

## Solving Sine Equations

Goal:

- to solve sine equations
- to understand that there may infinite solutions and how to use correct notation

Solve the following equations:

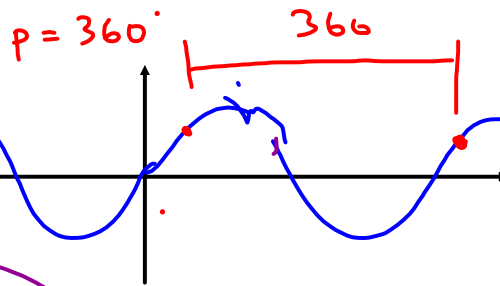
a)  $2\sin\theta = 1$

$\sin\theta = \frac{1}{2}$

$\theta = \sin^{-1}\left(\frac{1}{2}\right)$

$\theta = 30^\circ$

$+360n ; n \in \mathbb{Z}$

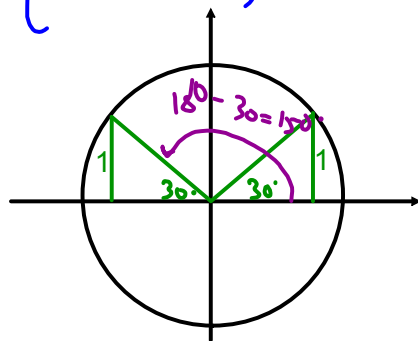


set of integers

belongs to

$\theta = 180^\circ - 30^\circ = 150^\circ$

$\theta = \{30 + 360n, 150 + 360n\}; n \in \mathbb{Z}$



2nd angle is  $180^\circ - \text{first angle}$ .

b)  $2\sin(x-180) - \sqrt{3} = 0$   $p = 360$

$\sin(x-180) = \frac{\sqrt{3}}{2}$

$x-180 = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

$x-180 = 60$

$x = 240$

$x-180 = 120$

$x = 300$

$180 - 60 = 120$

$x = \{240 + 360n, 300 + 360n\}; n \in \mathbb{Z}$

c)  $\sin 4x = 0.6$

$$4x = \sin^{-1}(0.6)$$

$$\frac{4x}{4} = \frac{36.9}{4}$$

$$x = 9.23$$

$$\frac{4x}{4} = \frac{180 - 36.9}{4}$$

$$x = 35.8$$

$$x = \{9.23 + 90n, 35.8 + 90n\}; n \in \mathbb{Z}$$

d)  $3\sin(45x-45) - \sqrt{2} = 0$

$$e) 6\sin 180(x-1)=1$$