

Precalculus

The equation $\sin \theta = a$, special angles

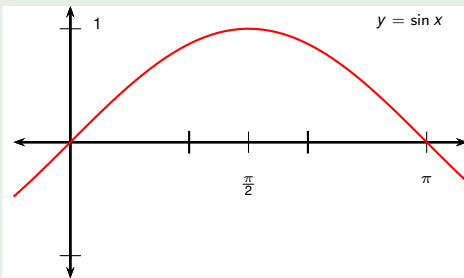
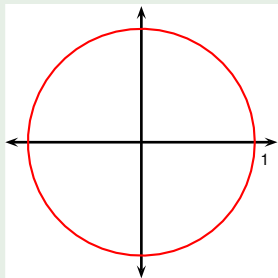
Todor Milev

2019

Example

Find all solutions and then find those that lie between -360° and 360° .

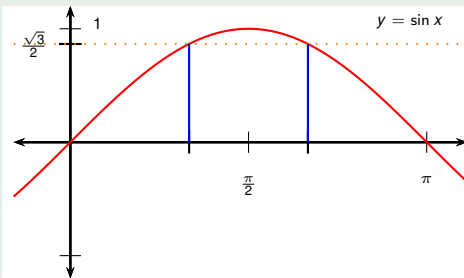
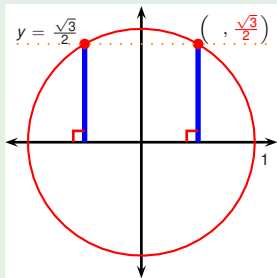
$$\sin \theta = \frac{\sqrt{3}}{2}$$



Example

Find all solutions and then find those that lie between -360° and 360° .

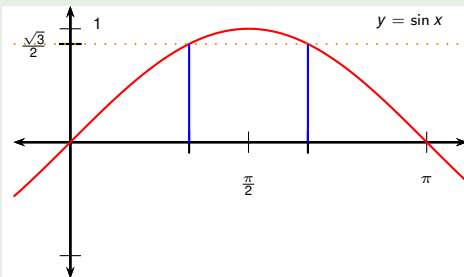
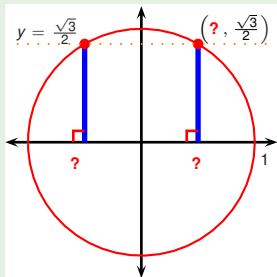
$$\sin \theta = \frac{\sqrt{3}}{2}$$



Example

Find all solutions and then find those that lie between -360° and 360° .

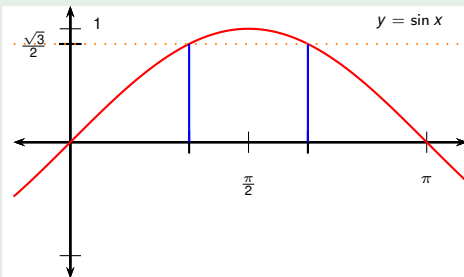
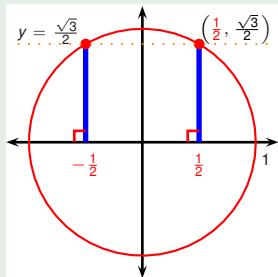
$$\sin \theta = \frac{\sqrt{3}}{2}$$



Example

Find all solutions and then find those that lie between -360° and 360° .

$$\sin \theta = \frac{\sqrt{3}}{2}$$

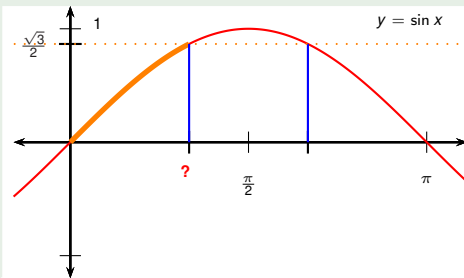
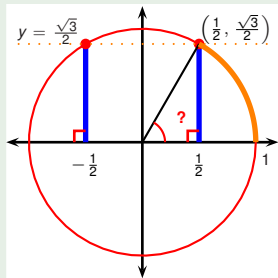


Example

Find all solutions and then find those that lie between -360° and 360° .

