

Precalculus

The equation $\cos \theta = b$, special angles

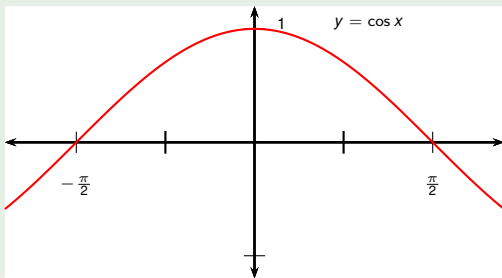
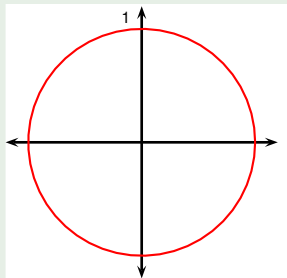
Todor Milev

2019

Example

Find all solutions and then find those that lie between -180° and 180° .

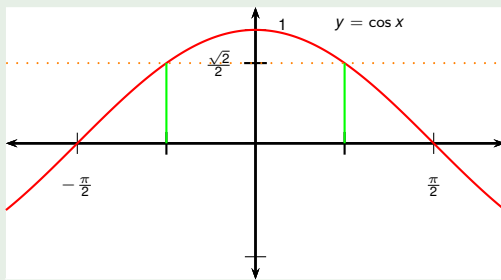
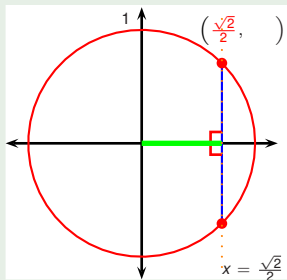
$$\cos \theta = \frac{\sqrt{2}}{2}$$



Example

Find all solutions and then find those that lie between -180° and 180° .

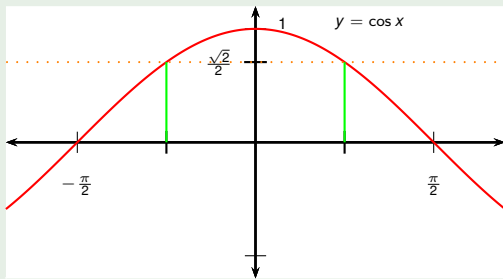
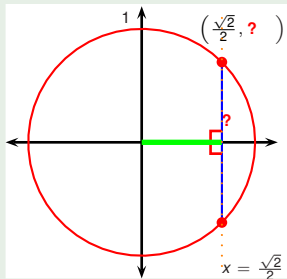
$$\cos \theta = \frac{\sqrt{2}}{2}$$



Example

Find all solutions and then find those that lie between -180° and 180° .

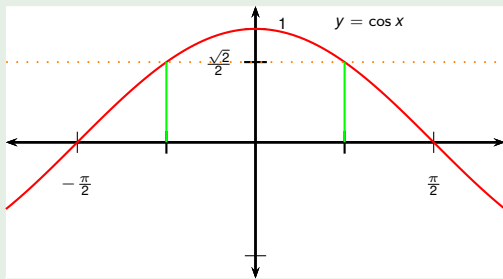
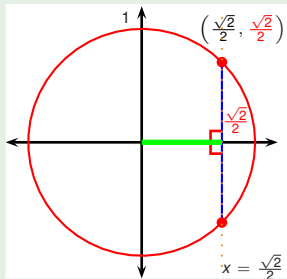
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$$\cos \theta = \frac{\sqrt{2}}{2}$$

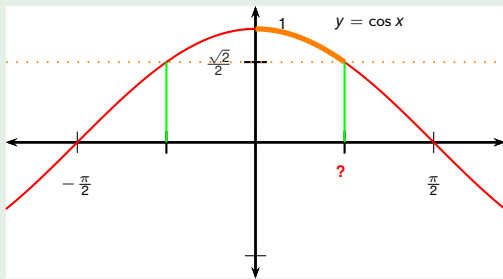
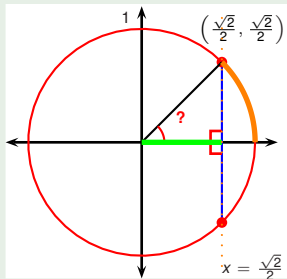


Example

Find all solutions and then find those that lie between -180° and 180° .

$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\theta = ?$$

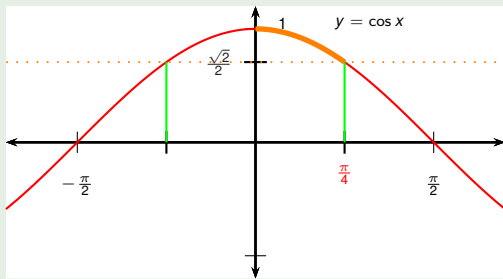
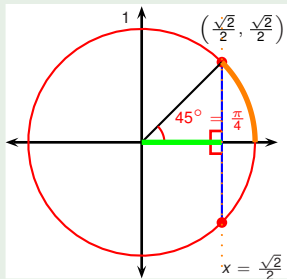


Example

Find all solutions and then find those that lie between -180° and 180° .

$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45^\circ$$



Example

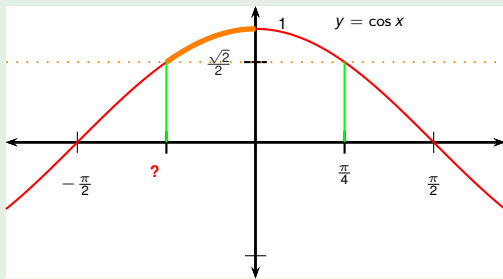
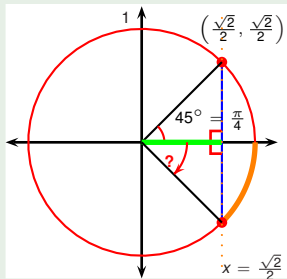
Find all solutions and then find those that lie between -180° and 180° .

$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45^\circ$$

or

?



Example

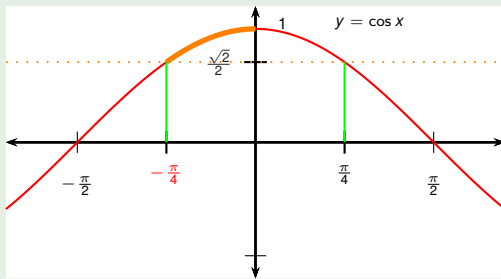
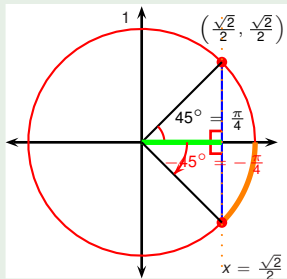
Find all solutions and then find those that lie between -180° and 180° .

$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45^\circ$$

or

$$-45^\circ$$



Example

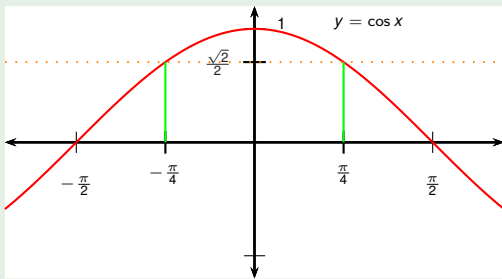
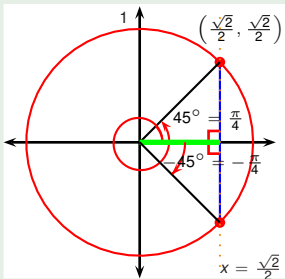
Find all solutions and then find those that lie between -180° and 180° .

$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45^\circ + k \cdot 360^\circ$$

or

$$-45^\circ$$



Example

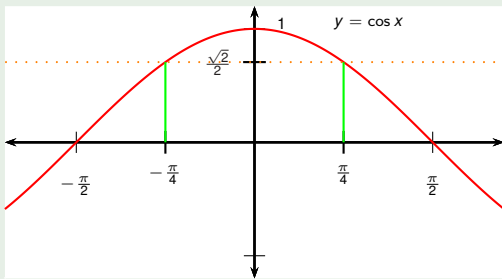
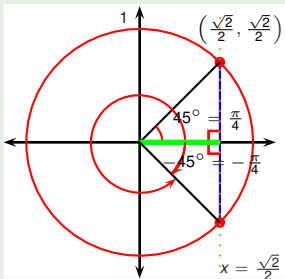
Find all solutions and then find those that lie between -180° and 180° .

$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45^\circ + k \cdot 360^\circ$$

or

$$-45^\circ + k \cdot 360^\circ$$



Example

Find all solutions and then find those that lie between -180° and 180° .

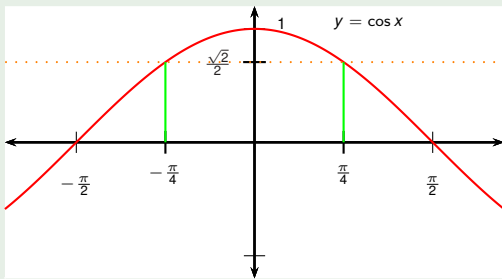
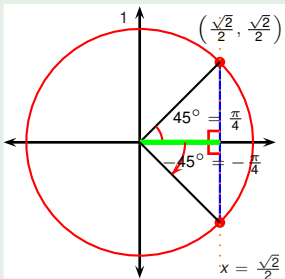
$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45^\circ + k \cdot 360^\circ = \dots - 675^\circ,$$

or

$$\dots k = -2$$

$$-45^\circ + k \cdot 360^\circ = \dots - 765^\circ,$$



Example

Find all solutions and then find those that lie between -180° and 180° .

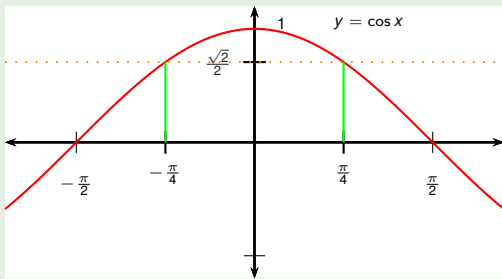
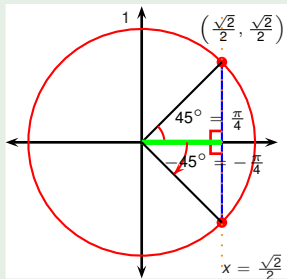
$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45^\circ + k \cdot 360^\circ = \dots - 675^\circ, -315^\circ,$$

or

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

$$-45^\circ + k \cdot 360^\circ = \dots - 765^\circ, -405^\circ,$$



Example

Find all solutions and then find those that lie between -180° and 180° .

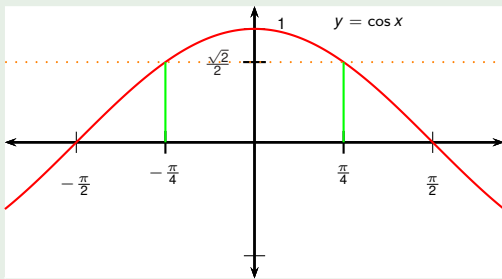
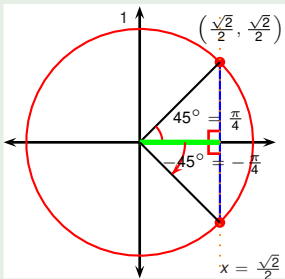
$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45^\circ + k \cdot 360^\circ = \dots - 675^\circ, -315^\circ, 45^\circ,$$

or

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

$$-45^\circ + k \cdot 360^\circ = \dots - 765^\circ, -405^\circ, -45^\circ,$$



Example

Find all solutions and then find those that lie between -180° and 180° .

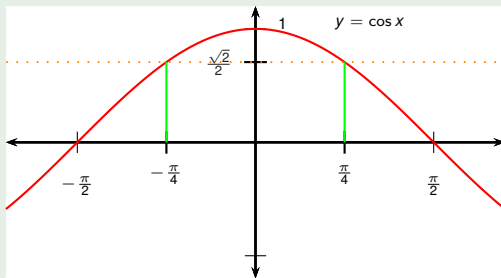
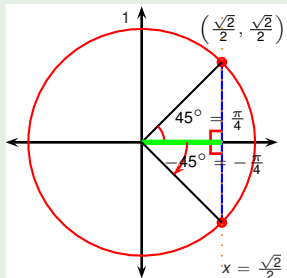
$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45^\circ + k \cdot 360^\circ = \dots - 675^\circ, -315^\circ, 45^\circ, 405^\circ, \dots$$

or

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

$$-45^\circ + k \cdot 360^\circ = \dots - 765^\circ, -405^\circ, -45^\circ, 315^\circ, \dots$$



Example

Find all solutions and then find those that lie between -180° and 180° .

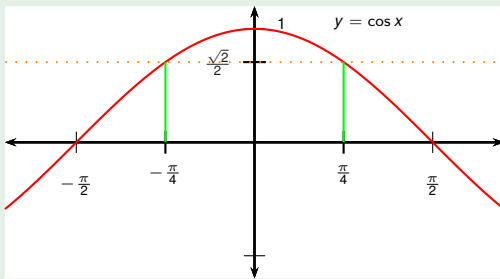
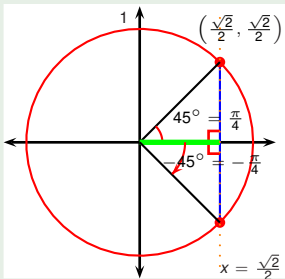
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$$\theta = 45^\circ + k \cdot 360^\circ = \dots - 675^\circ, -315^\circ, 45^\circ, 405^\circ, \dots$$

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Find all solutions and then find **those that lie between -180° and 180°** .

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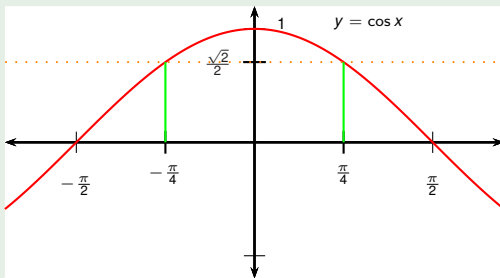
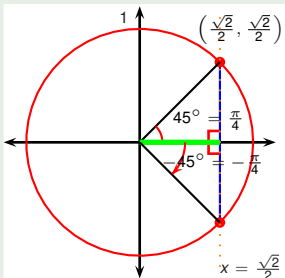
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or

$$-45^\circ + k \cdot 360^\circ = \dots - 765^\circ, -405^\circ, -45^\circ, 315^\circ, \dots$$

$$\theta = \dots - 675^\circ, -315^\circ, 45^\circ, 405^\circ, \dots$$

$$\dots - 765^\circ, -405^\circ, -45^\circ, 315^\circ, \dots$$



Example

Find all solutions and then find **those that lie between -180° and 180°** .

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$$\theta = 45^\circ + k \cdot 360^\circ = \dots - 675^\circ, -315^\circ, 45^\circ, 405^\circ, \dots$$

or

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

$$-45^\circ + k \cdot 360^\circ = \dots - 765^\circ, -405^\circ, -45^\circ, 315^\circ, \dots$$

$$\theta =$$

$$\begin{aligned} & \text{./. } \cancel{-675^\circ}, \cancel{-315^\circ}, 45^\circ, 405^\circ, \text{./.} \\ & \text{./. } \cancel{-765^\circ}, \cancel{-405^\circ}, -45^\circ, 315^\circ, \text{./.} \end{aligned}$$

