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

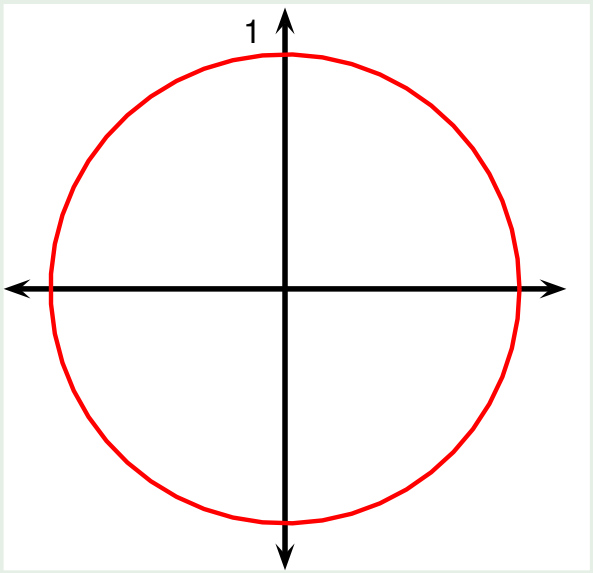
Todor Milev

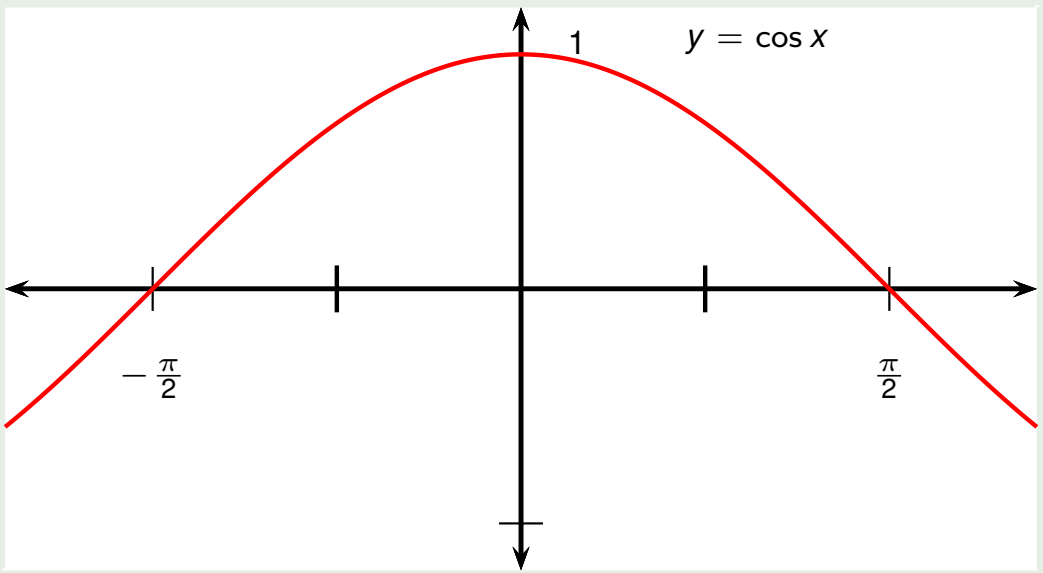
2019

Example

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

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





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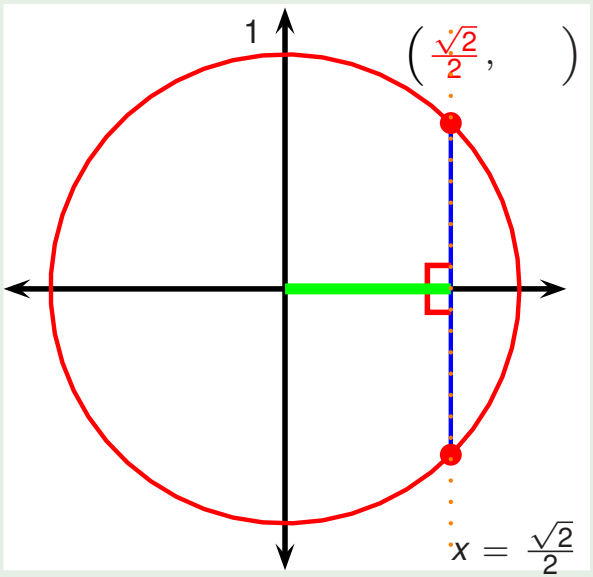