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = ?$$

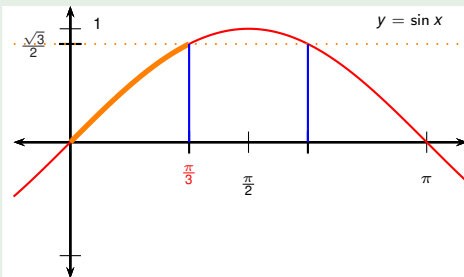
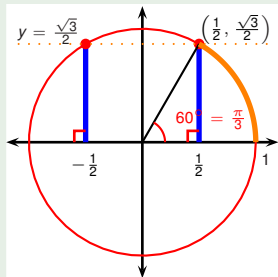


Example

Find all solutions and then find those that lie between -360° and 360° .

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ$$



Example

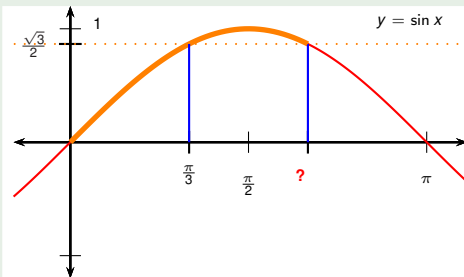
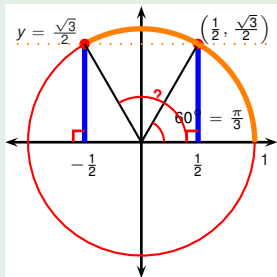
Find all solutions and then find those that lie between -360° and 360° .

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ$$

or

?



Example

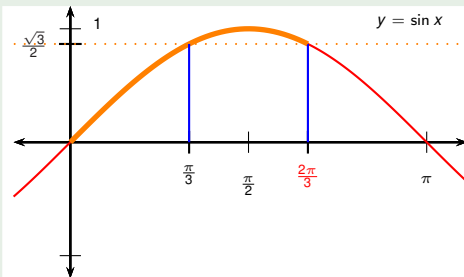
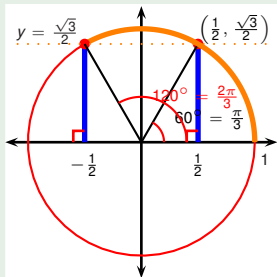
Find all solutions and then find those that lie between -360° and 360° .

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ$$

or

$$120^\circ$$



Example

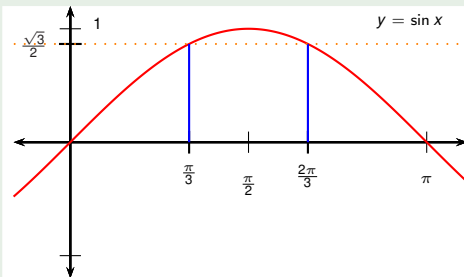
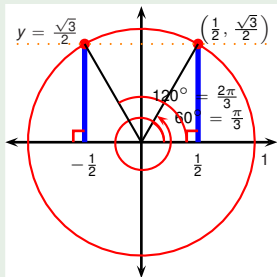
Find all solutions and then find those that lie between -360° and 360° .

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ + k \cdot 360^\circ$$

or

$$120^\circ$$



Example

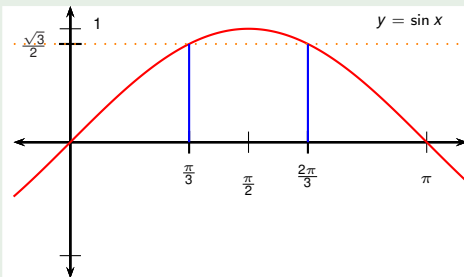
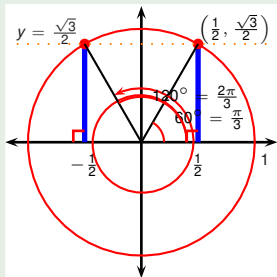
Find all solutions and then find those that lie between -360° and 360° .

