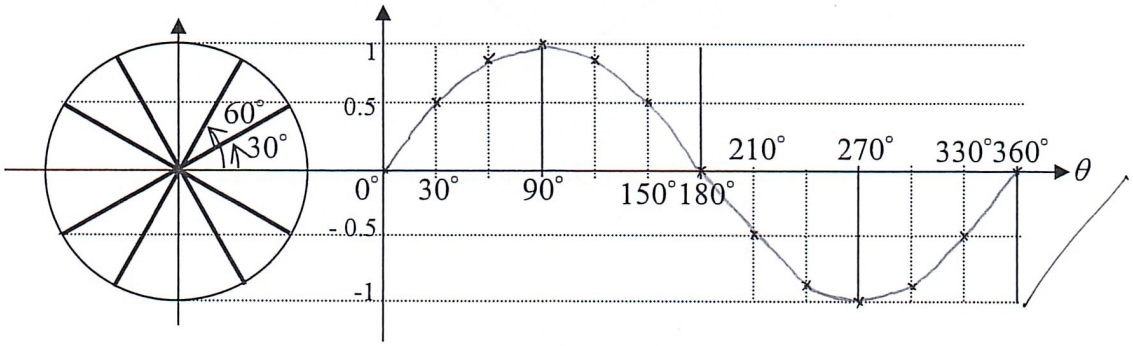
Sine graph

E1. Consider the unit circle (i.e. a circle with radius 1 unit).

(a) Express y in terms of θ.



(b) As θ changes, so does the value of y. Trace out the *locus* of y in the diagram below.



(c) Describe the locus in full.

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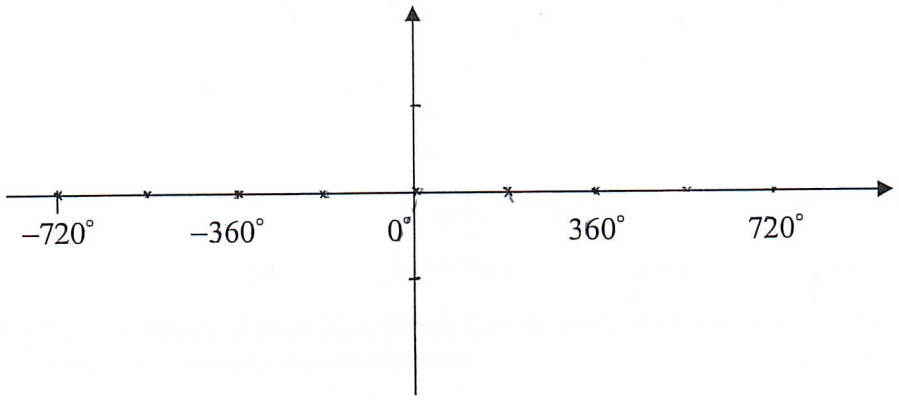
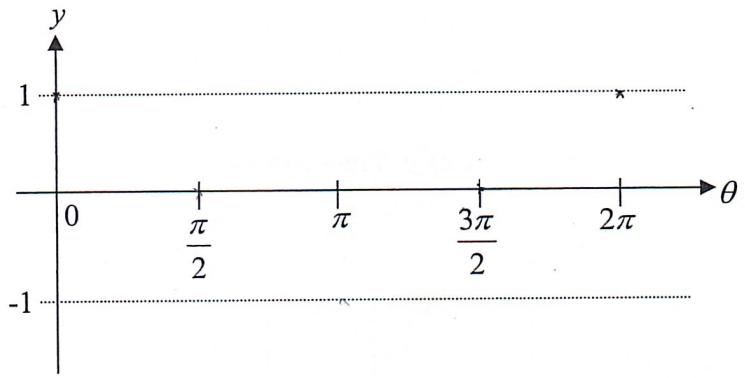
(d) Sketch below the function $f: x \to \sin x$ for $-720^\circ \le x \le 720^\circ$. What is the corresponding range?



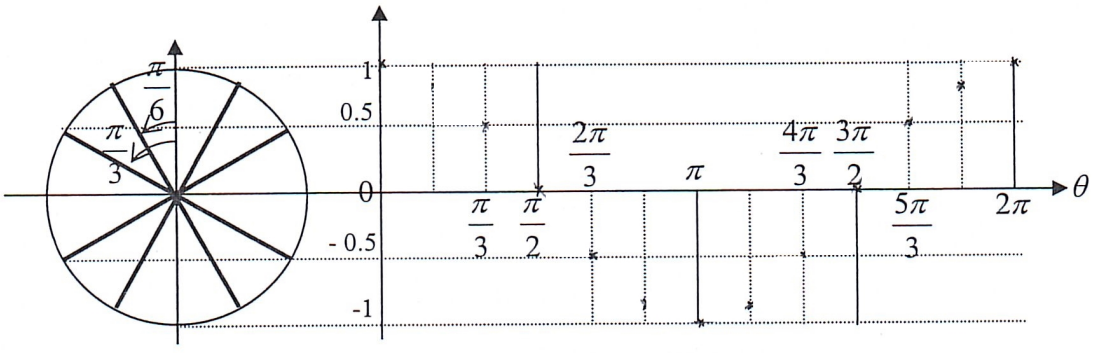
Cosine graph

E2. Sketch the graph of $y = \cos\theta$ for $0 \le \theta \le 2\pi$ using the table below.