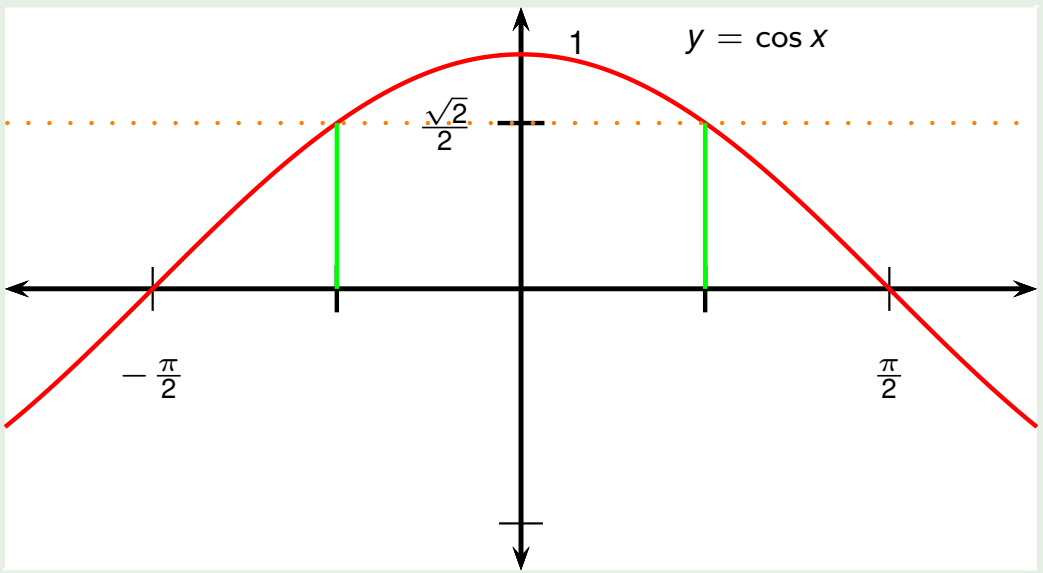

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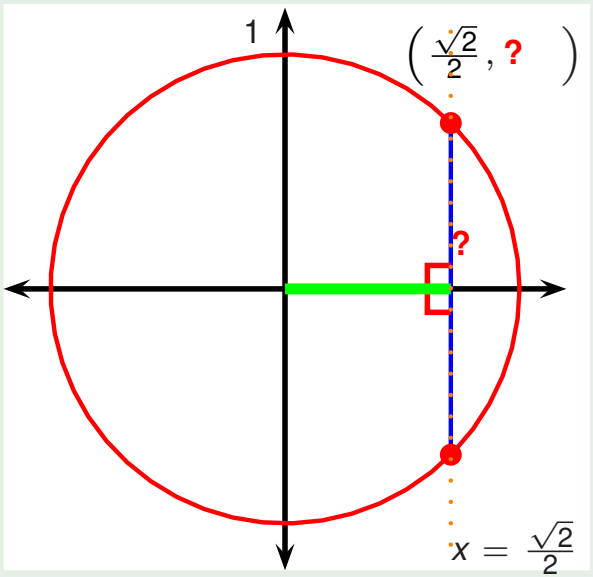

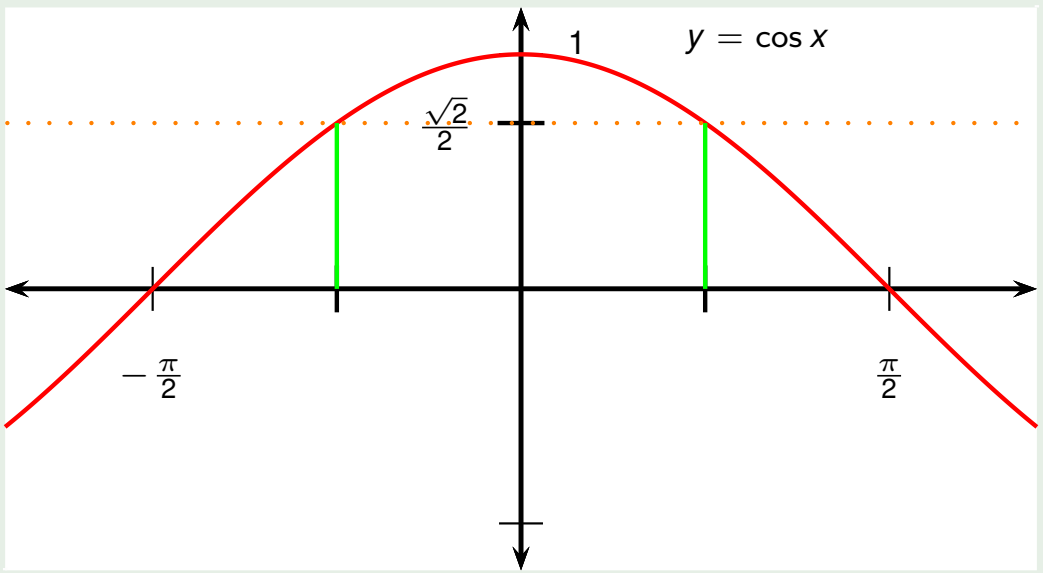

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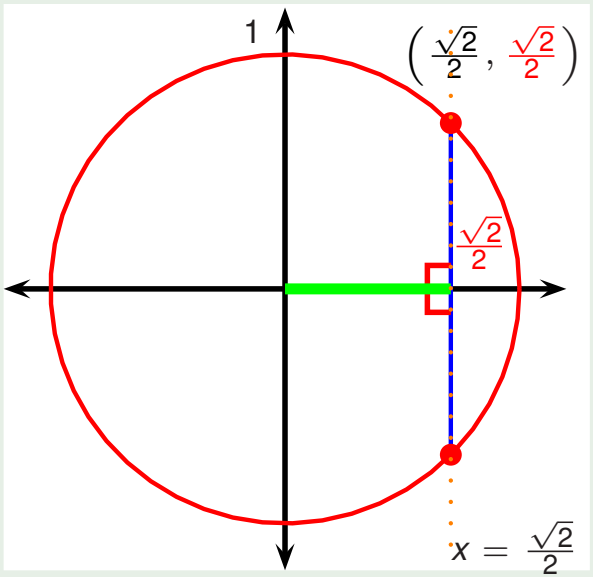

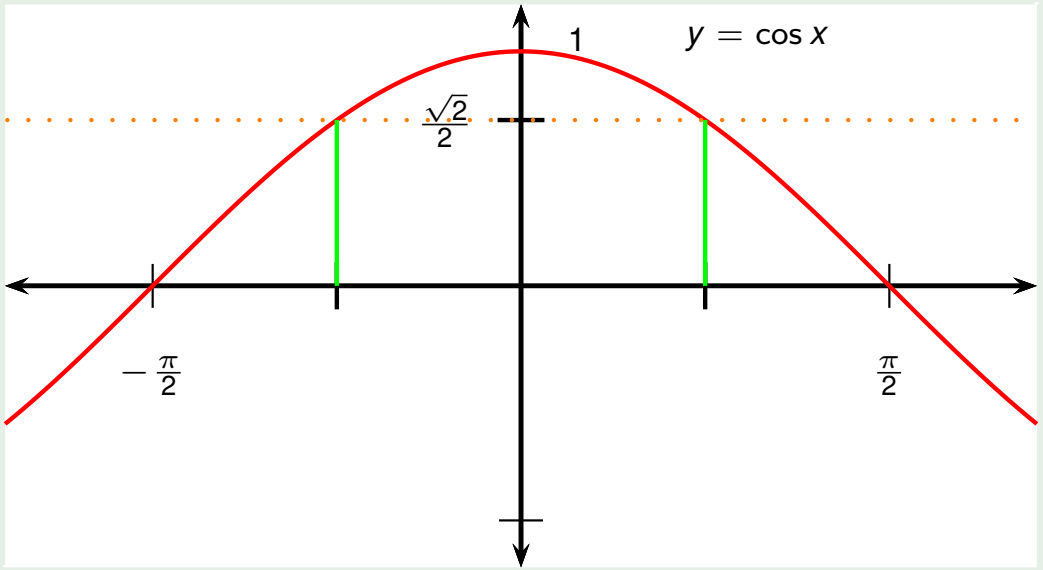

Example

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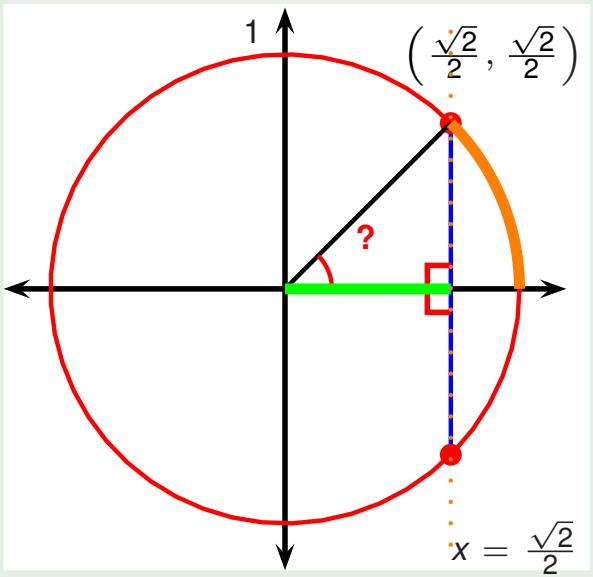
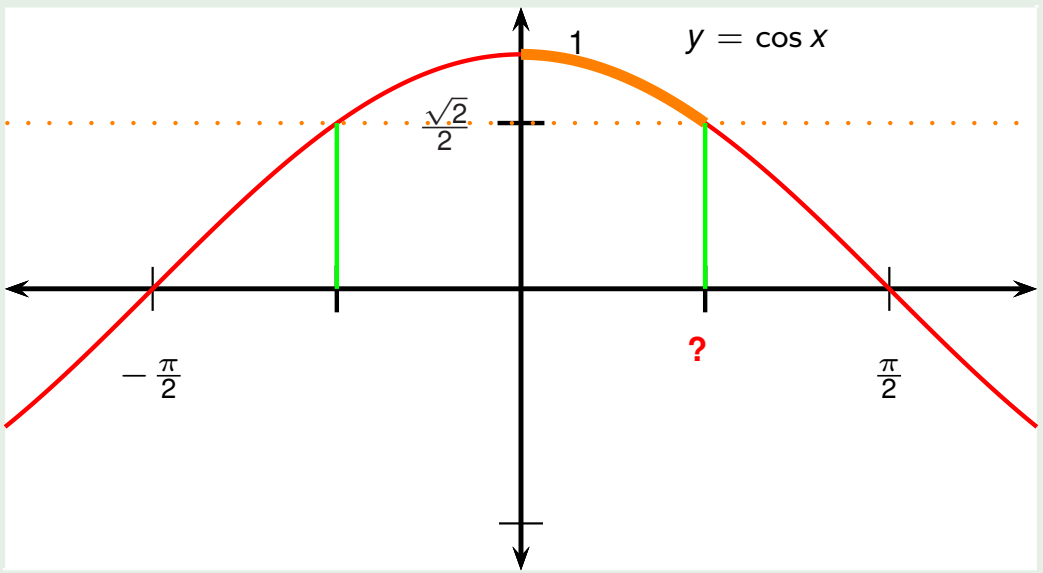
$$\cos\theta = \frac{\sqrt{2}}{2}$$

$$\theta = \textbf{?}$$



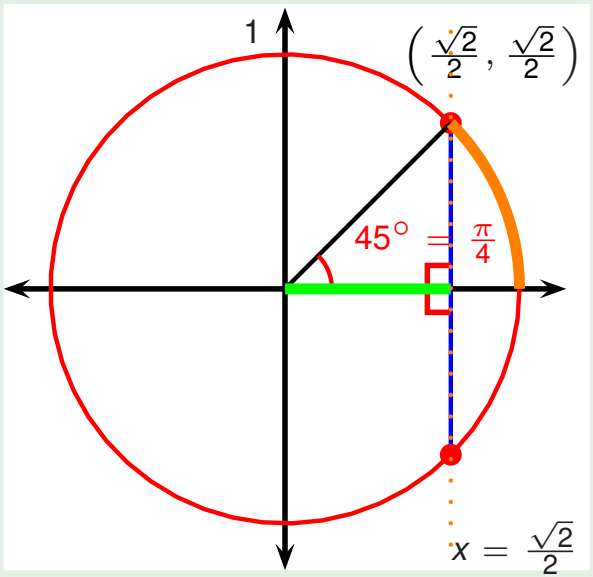


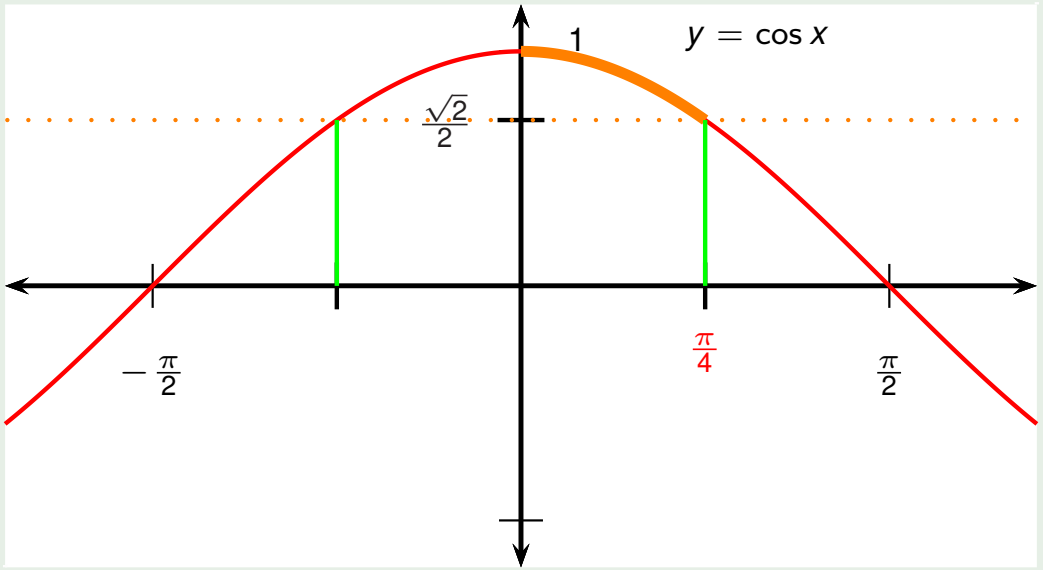
Example

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

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

$$\theta = 45°$$





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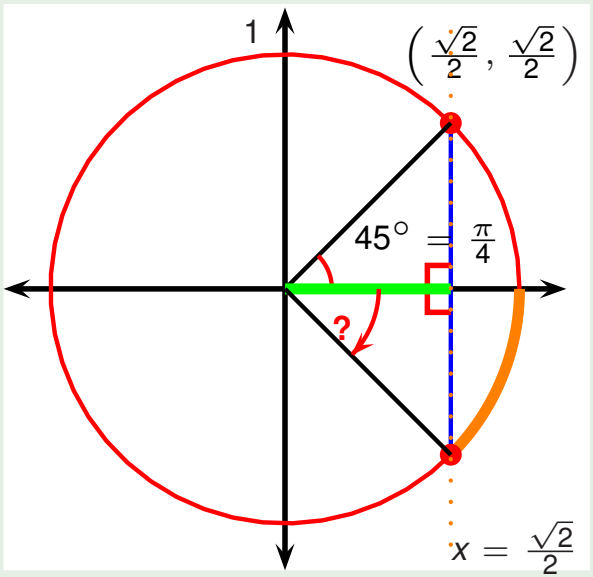
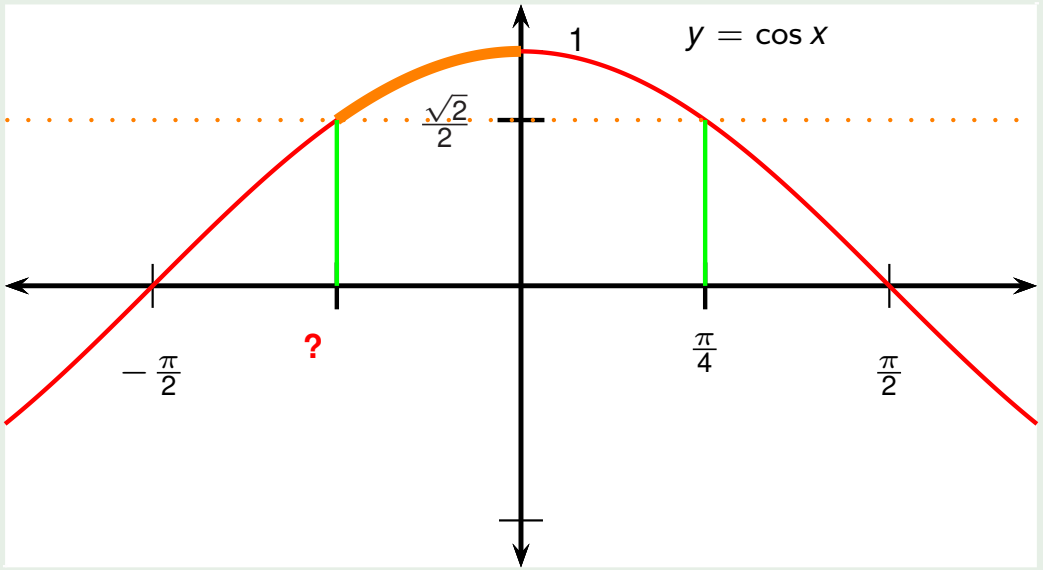
$$\theta = 45°$$

or

?





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

$$\theta = 45°$$

or

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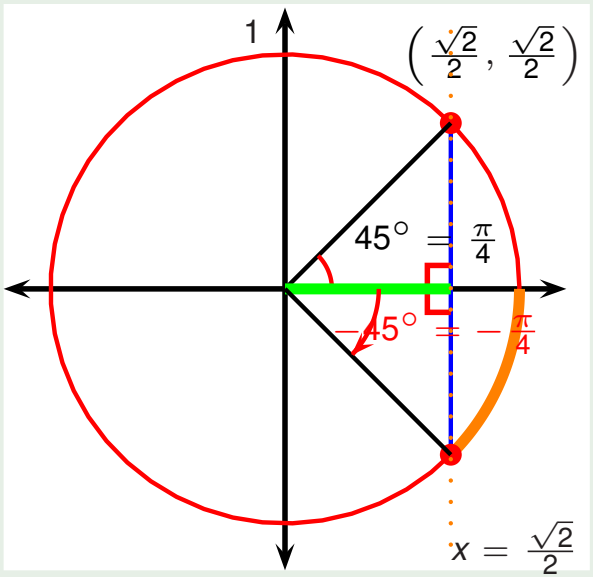
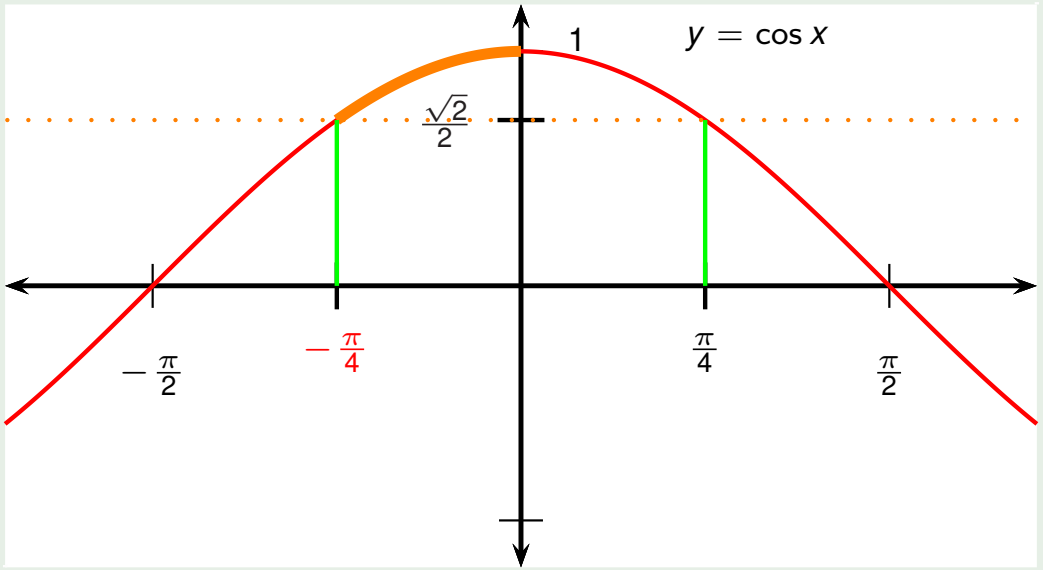




Example

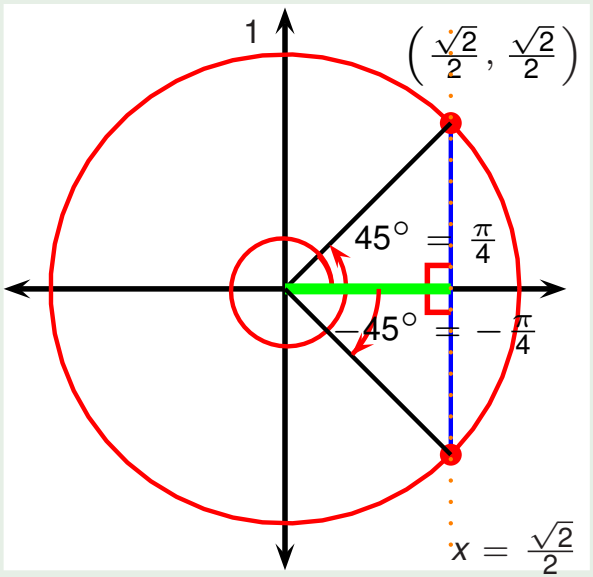
Find all solutions and then find those that lie between $-180°$ and $180°$.

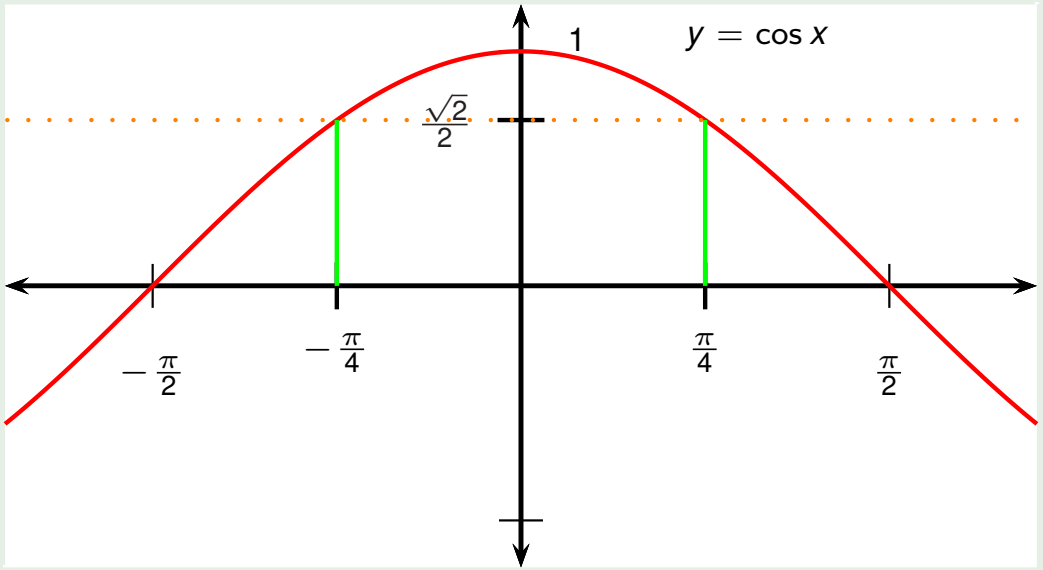
$$\cos\theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45° + k \cdot 360°$$

or

$$-45°$$





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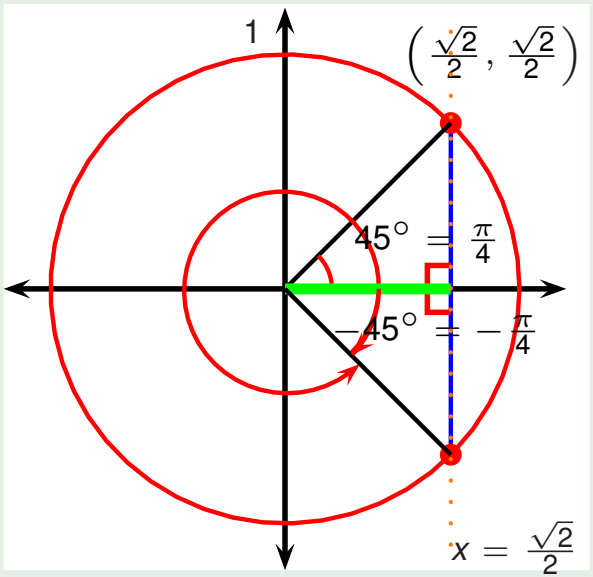
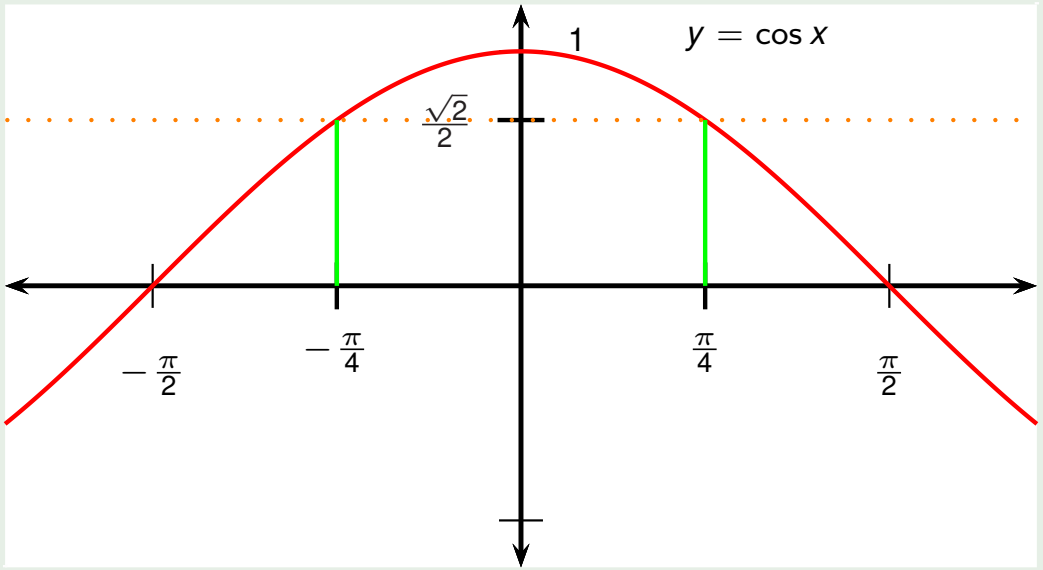




Example

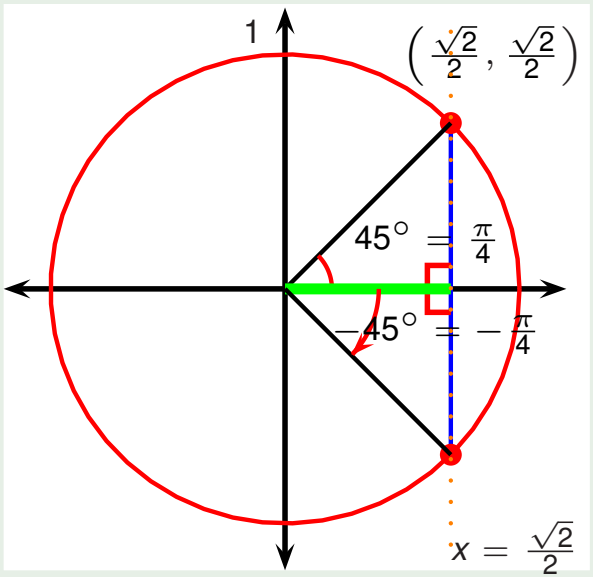
Find all solutions and then find those that lie between -180° and 180°.

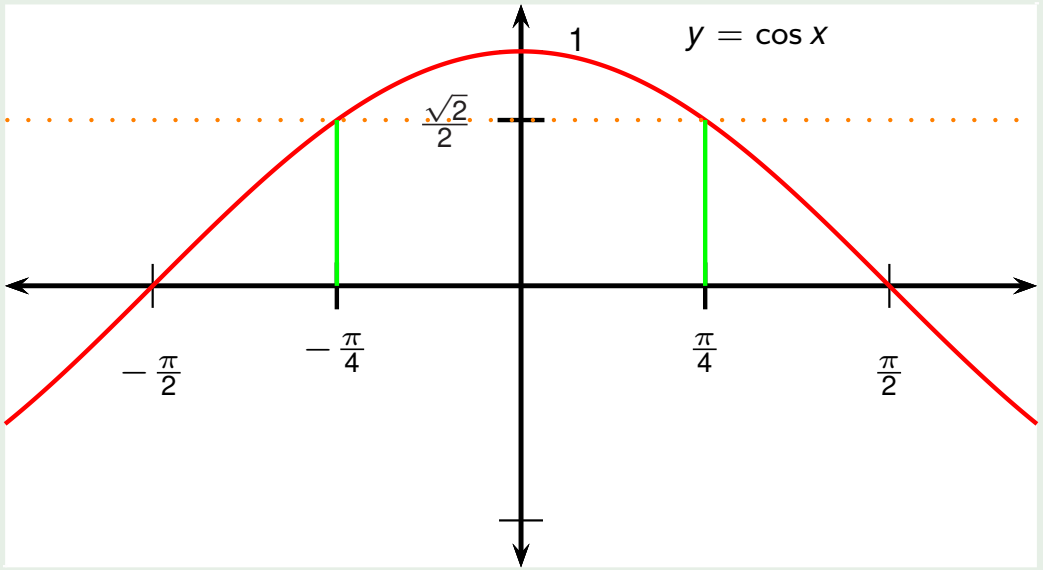
$$\cos\theta = \frac{\sqrt{2}}{2}$$

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

or $\cdots \quad k{=}{-}2$

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





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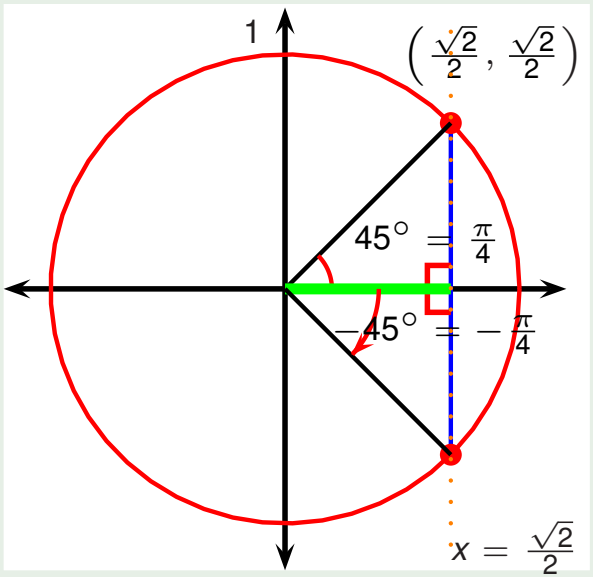
Find all solutions and then find those that lie between $-180°$ and $180°$.

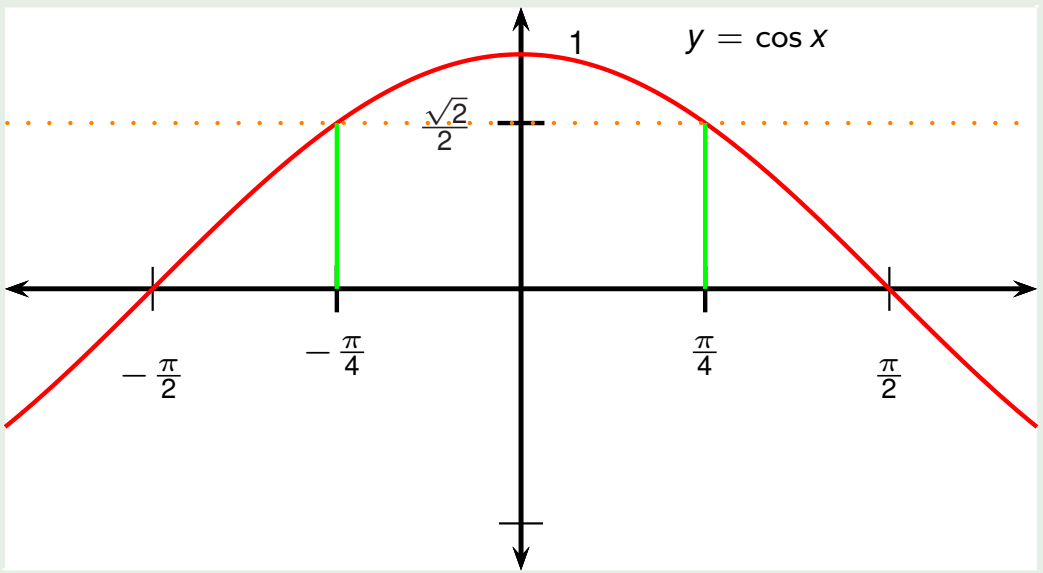
$$\cos\theta = \frac{\sqrt{2}}{2}$$

$$\theta = 45° + k \cdot 360° = \quad \ldots \quad -675°, \quad -315°,$$

$$\text{or} \qquad\qquad \ldots \quad k{=}{-2} \qquad k{=}{-1}$$

$$-45° + k \cdot 360° = \ldots \quad -765°, \quad -405°,$$





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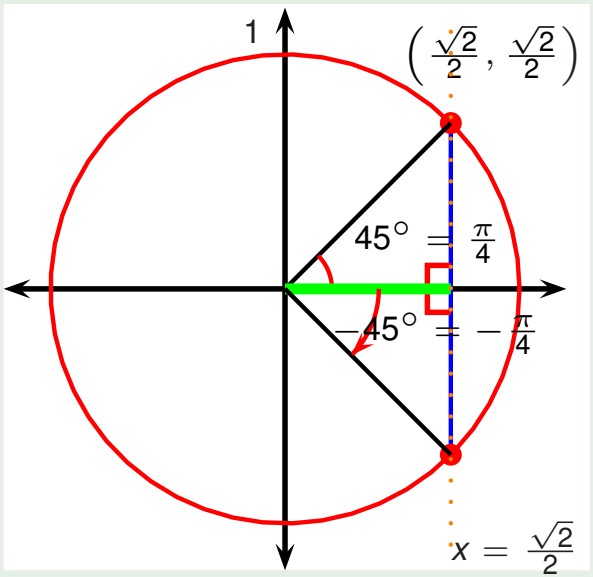

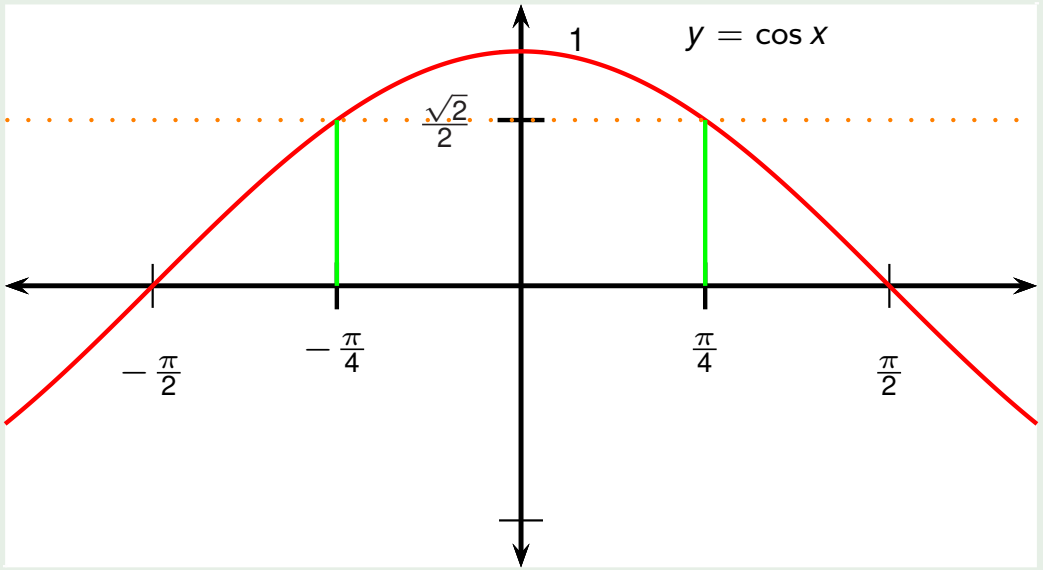

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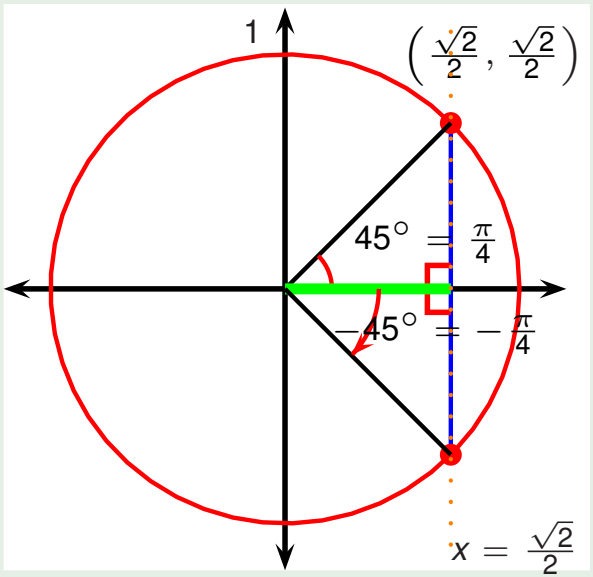

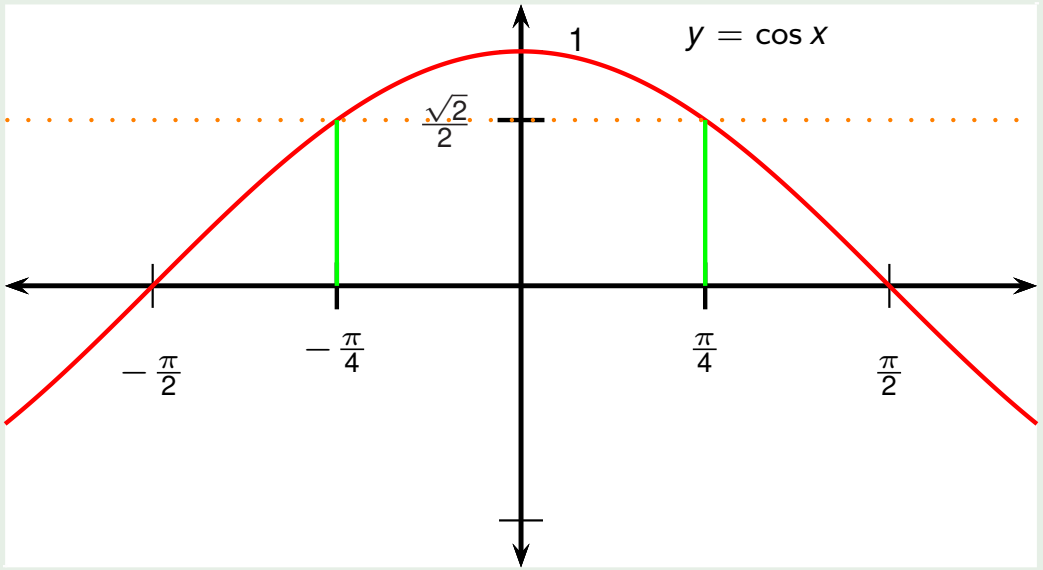

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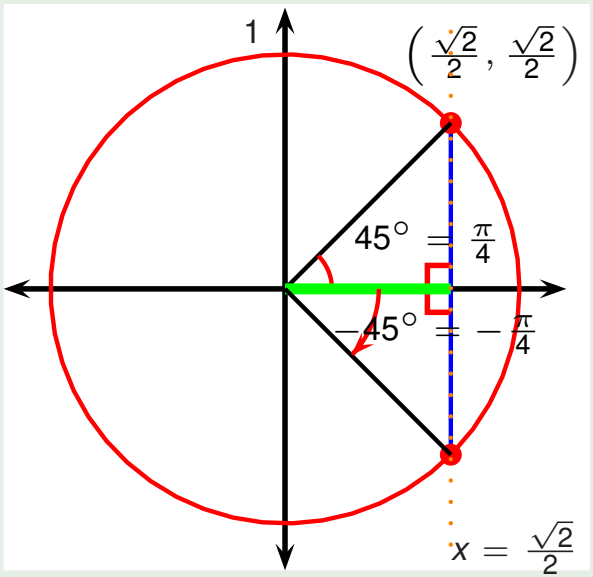

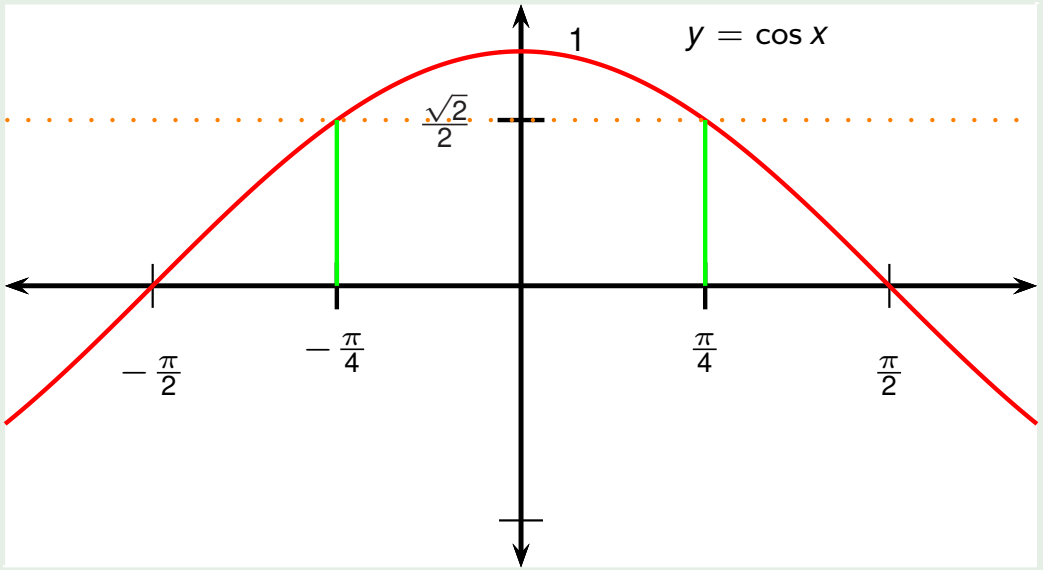

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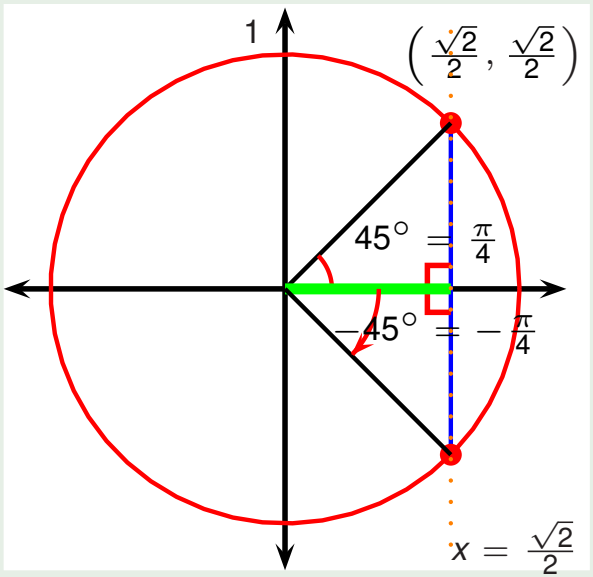

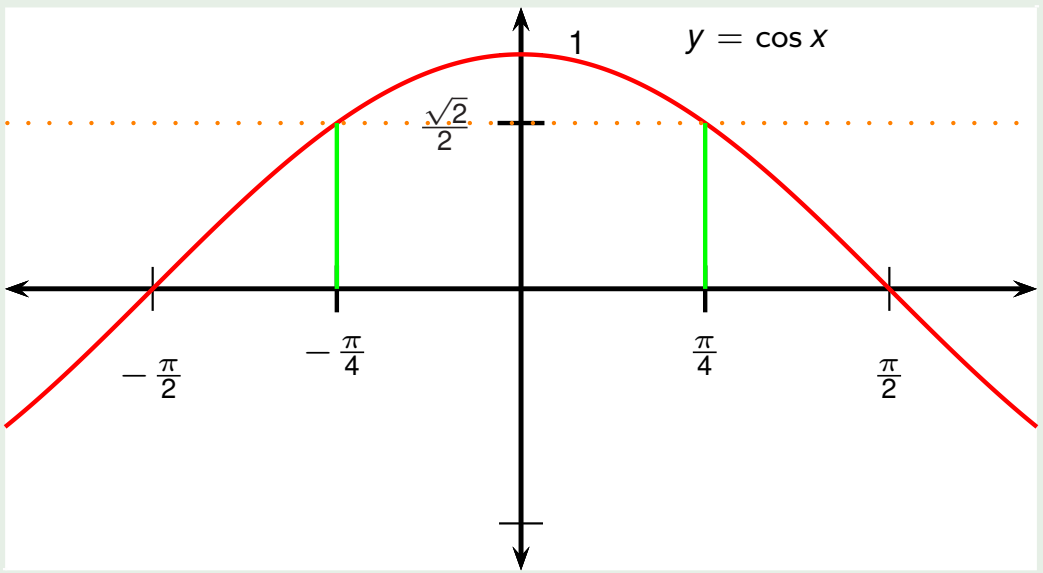

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$$\theta = \quad \cancel{\ldots} \quad \cancel{-675°}, \quad \cancel{-315°}, \quad 45°, \quad \cancel{405°}, \quad \cancel{\ldots}$$

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