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ + k \cdot 360^\circ$$

or

$$120^\circ + k \cdot 360^\circ$$



Example

Find all solutions and then find those that lie between -360° and 360° .

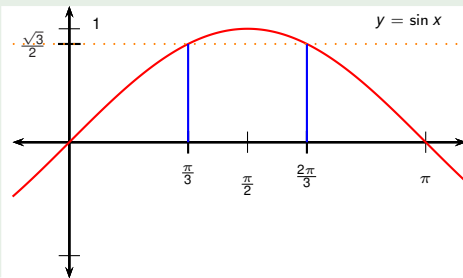
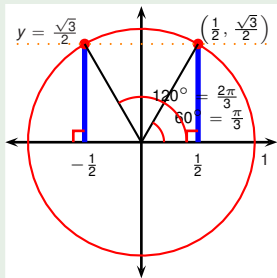
$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ + k \cdot 360^\circ = \dots -660^\circ,$$

or

$$\dots k=-2$$

$$120^\circ + k \cdot 360^\circ = \dots -600^\circ,$$



Example

Find all solutions and then find those that lie between -360° and 360° .

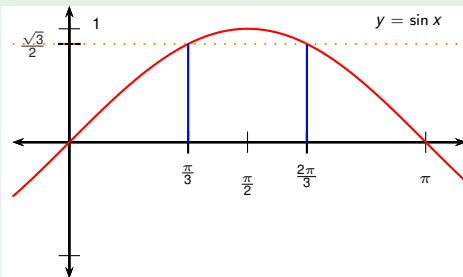
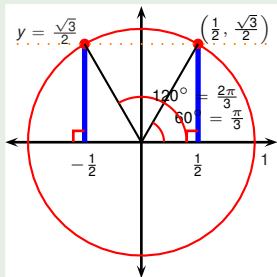
$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ + k \cdot 360^\circ = \dots -660^\circ, -300^\circ,$$

or

$$\dots k=-2 \quad k=-1$$

$$120^\circ + k \cdot 360^\circ = \dots -600^\circ, -240^\circ,$$



Example

Find all solutions and then find those that lie between -360° and 360° .

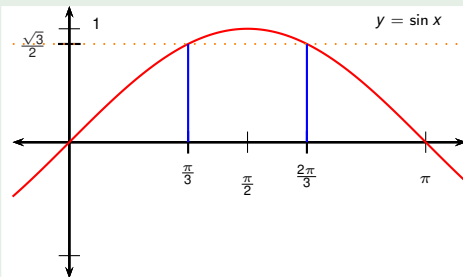
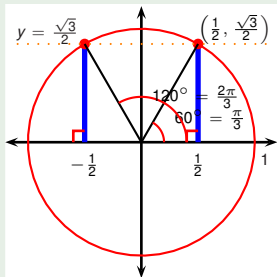
$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ + k \cdot 360^\circ = \dots -660^\circ, -300^\circ, 60^\circ,$$

or

$$\dots \quad k=-2 \quad k=-1 \quad k=0$$

$$120^\circ + k \cdot 360^\circ = \dots -600^\circ, -240^\circ, 120^\circ,$$



Example

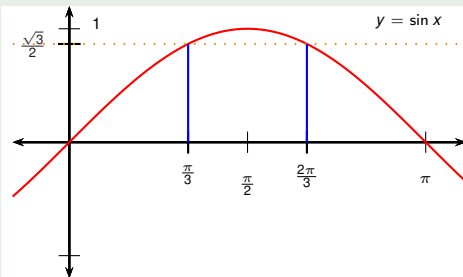
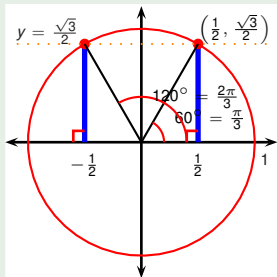
Find all solutions and then find those that lie between -360° and 360° .

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ + k \cdot 360^\circ = \dots -660^\circ, -300^\circ, 60^\circ, 420^\circ, \dots$$

or $\dots \quad k=-2 \quad k=-1 \quad k=0 \quad k=1 \quad \dots$

$$120^\circ + k \cdot 360^\circ = \dots -600^\circ, -240^\circ, 120^\circ, 480^\circ, \dots$$



Example

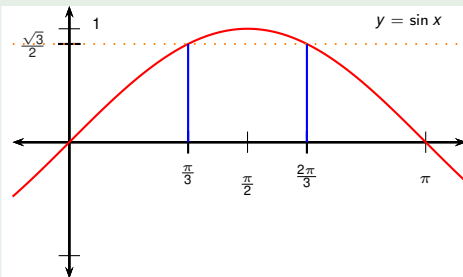
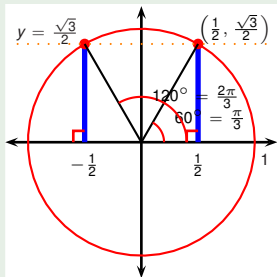
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$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ + k \cdot 360^\circ = \dots -660^\circ, -300^\circ, 60^\circ, 420^\circ, \dots$$

$$\text{or} \quad \dots \quad k=-2 \quad k=-1 \quad k=0 \quad k=1 \quad \dots$$

$$120^\circ + k \cdot 360^\circ = \dots -600^\circ, -240^\circ, 120^\circ, 480^\circ, \dots$$



Example

Find all solutions and then find **those that lie between -360° and 360°** .

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ + k \cdot 360^\circ = \dots -660^\circ, -300^\circ, 60^\circ, 420^\circ, \dots$$

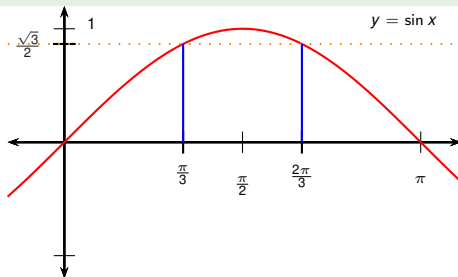
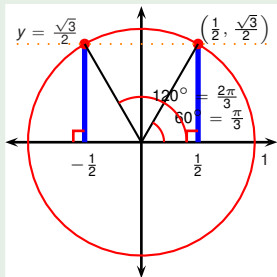
or

$$\dots \quad k=-2 \quad k=-1 \quad k=0 \quad k=1 \quad \dots$$

$$120^\circ + k \cdot 360^\circ = \dots -600^\circ, -240^\circ, 120^\circ, 480^\circ, \dots$$

$$\theta = \dots -660^\circ, -300^\circ, 60^\circ, 420^\circ, \dots$$

$$\dots -600^\circ, -240^\circ, 120^\circ, 480^\circ, \dots$$



Example

Find all solutions and then find **those that lie between -360° and 360°** .

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ + k \cdot 360^\circ = \dots -660^\circ, -300^\circ, 60^\circ, 420^\circ, \dots$$

or

$$\dots \quad k=-2 \quad k=-1 \quad k=0 \quad k=1 \quad \dots$$

$$120^\circ + k \cdot 360^\circ = \dots -600^\circ, -240^\circ, 120^\circ, 480^\circ, \dots$$

$$\theta =$$

$$\therefore \neq -660^\circ, -300^\circ, 60^\circ, 420^\circ, \therefore \neq$$

$$\therefore \neq -600^\circ, -240^\circ, 120^\circ, 480^\circ, \therefore \neq$$

