

## 5.1 Graphing Sine and Cosine Functions

Fill in the following chart:

Try without a calculator; round to 1 decimal place.

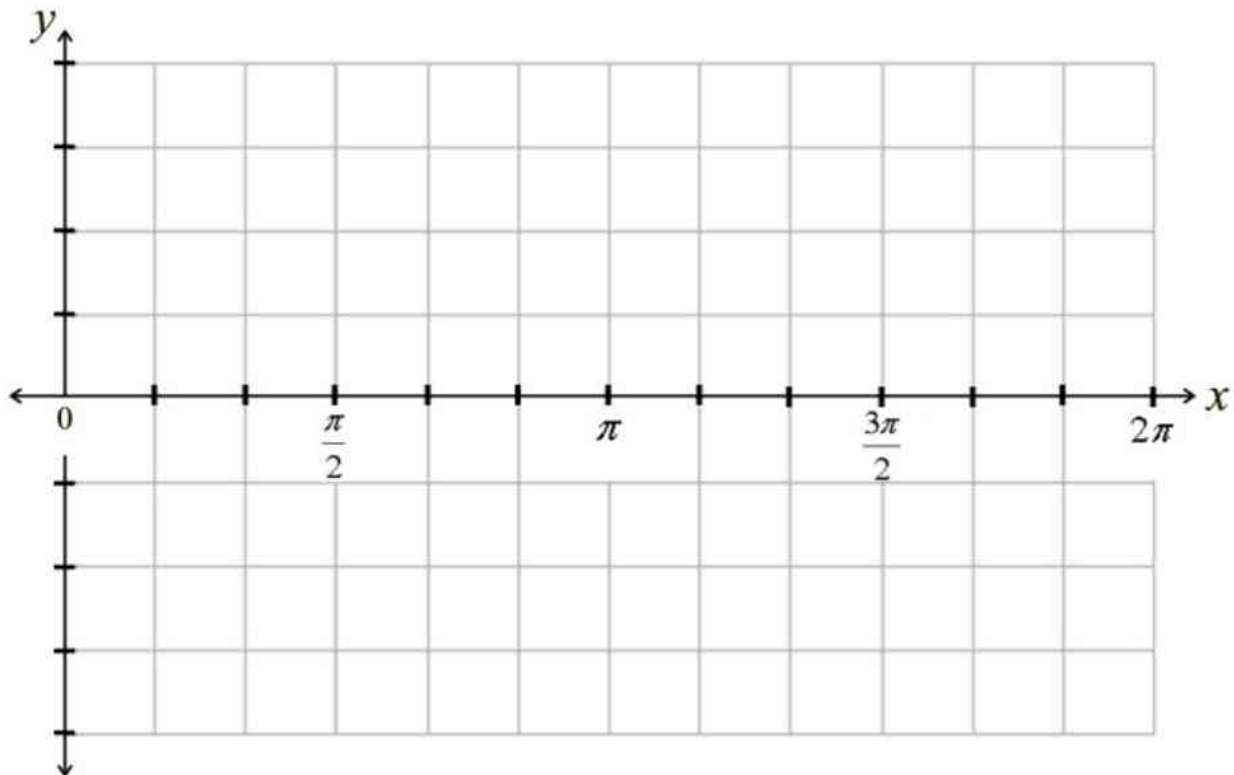
$$\sqrt{3} \approx 1.732$$

$$\sqrt{2} \approx 1.414$$

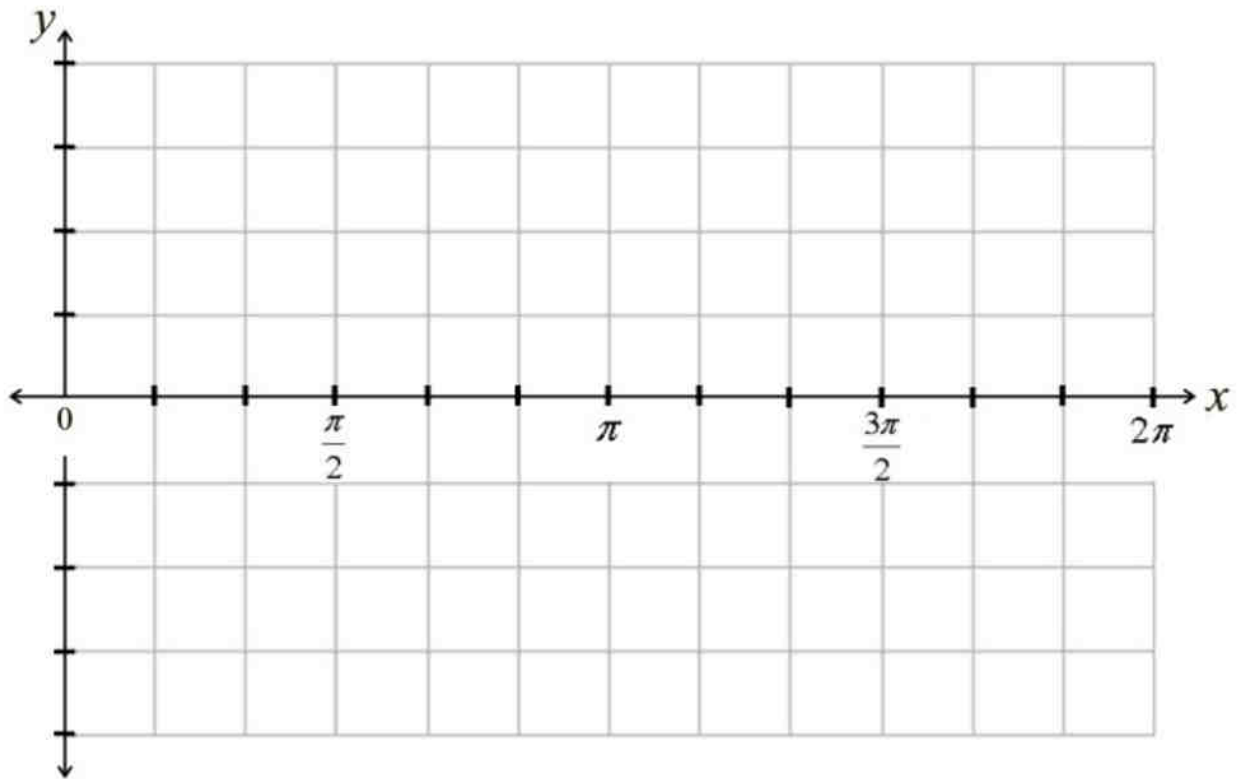
Angle $\theta$	$\sin \theta$	$\cos \theta$
$0^\circ, 0$		
$30^\circ, \pi/6$		
$45^\circ, \pi/4$		
$60^\circ, \pi/3$		
$90^\circ, \pi/2$		
$180^\circ, \pi$		
$270^\circ, 3\pi/2$		
$360^\circ, 2\pi$		

Graph

$$y = \sin \theta$$



$$y = \cos \theta$$



The Sine and Cosine functions are:

**periodic** functions, a piece of the graph (period) repeats over and over again.

**sinusoidal** functions, the general curvy shape.

**continuous**, no undefined values of the variable (can be drawn without lifting your pencil)

For the functions:

$$y = a \sin b\theta \text{ or } y = a \cos b\theta$$

**Amplitude,  $a$**  – distance from horizontal centre to maximum

$$a = \frac{\max - \min}{2}$$

**Period,  $p$**  – length of the piece that repeats

$$b = \frac{2\pi}{p} \text{ or } b = \frac{360^\circ}{p}$$

**Example 1:** Graph the following sinusoidal functions:

a)  $y = \cos 3\theta$

**Analysis**

Domain \_\_\_\_\_

Maximum \_\_\_\_\_

Range \_\_\_\_\_

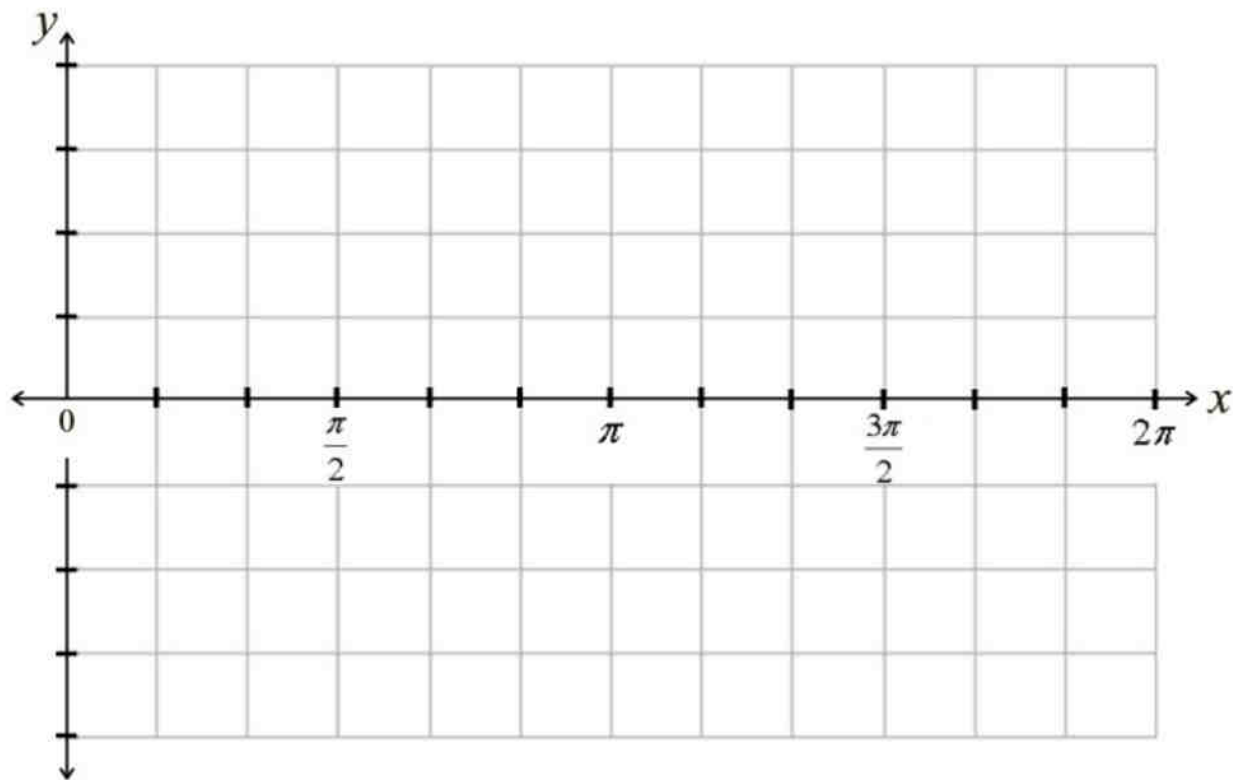
Minimum \_\_\_\_\_

Amplitude \_\_\_\_\_

Period \_\_\_\_\_

y-intercept \_\_\_\_\_

$\theta$ -intercepts \_\_\_\_\_