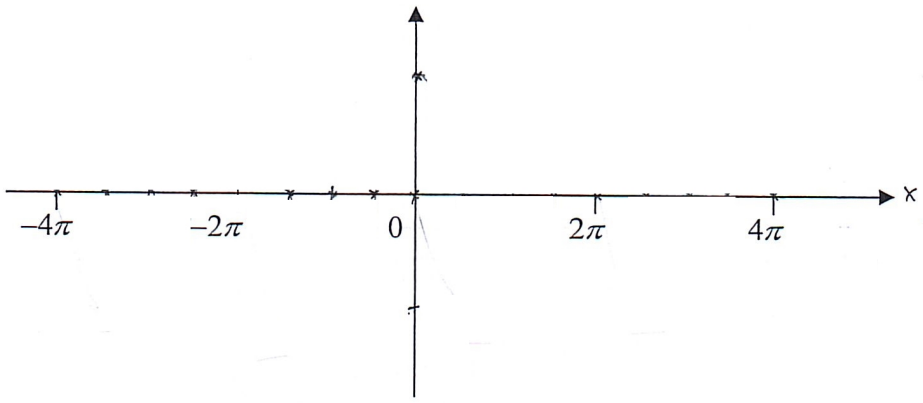
θ	0	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	π	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	2π
$\cos\theta$									



(a) Using the unit circle, derive the graph of $y = \cos\theta$ in another way.

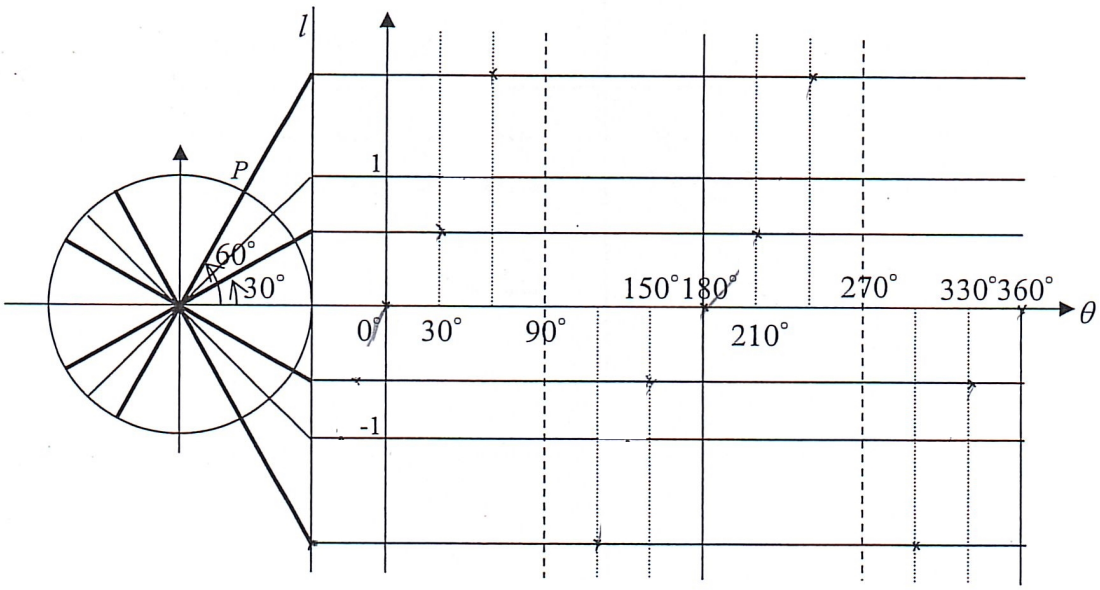


(b) Draw the function $f: x \to \cos x$ for $-4\pi \le x \le 4\pi$. What is the corresponding range?

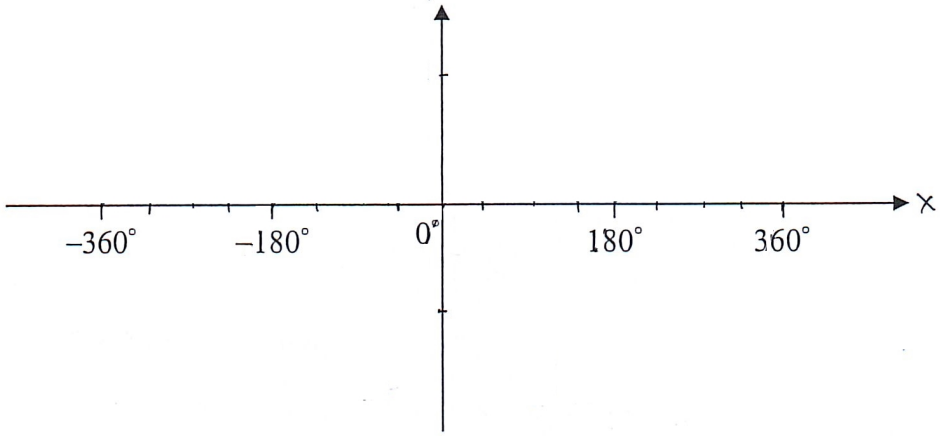


Tangent graph

E3. Consider the following diagram, where a *ray* from the origin to point P extend towards a line l. Plot the points for the special angles and connect the points with a smooth curve.



P1. Draw the function $f: x \to \tan x$ for $-360^\circ \le x \le 360^\circ$. What is the corresponding range?



P2. Compare the sine, cosine and tangent graphs. List the similarities and differences between them.

Similarities	Differences

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