b)  $y = \sin 2\theta$

**Analysis**

Domain \_\_\_\_\_

Maximum \_\_\_\_\_

Range \_\_\_\_\_

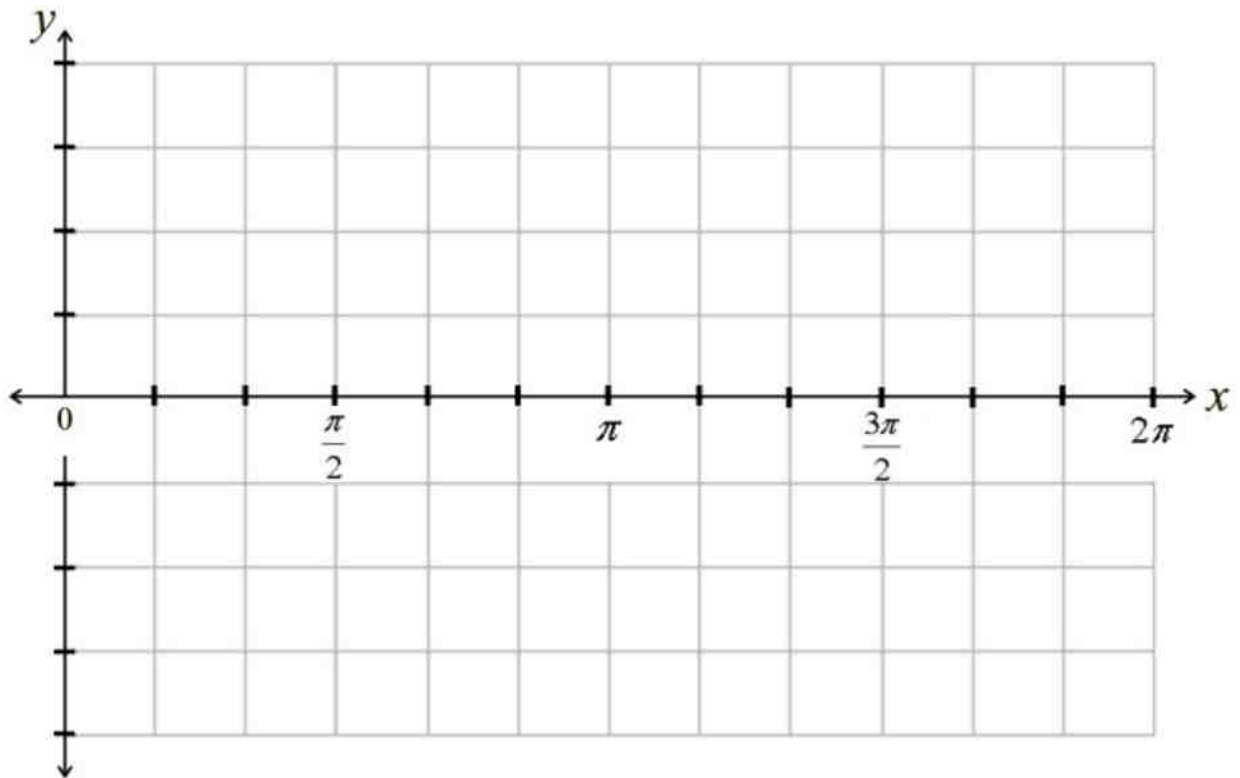
Minimum \_\_\_\_\_

Amplitude \_\_\_\_\_

Period \_\_\_\_\_

y-intercept \_\_\_\_\_

$\theta$ -intercepts \_\_\_\_\_



c)  $y = \frac{1}{2} \sin \frac{1}{2} \theta$

**Analysis**

Domain \_\_\_\_\_

Maximum \_\_\_\_\_

Range \_\_\_\_\_

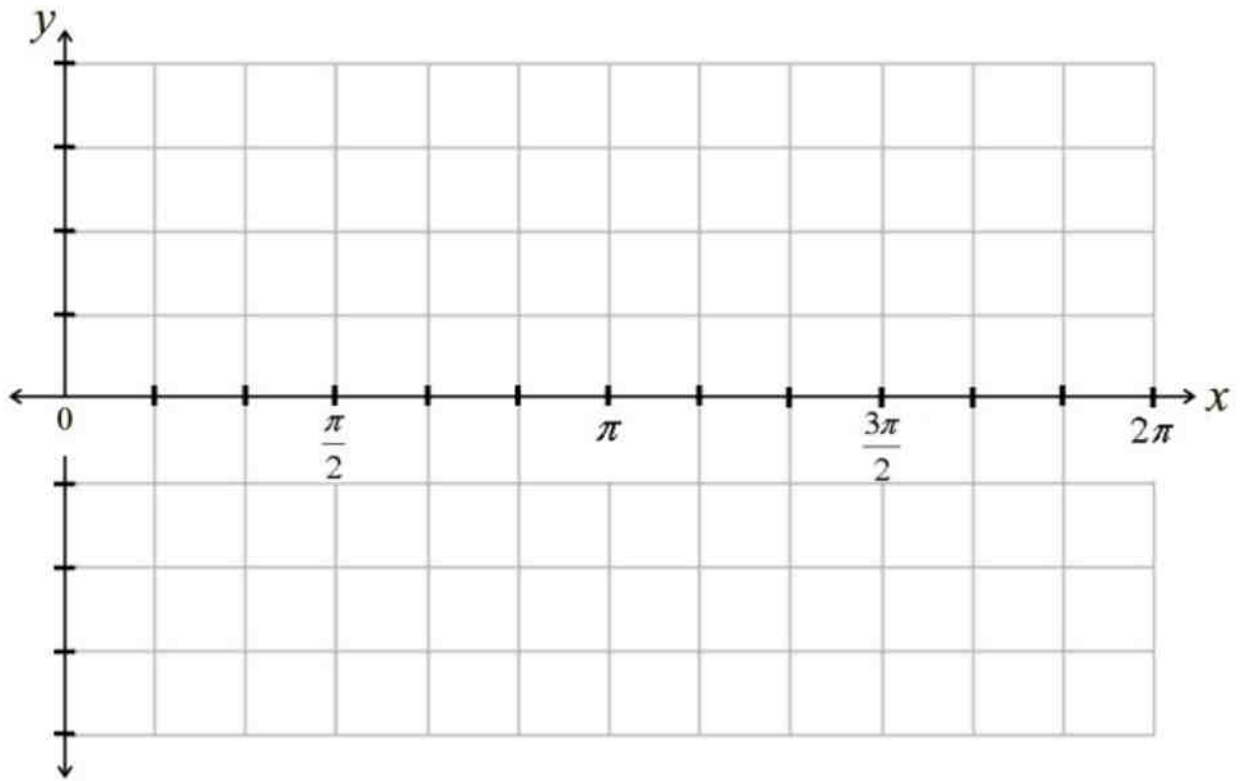
Minimum \_\_\_\_\_

Amplitude \_\_\_\_\_

Period \_\_\_\_\_

y-intercept \_\_\_\_\_

$\theta$ -intercepts \_\_\_\_\_



**Example 2:** Determine the equation of the following graph:

