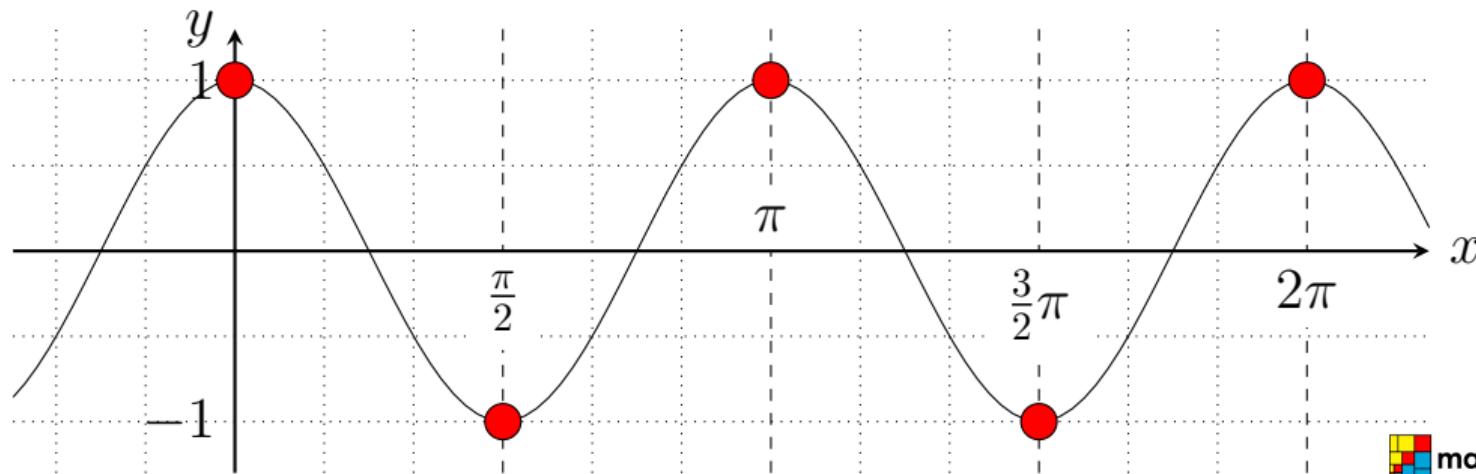


三角関数

2302. 倍角公式をグラフで見る

$y = 1 - 2 \sin^2 \theta$ と $y = \cos 2\theta$ が等しくなることをグラフを描いて示しなさい。



今回の学習目標

倍角公式をグラフの視点から

- $\cos 2\theta = 2 \cos^2 \theta - 1$ は、なぜ等しいのか？

倍角の公式 : $\cos 2\theta = \cos^2 \theta - \sin^2 \theta$

倍角の公式 : $\cos 2\theta = \cos^2 \theta - \sin^2 \theta$

$$= \cos^2 \theta - (1 - \cos^2 \theta)$$

倍角の公式 : $\cos 2\theta = \cos^2 \theta - \sin^2 \theta$

$$\begin{aligned} &= \cos^2 \theta - (1 - \cos^2 \theta) \\ &= 2 \cos^2 \theta - 1 \end{aligned}$$

倍角の公式 : $\cos 2\theta = \cos^2 \theta - \sin^2 \theta$

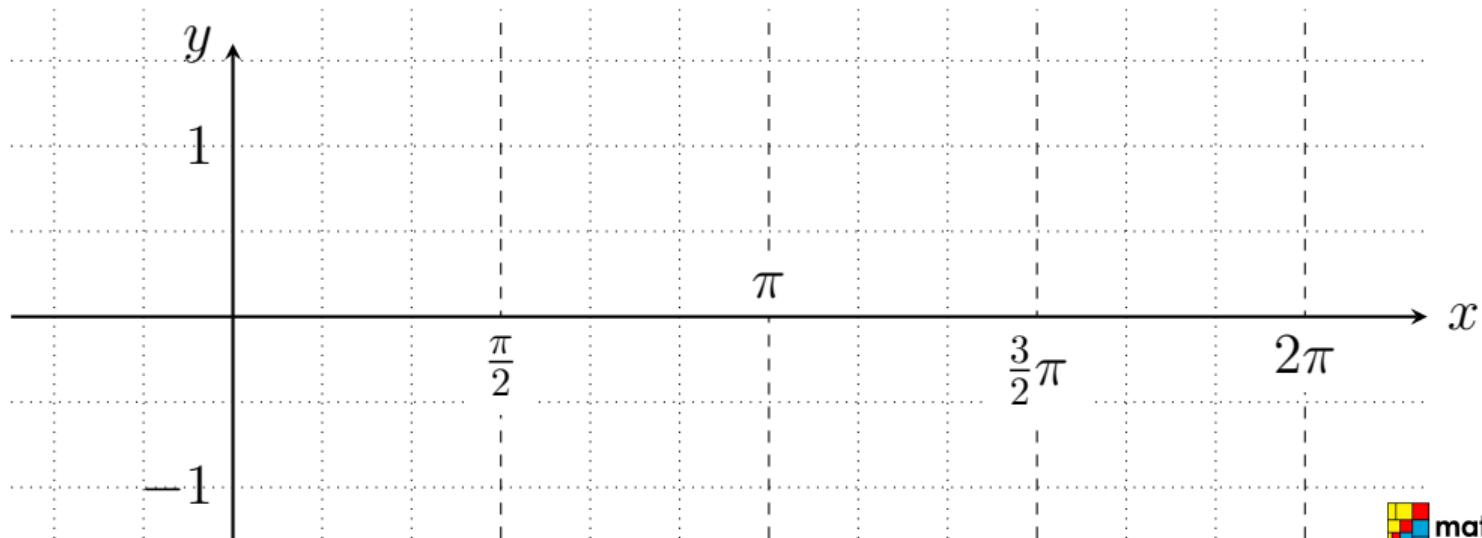
$$\begin{aligned} &= \cos^2 \theta - (1 - \cos^2 \theta) \\ &= 2 \cos^2 \theta - 1 \end{aligned}$$

$$\cos 2\theta = 2 \cos^2 \theta - 1$$

$$\cos 2\theta = 2 \cos^2 \theta - 1$$

左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

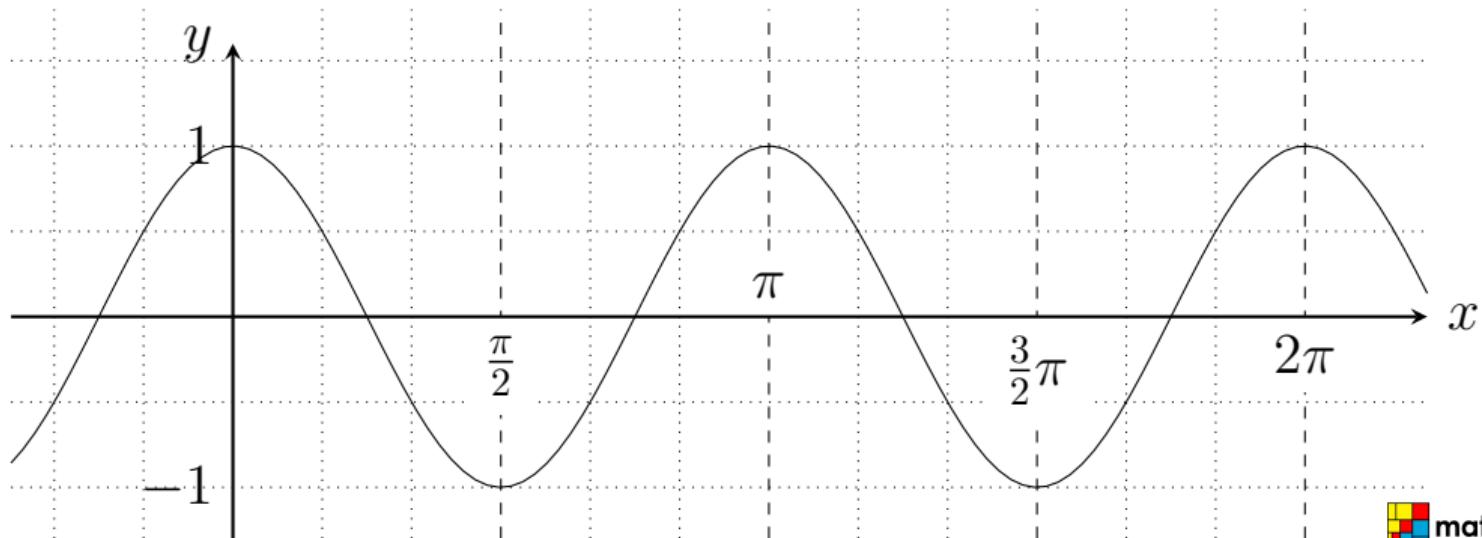
(左辺) $y = \cos 2\theta$



$$\cos 2\theta = 2 \cos^2 \theta - 1$$

左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

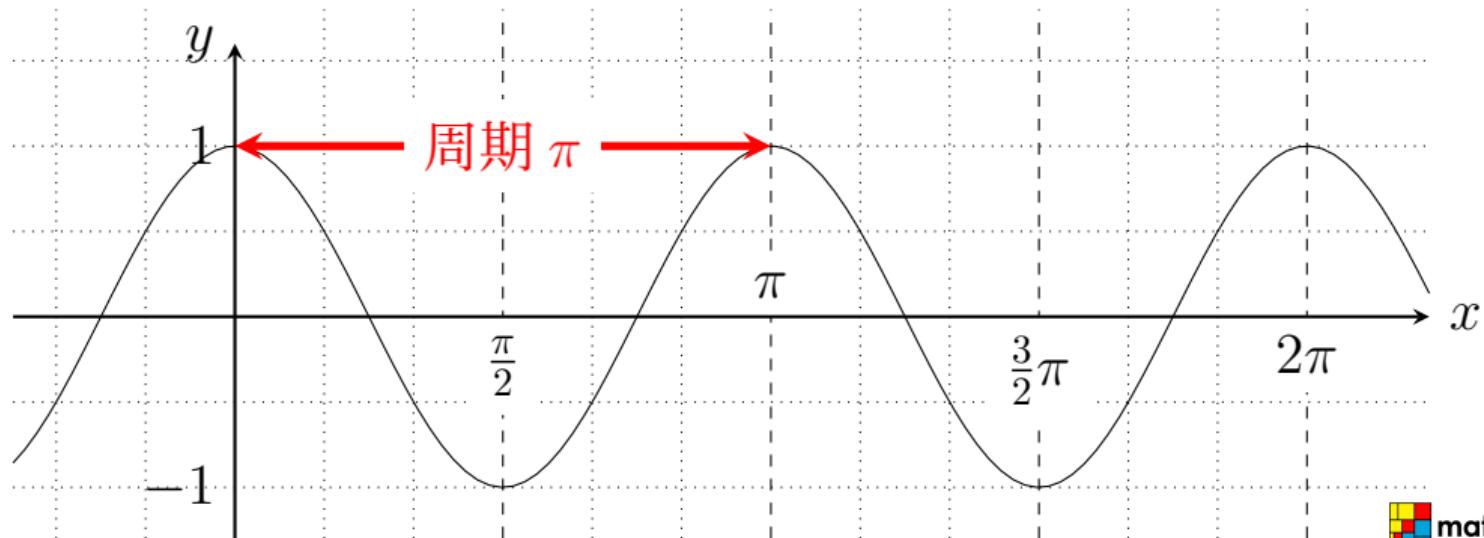
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左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

(左辺) $y = \cos 2\theta$

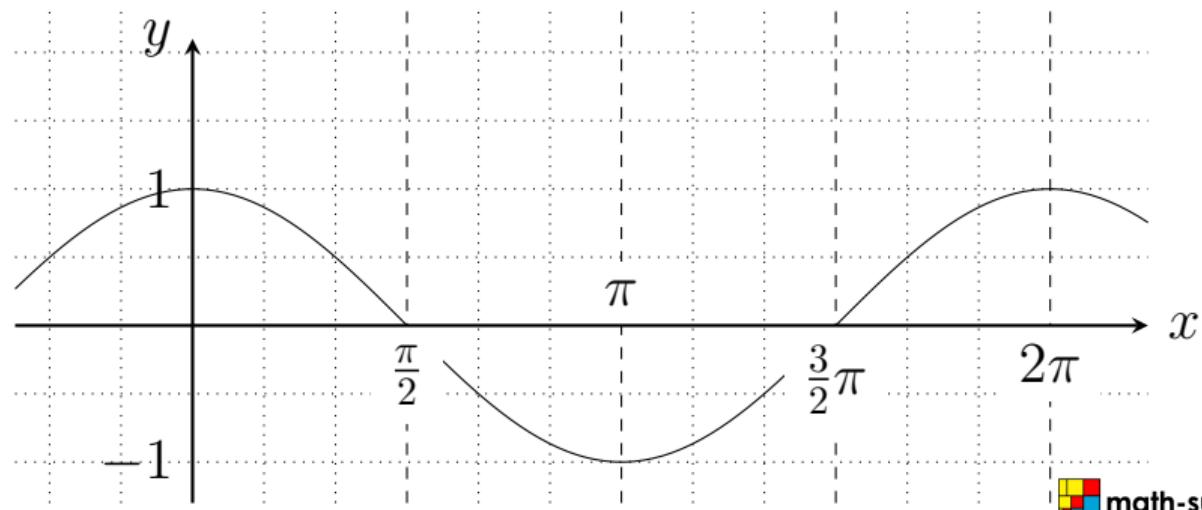


$$\cos 2\theta = 2 \cos^2 \theta - 1$$

左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

(右辺) $y = 2 \cos^2 \theta - 1$ はどんなグラフになるか？

$$y = \cos \theta$$



$$\cos 2\theta = 2 \cos^2 \theta - 1$$

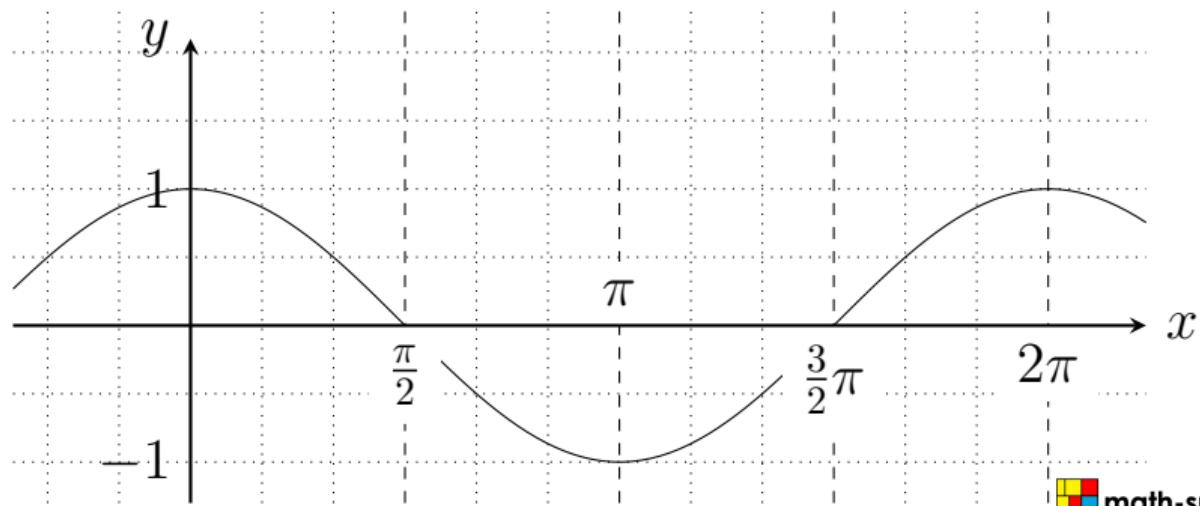
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(右辺) $y = 2 \cos^2 \theta - 1$ はどんなグラフになるか？

$$y = \cos \theta$$

$$\downarrow$$

$$y = \cos^2 \theta$$



$$\cos 2\theta = 2 \cos^2 \theta - 1$$

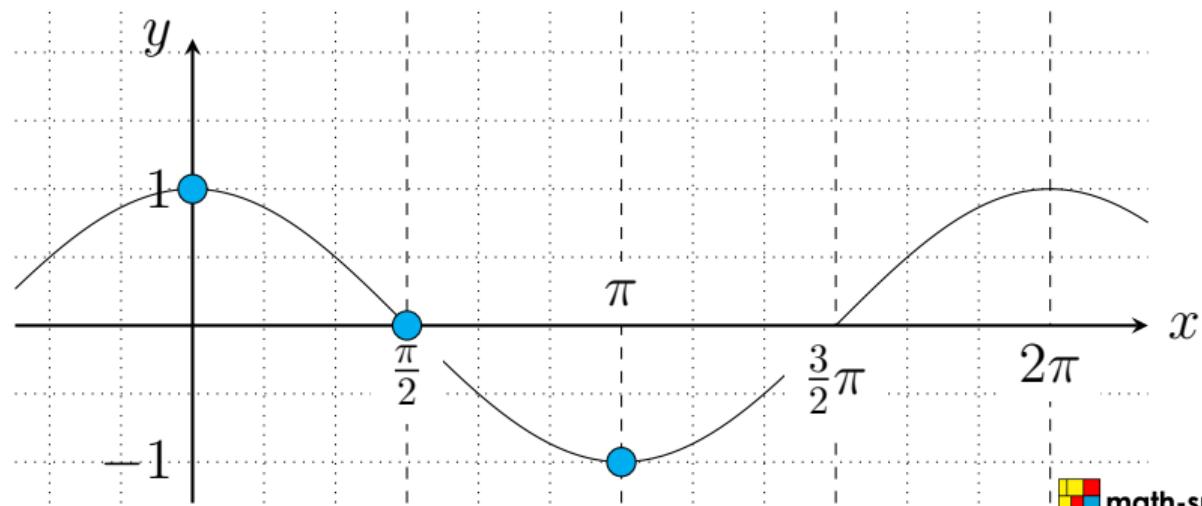
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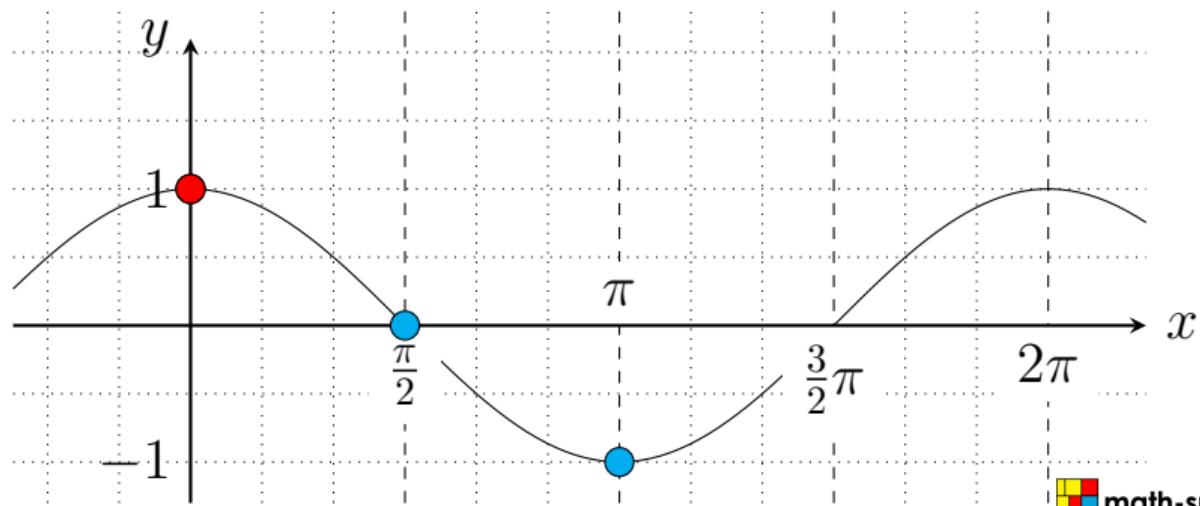
左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

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$$\cos 2\theta = 2 \cos^2 \theta - 1$$

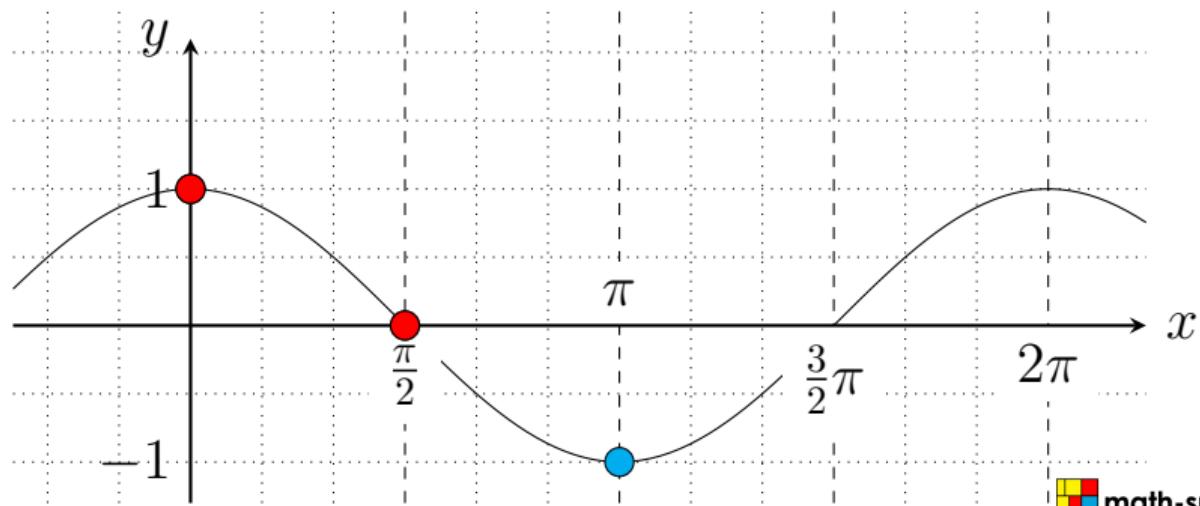
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$$\cos 2\theta = 2 \cos^2 \theta - 1$$

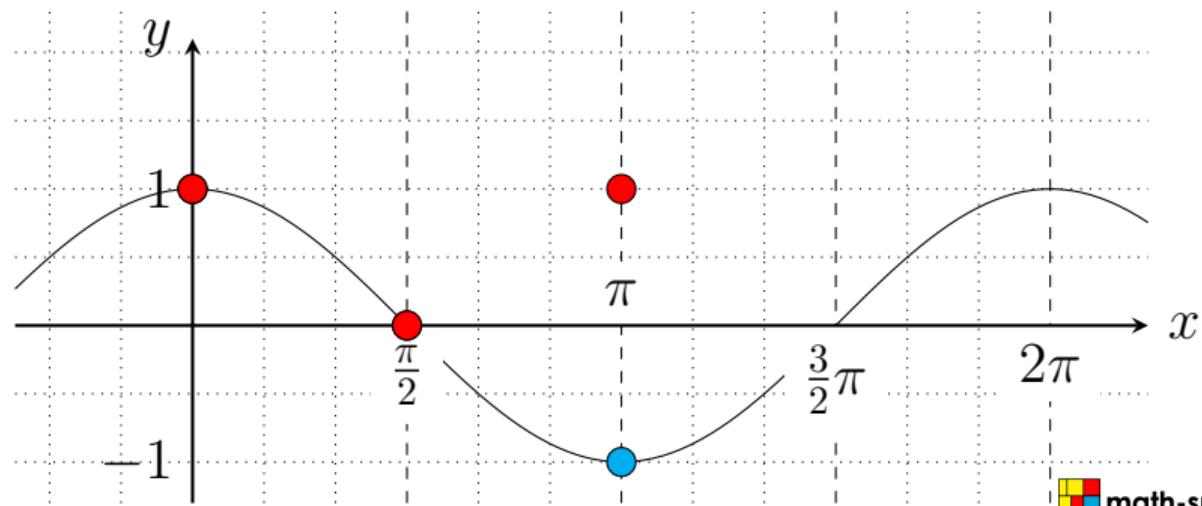
左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

(右辺) $y = 2 \cos^2 \theta - 1$ はどんなグラフになるか？

$$y = \cos \theta$$

$$\downarrow$$

$$y = \cos^2 \theta$$

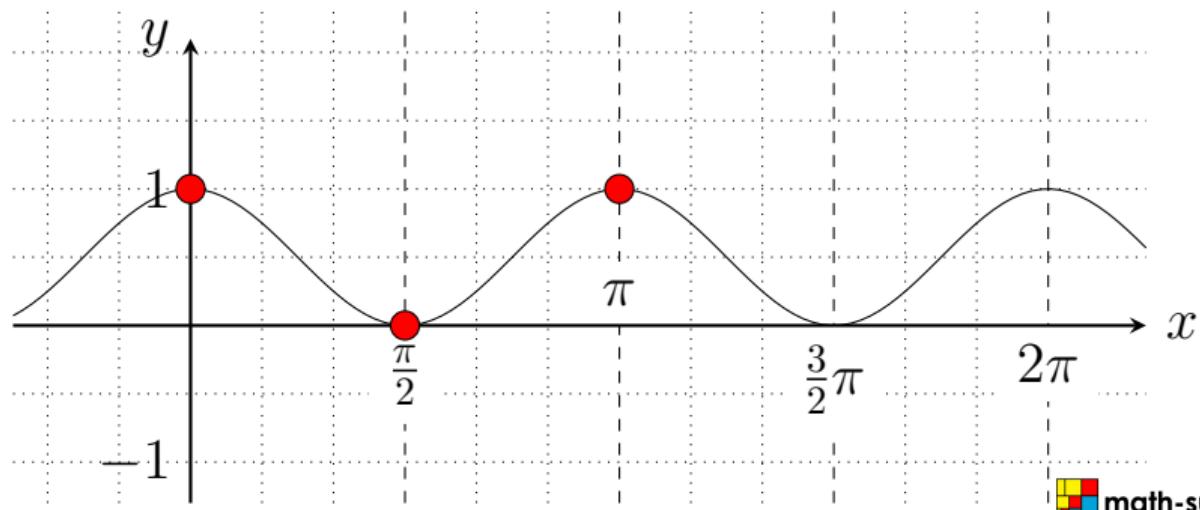


$$\cos 2\theta = 2 \cos^2 \theta - 1$$

左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

(右辺) $y = 2 \cos^2 \theta - 1$ はどんなグラフになるか？

$$y = \cos^2 \theta$$



$$\cos 2\theta = 2 \cos^2 \theta - 1$$

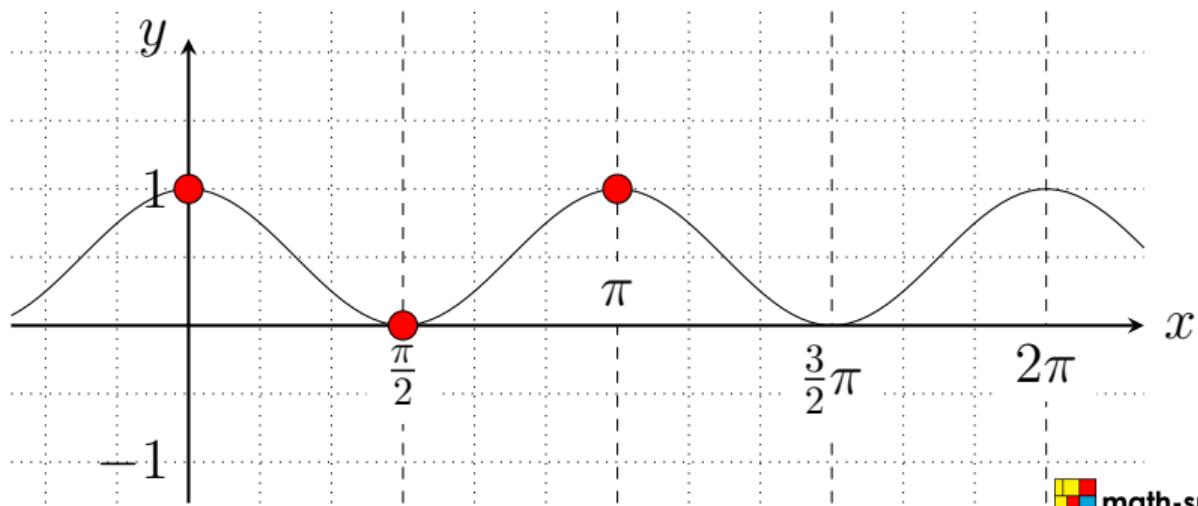
左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

(右辺) $y = 2 \cos^2 \theta - 1$ はどんなグラフになるか？

$$y = \cos^2 \theta$$

\downarrow

$$y = 2 \cos^2 \theta$$



$$\cos 2\theta = 2 \cos^2 \theta - 1$$

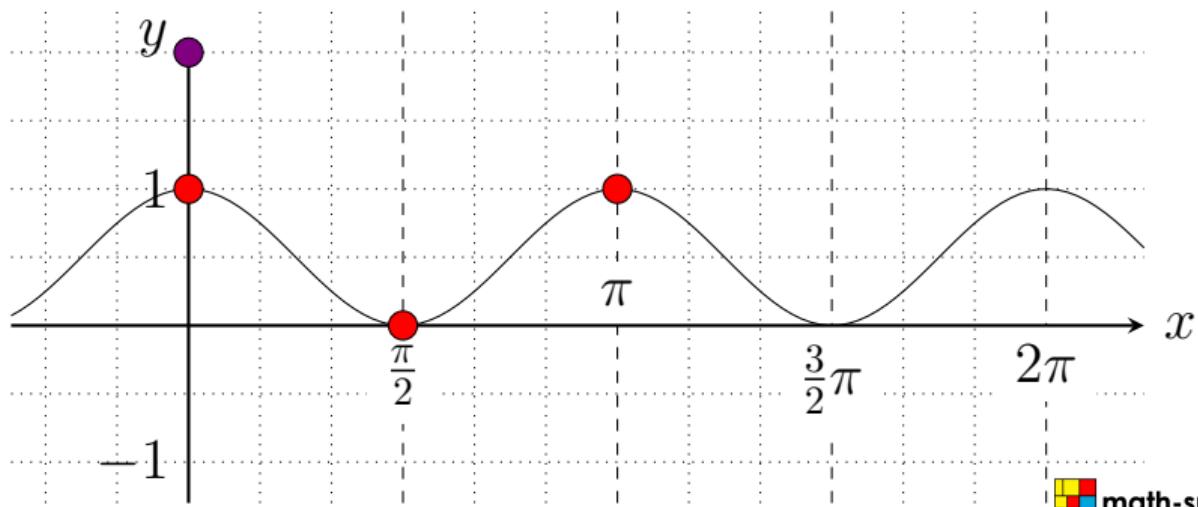
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(右辺) $y = 2 \cos^2 \theta - 1$ はどんなグラフになるか？

$$y = \cos^2 \theta$$

\downarrow

$$y = 2 \cos^2 \theta$$



$$\cos 2\theta = 2 \cos^2 \theta - 1$$

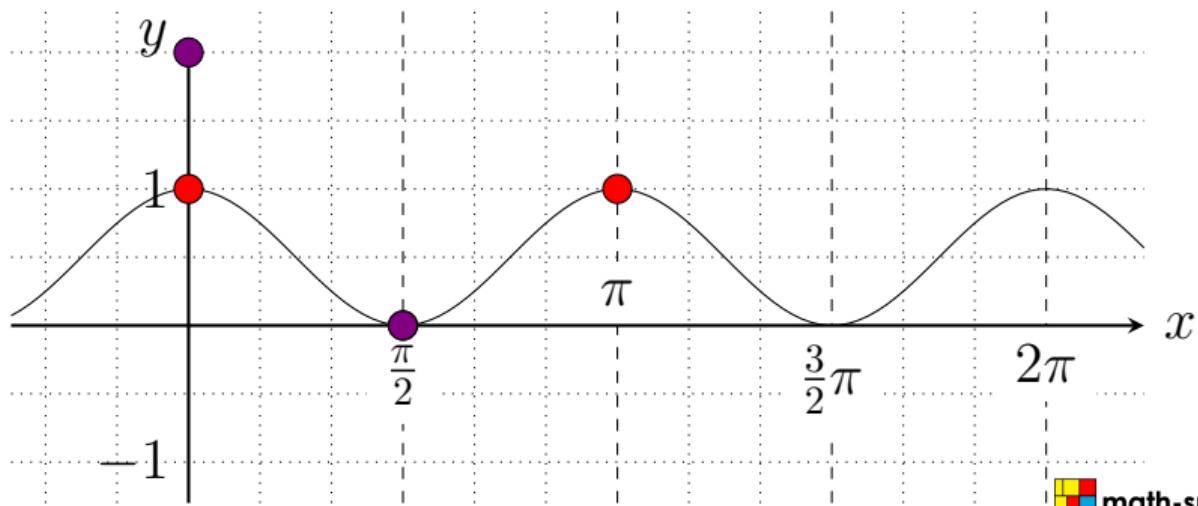
左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

(右辺) $y = 2 \cos^2 \theta - 1$ はどんなグラフになるか？

$$y = \cos^2 \theta$$

\downarrow

$$y = 2 \cos^2 \theta$$



$$\cos 2\theta = 2 \cos^2 \theta - 1$$

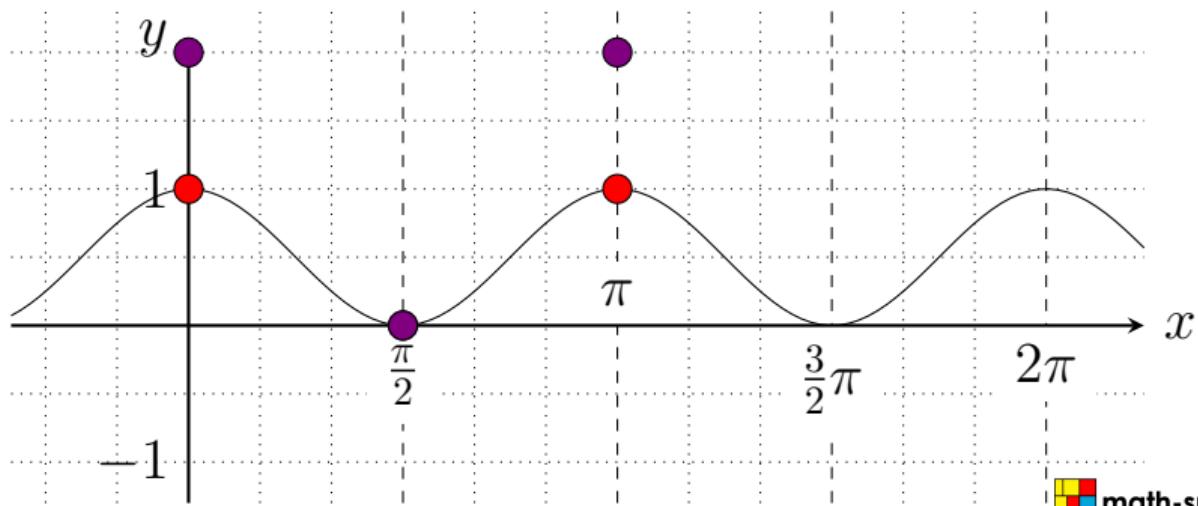
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$$y = 2 \cos^2 \theta$$

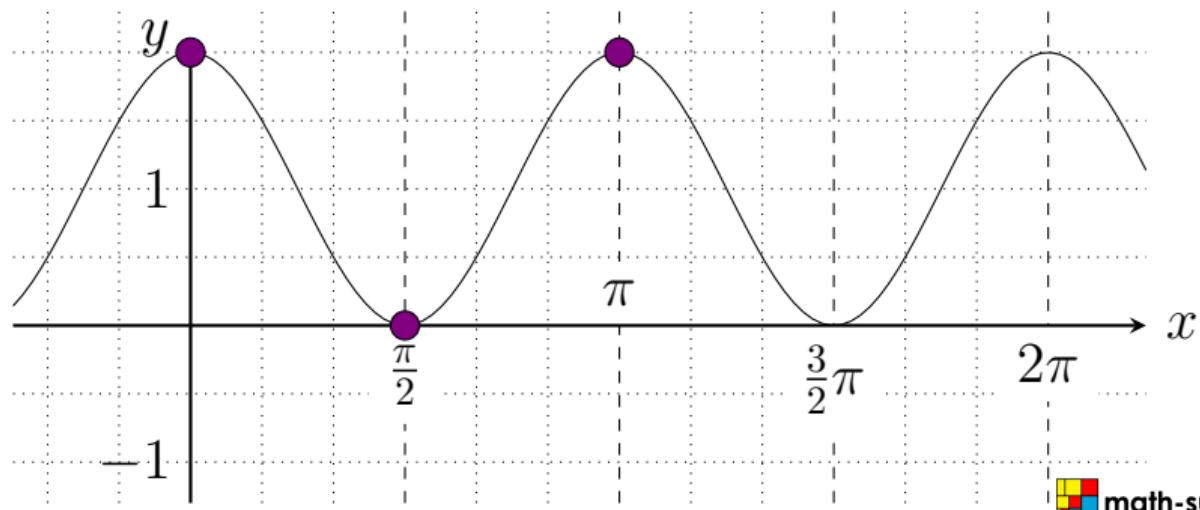


$$\cos 2\theta = 2 \cos^2 \theta - 1$$

左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

(右辺) $y = 2 \cos^2 \theta - 1$ はどんなグラフになるか？

$$y = 2 \cos^2 \theta$$



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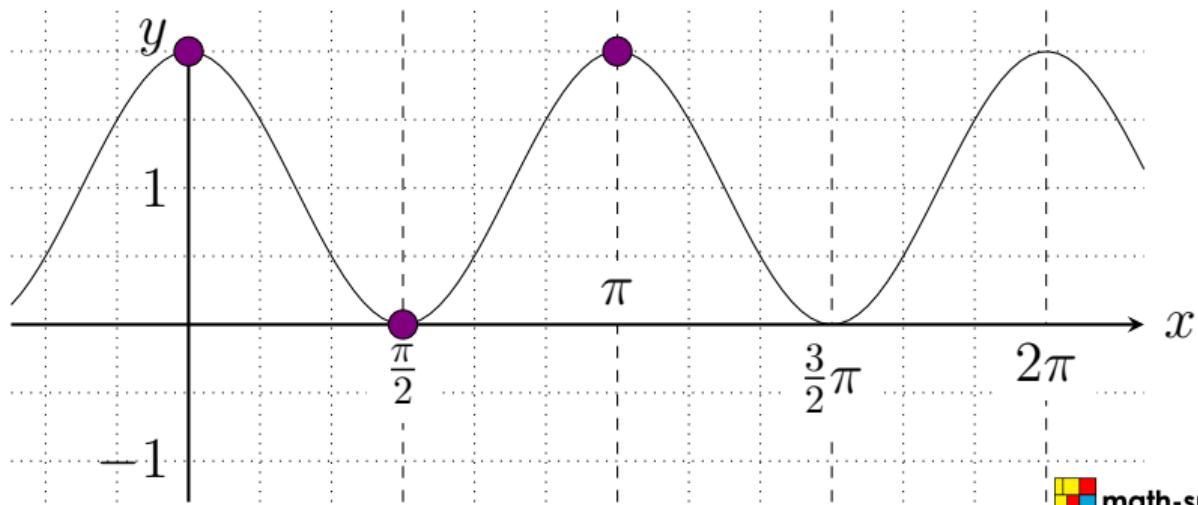
左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

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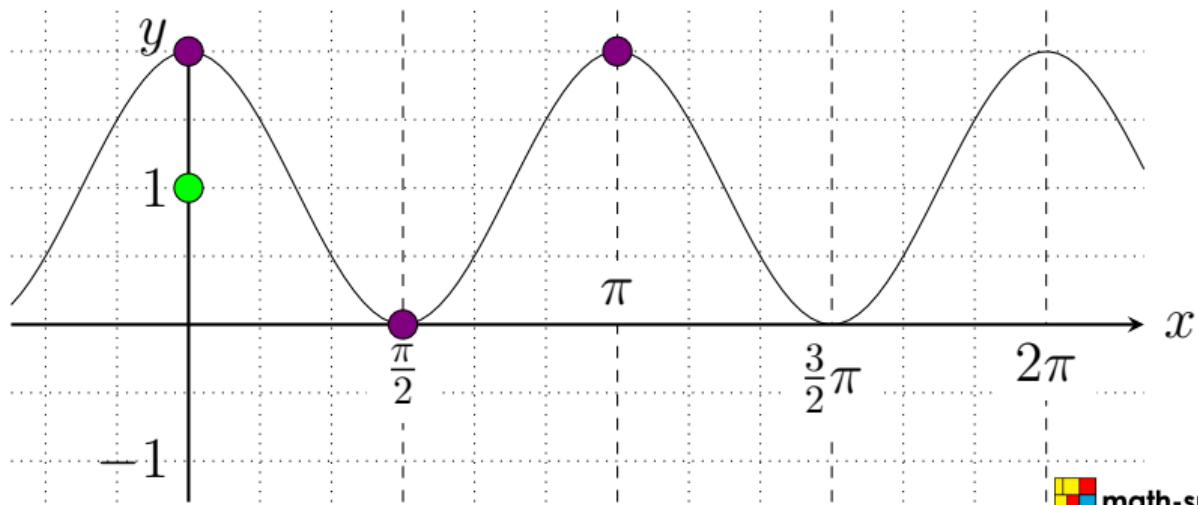
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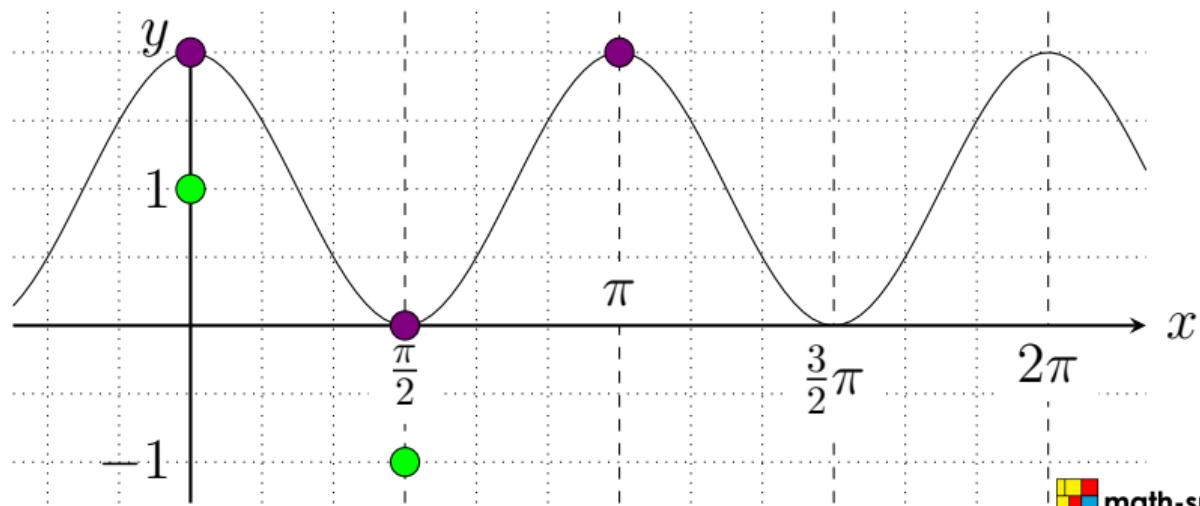
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$$y = 2 \cos^2 \theta - 1$$



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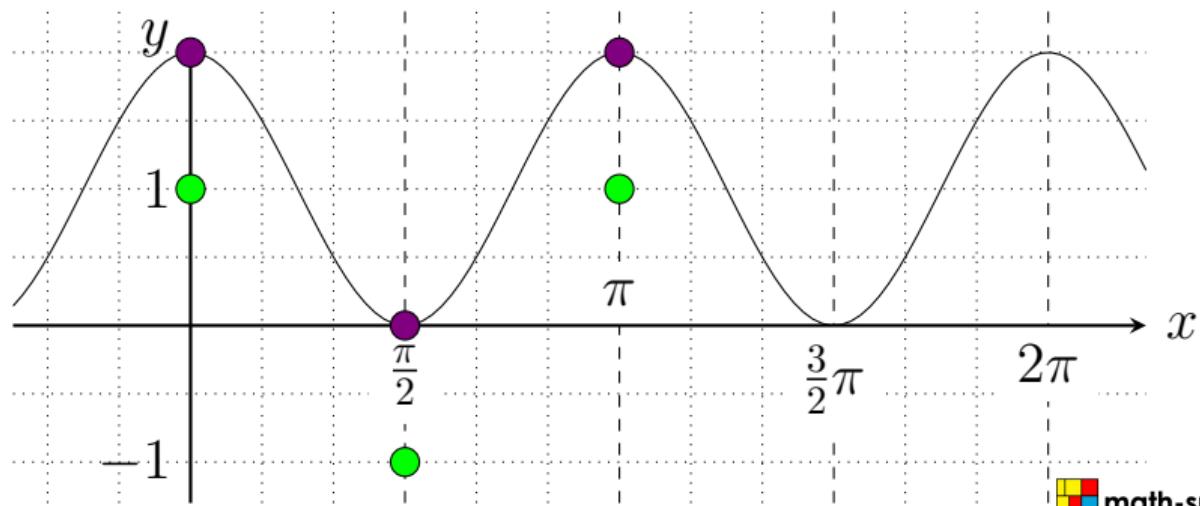
左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

(右辺) $y = 2 \cos^2 \theta - 1$ はどんなグラフになるか？

$$y = 2 \cos^2 \theta$$



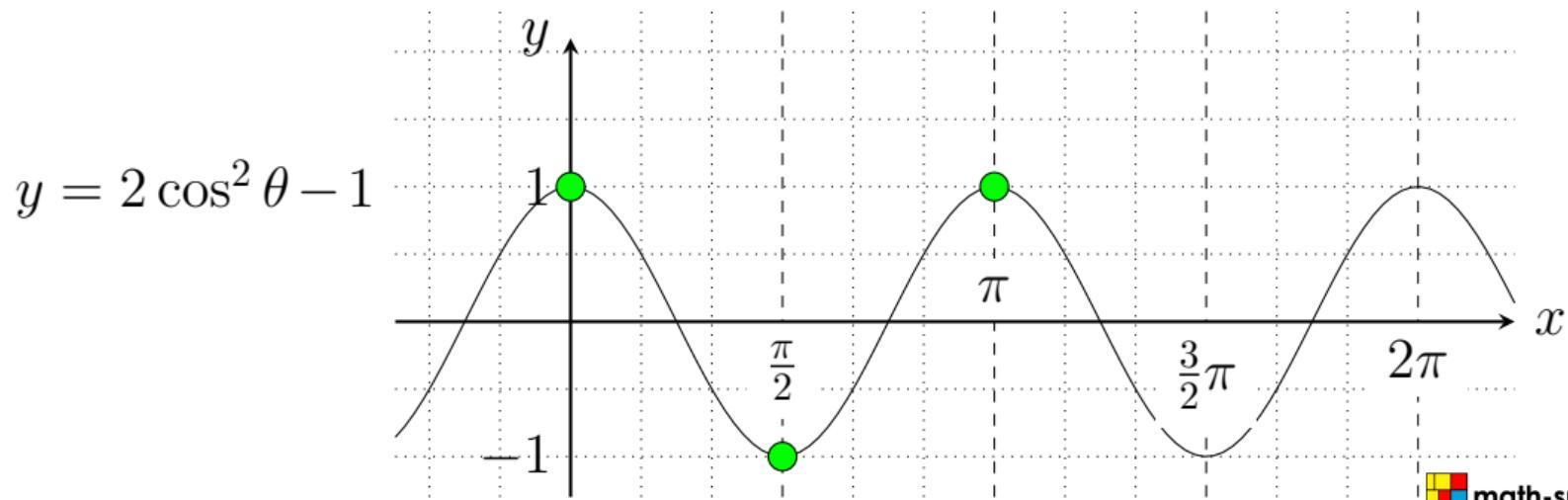
$$y = 2 \cos^2 \theta - 1$$



$$\cos 2\theta = 2 \cos^2 \theta - 1$$

左辺が角度 2θ 、右辺が角度 θ で違うのになぜ「等しい」？

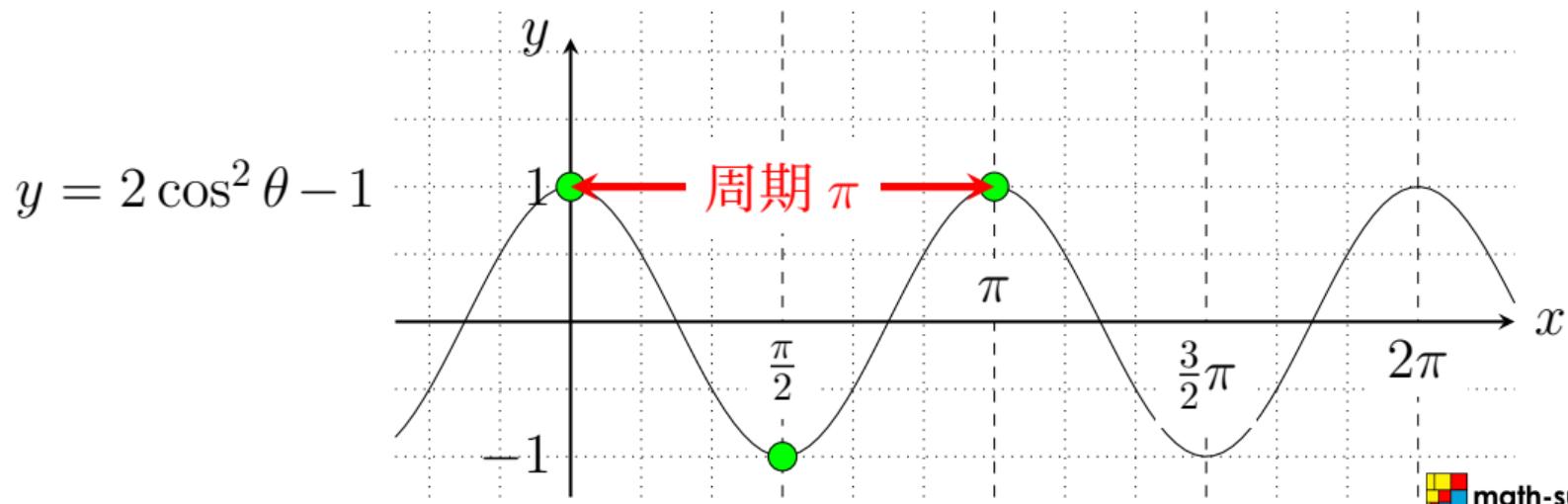
(右辺) $y = 2 \cos^2 \theta - 1$ はどんなグラフになるか？



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倍角の公式 : $\cos 2\theta = \cos^2 \theta - \sin^2 \theta$

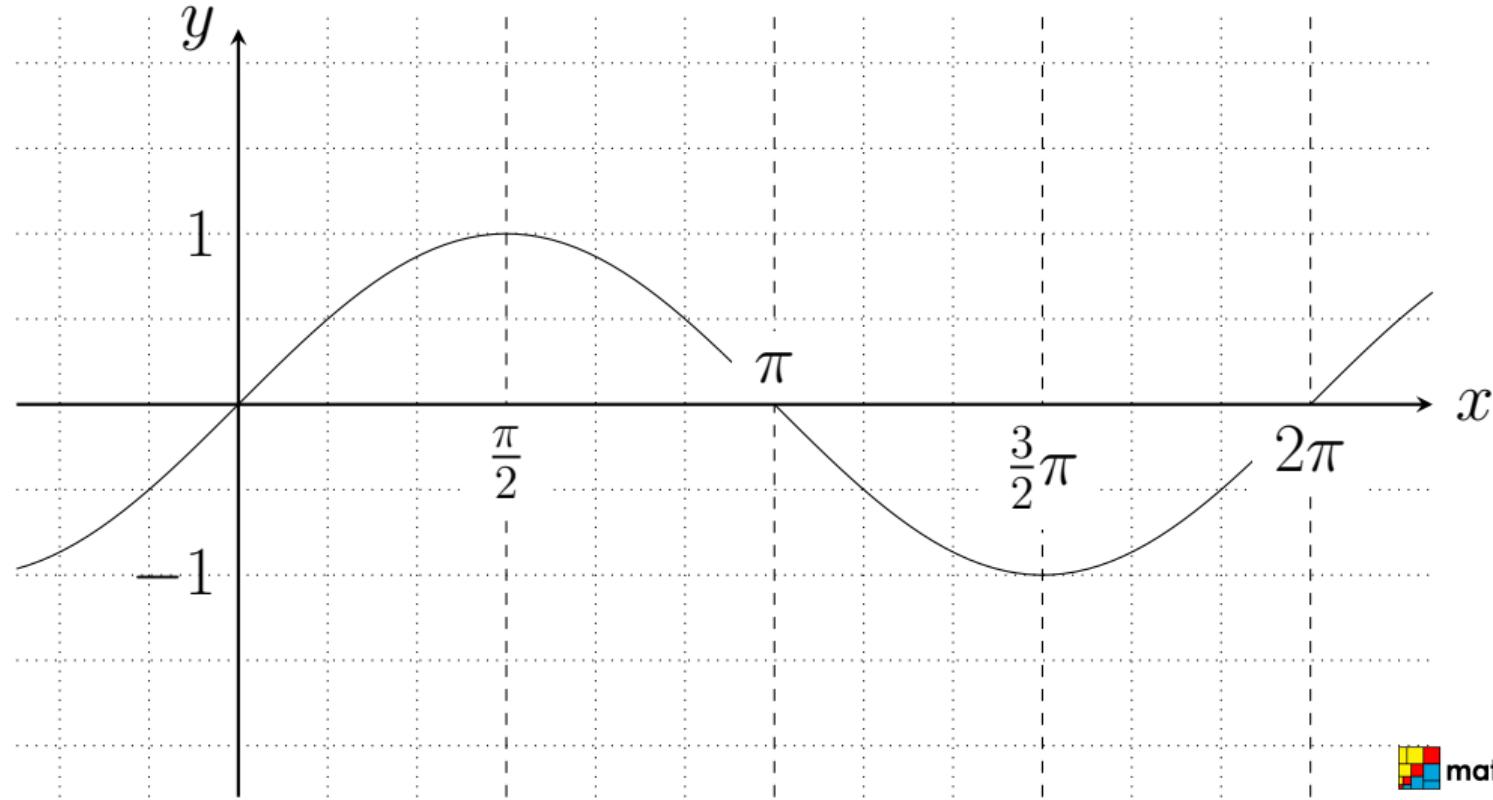
$$\begin{aligned} &= (1 - \sin^2 \theta) - \sin^2 \theta \\ &= 1 - 2 \sin^2 \theta \end{aligned}$$

$$\cos 2\theta = 1 - 2 \sin^2 \theta$$

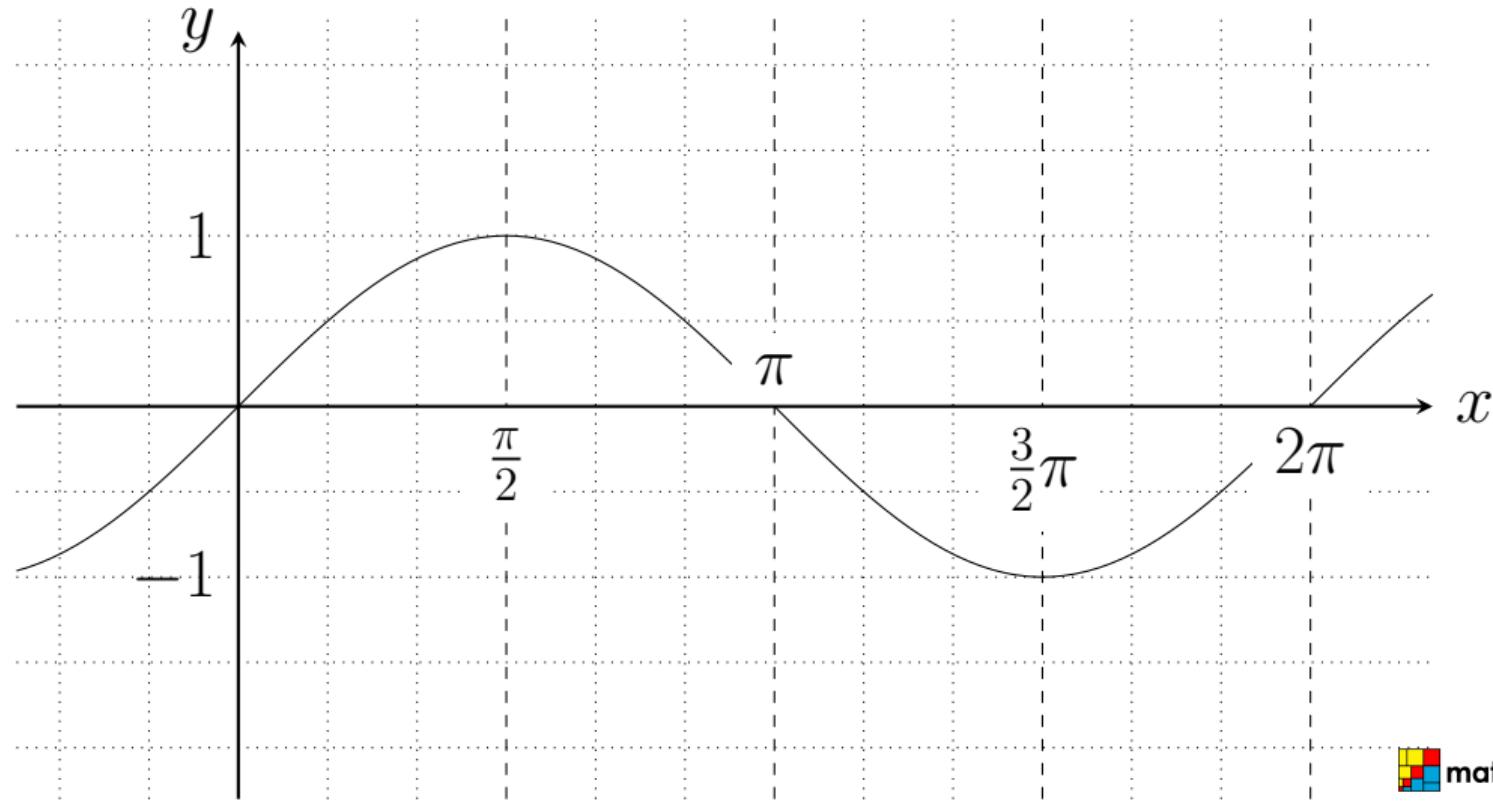
ビデオを止めて問題を解いてみよう

問 1 $y = 1 - 2 \sin^2 \theta$ と $y = \cos 2\theta$ が等しくなることをグラフを書いて示しなさい。

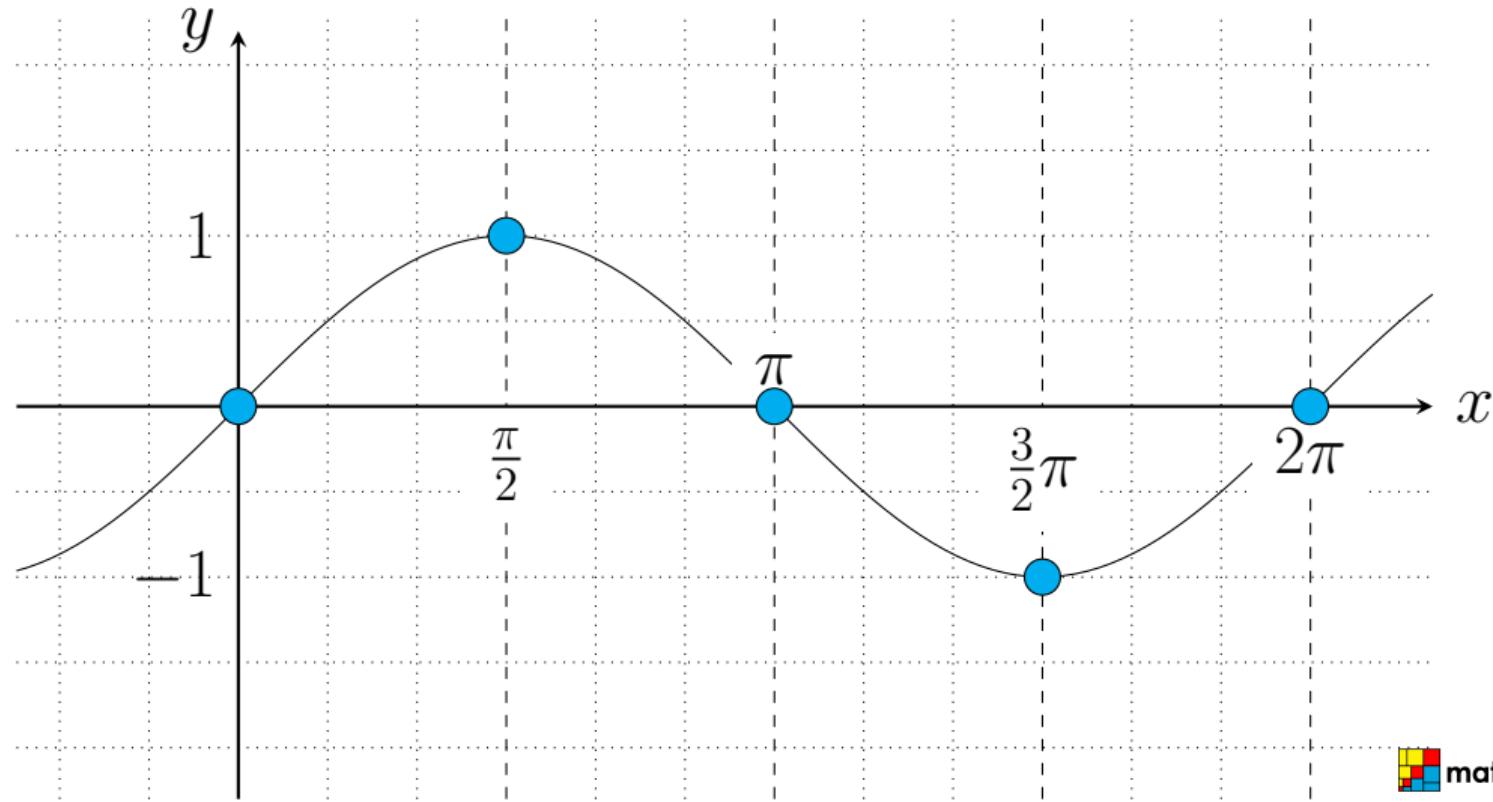
$$(1) \quad y = \sin \theta$$



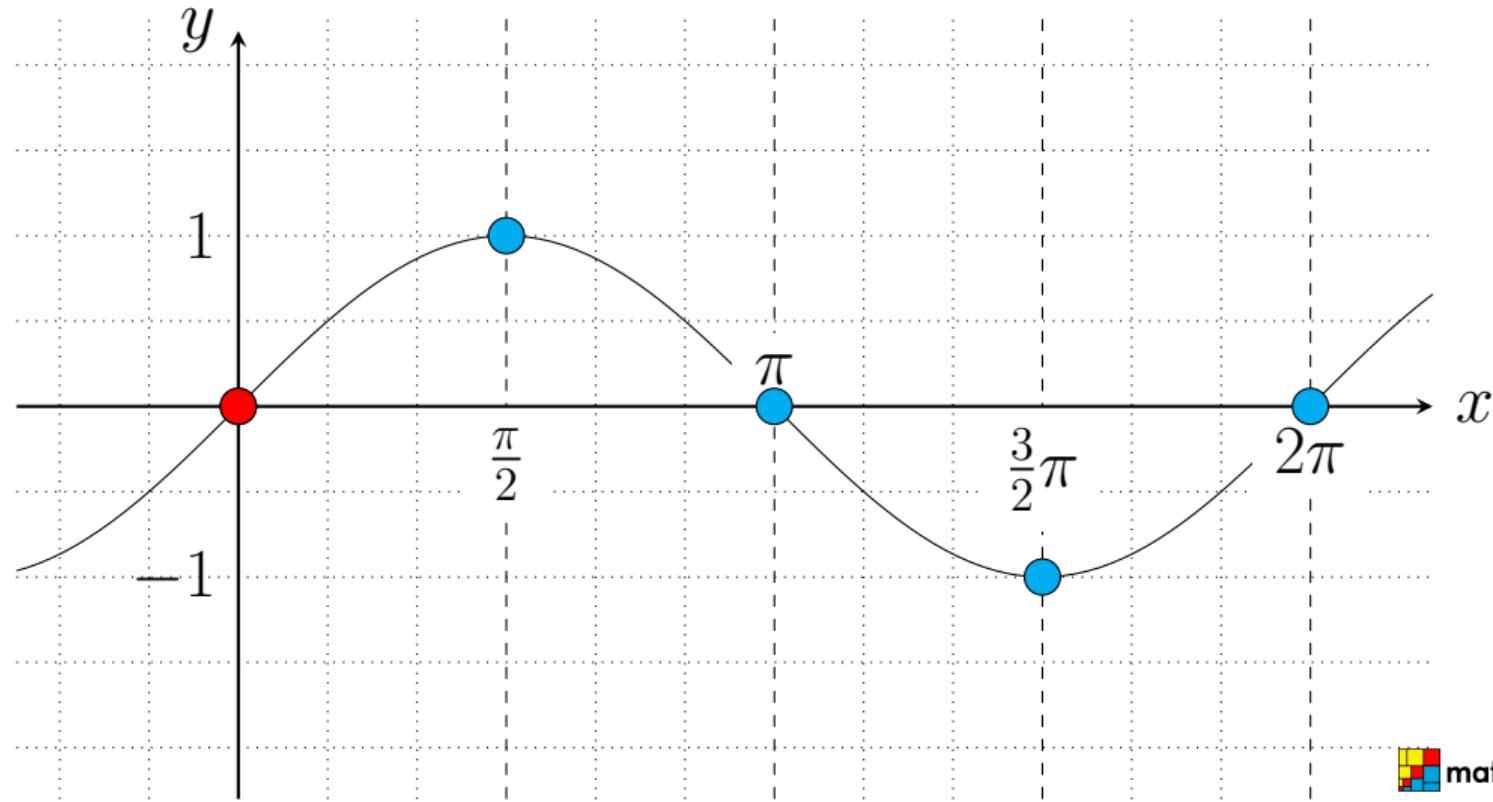
$$(1) \quad y = \sin \theta \quad \rightarrow \quad y = \sin^2 \theta$$



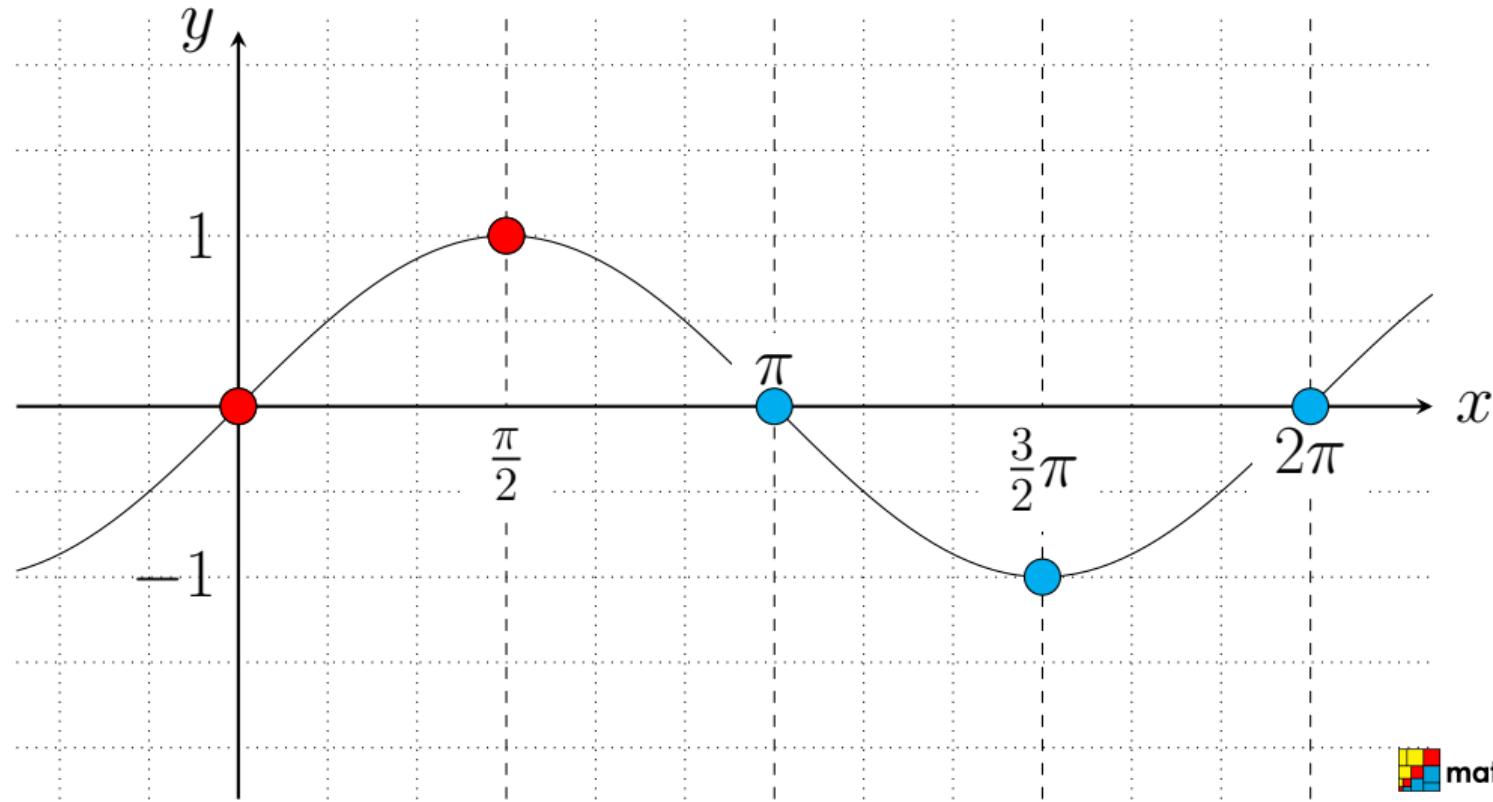
$$(1) \quad y = \sin \theta \quad \rightarrow \quad y = \sin^2 \theta$$



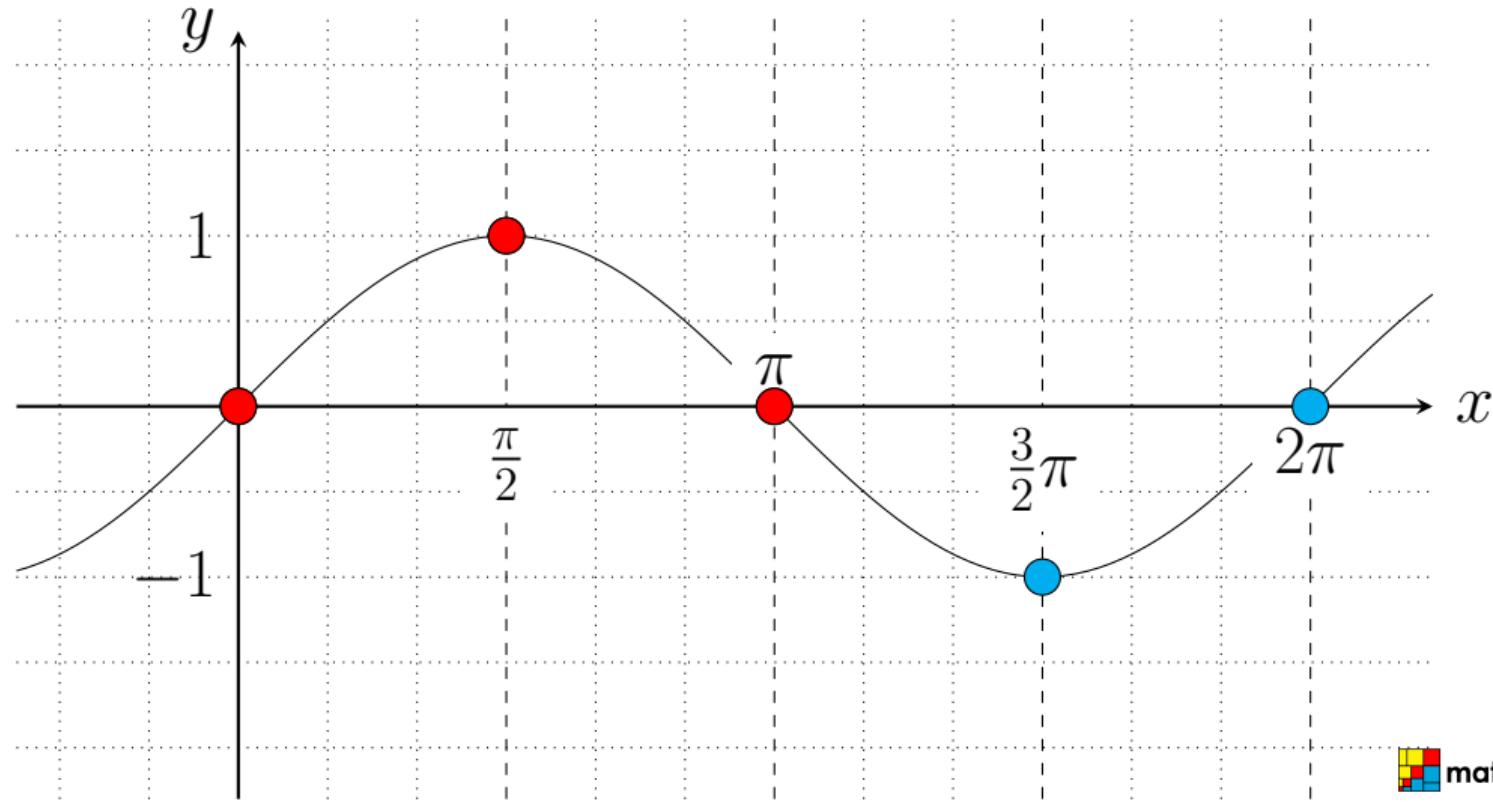
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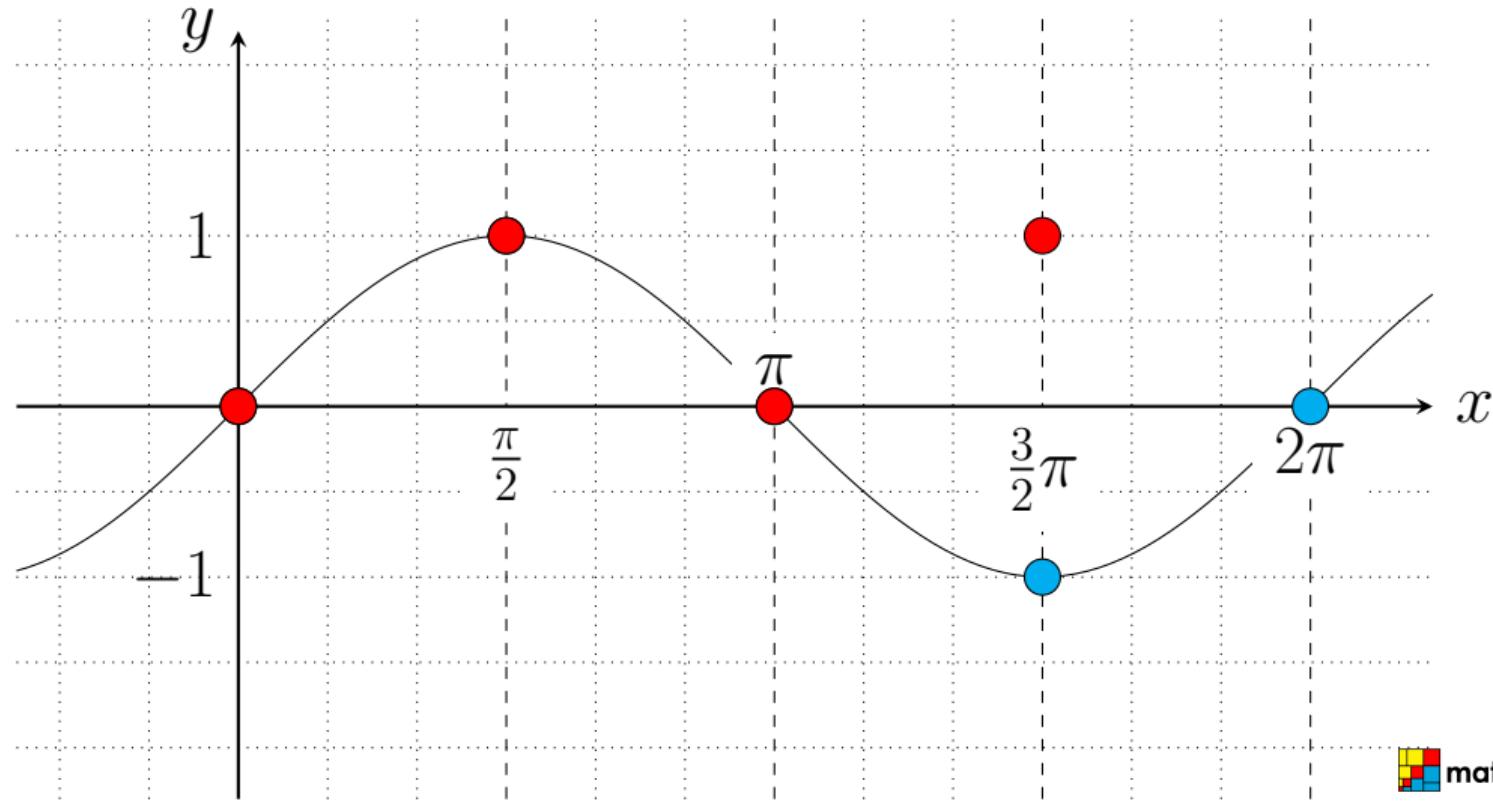
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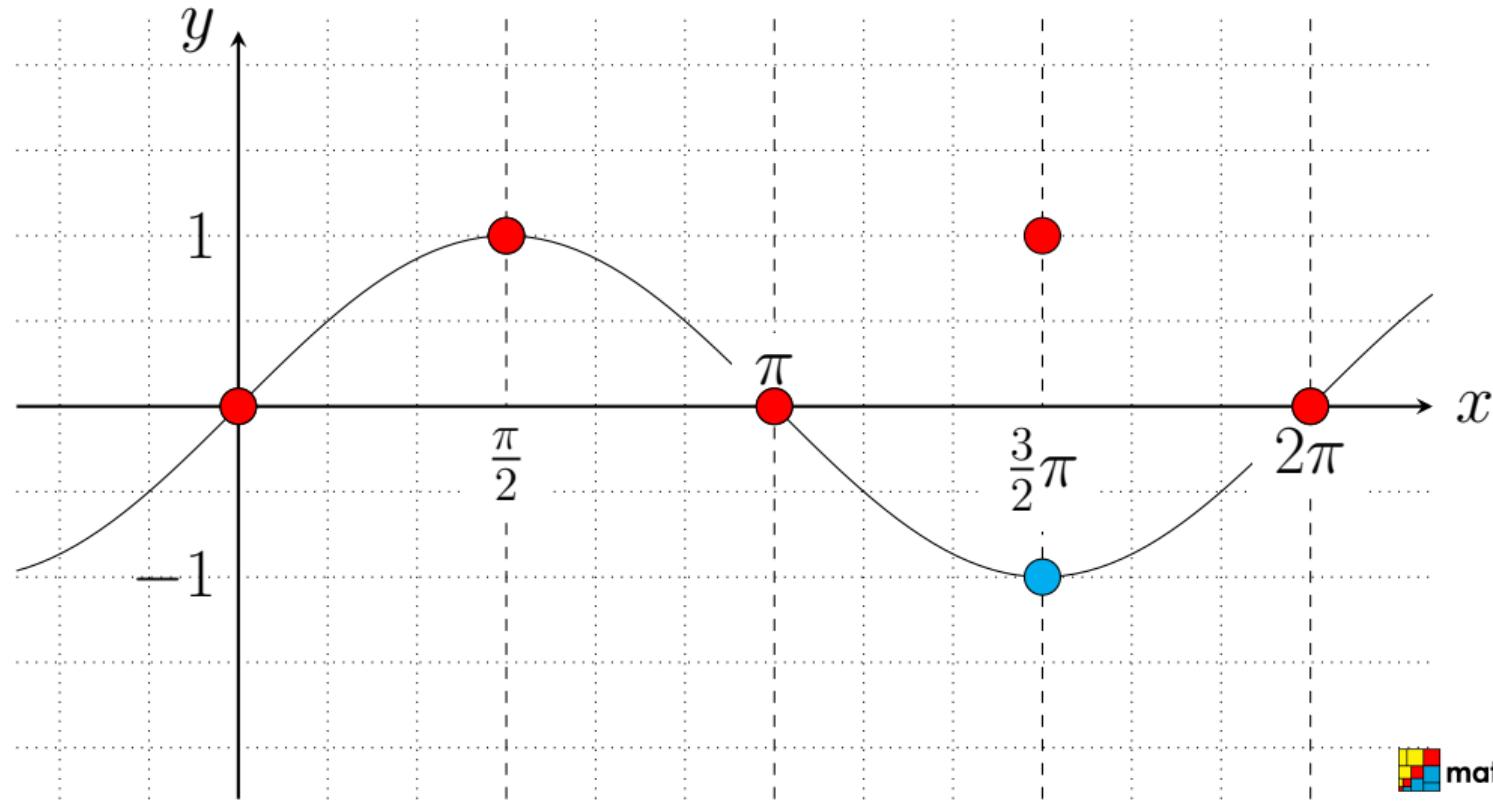
$$(1) \quad y = \sin \theta \quad \rightarrow \quad y = \sin^2 \theta$$



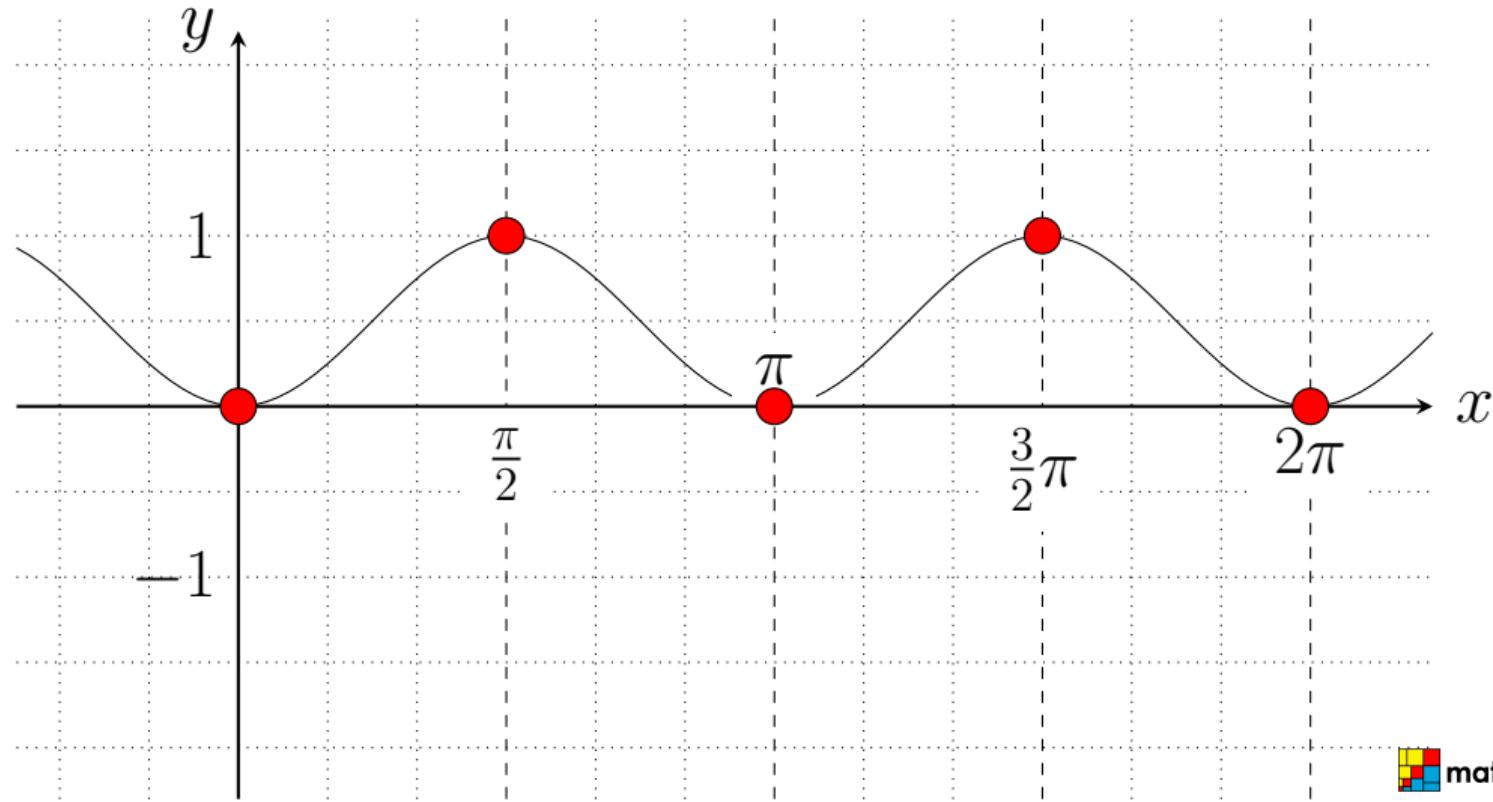
$$(1) \quad y = \sin \theta \quad \rightarrow \quad y = \sin^2 \theta$$



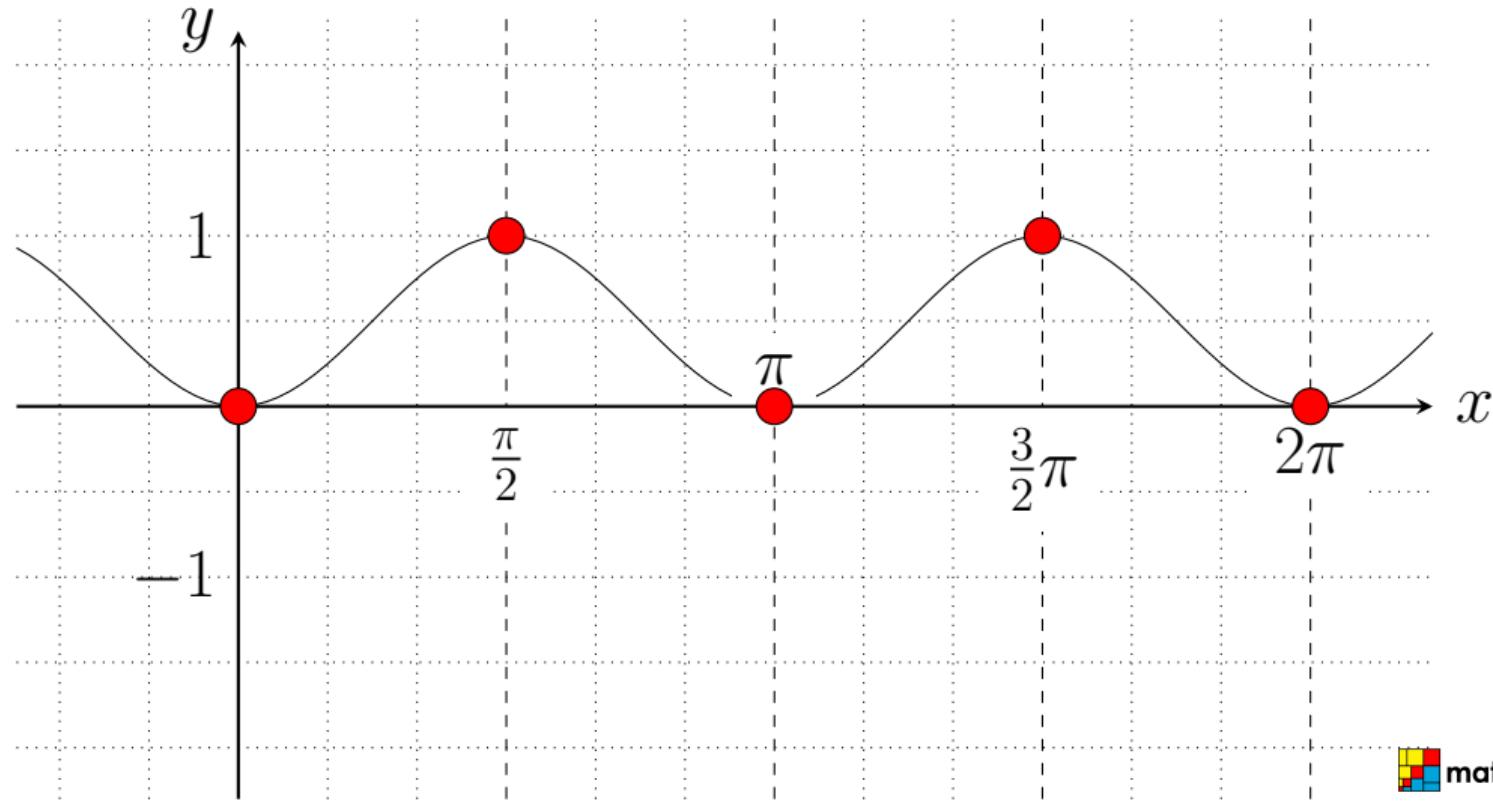
$$(1) \quad y = \sin \theta \quad \rightarrow \quad y = \sin^2 \theta$$



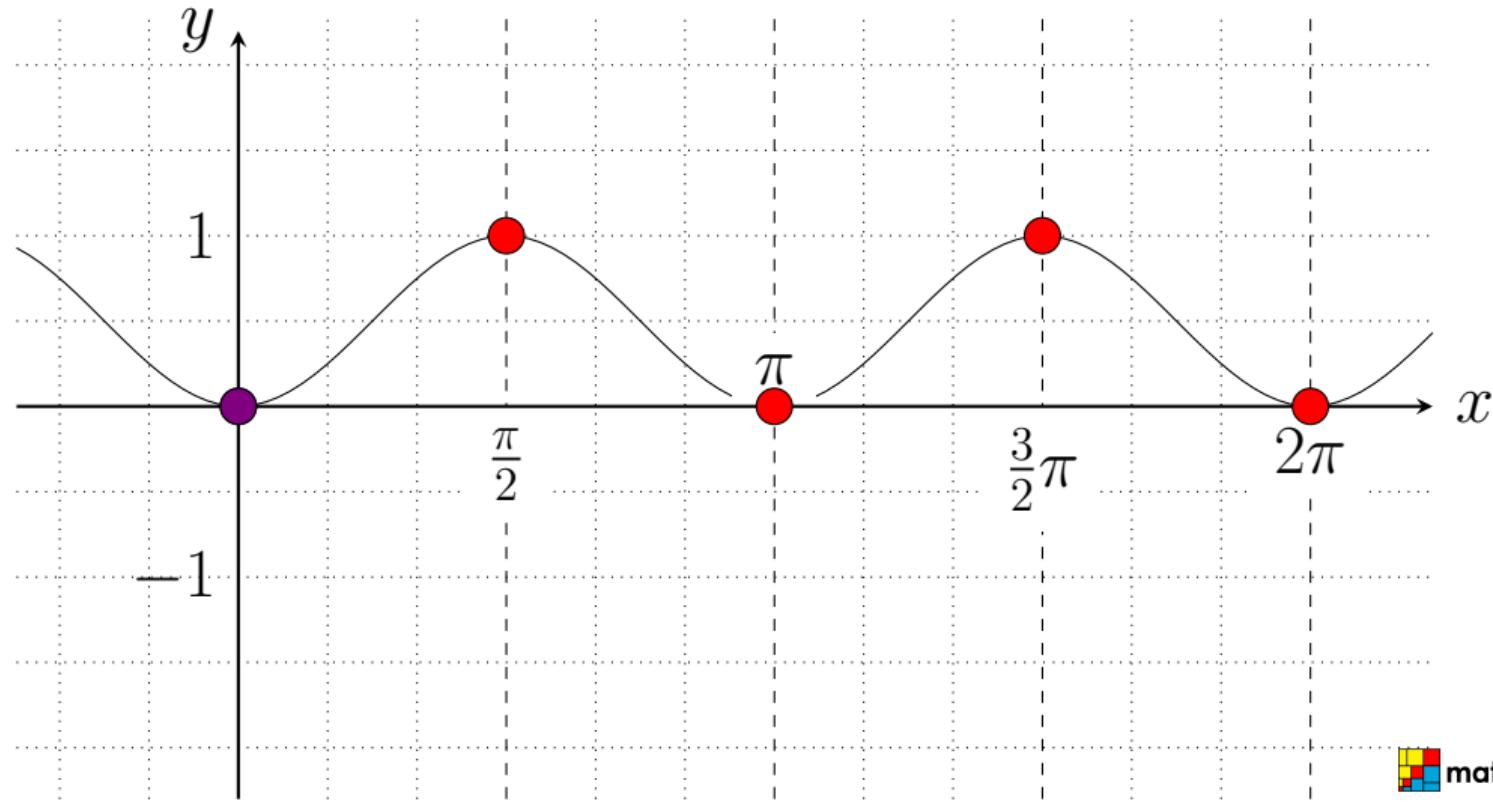
$$(2) \quad y = \sin^2 \theta$$



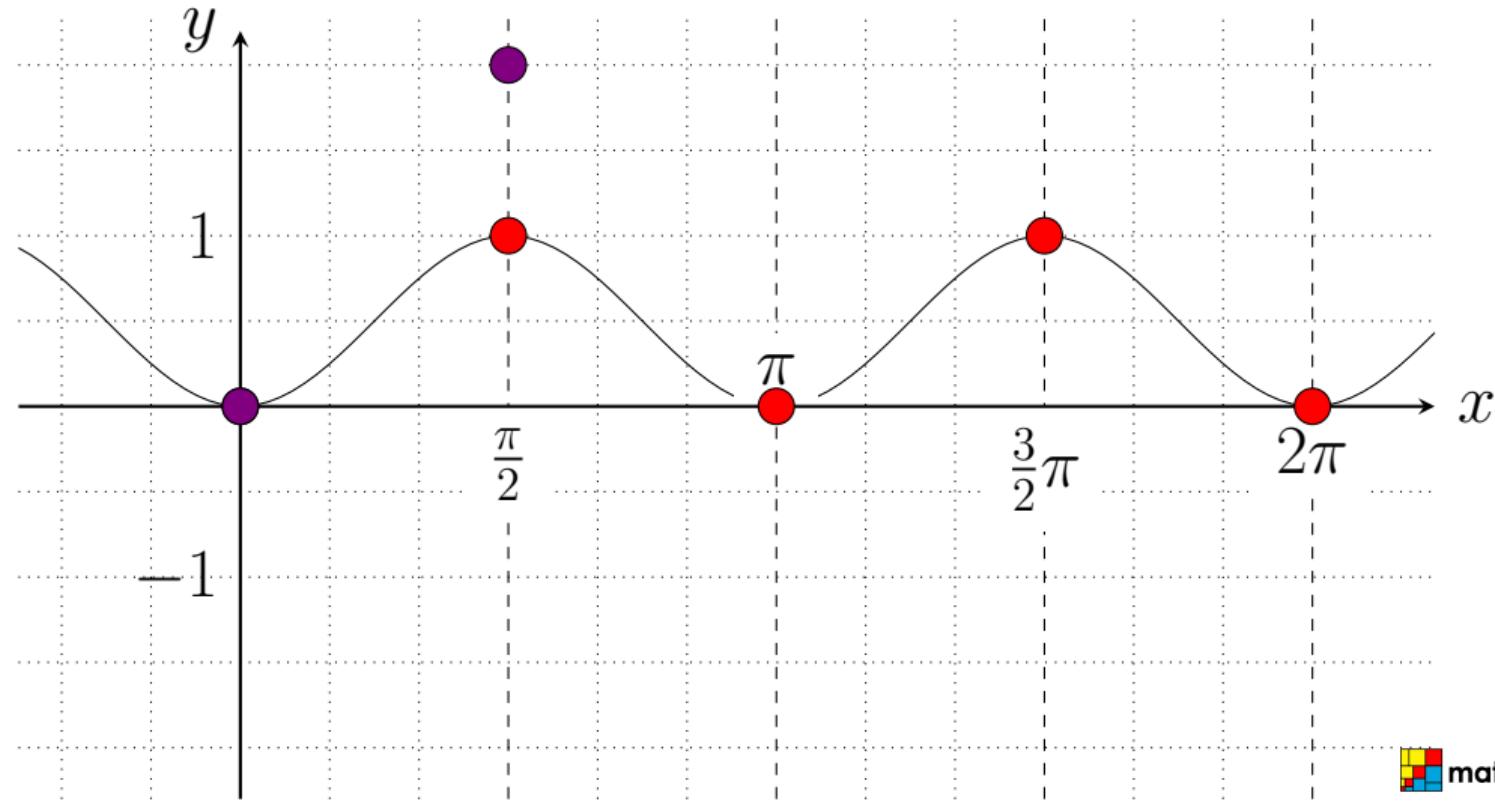
$$(2) \quad y = \sin^2 \theta \quad \rightarrow \quad y = 2 \sin^2 \theta$$



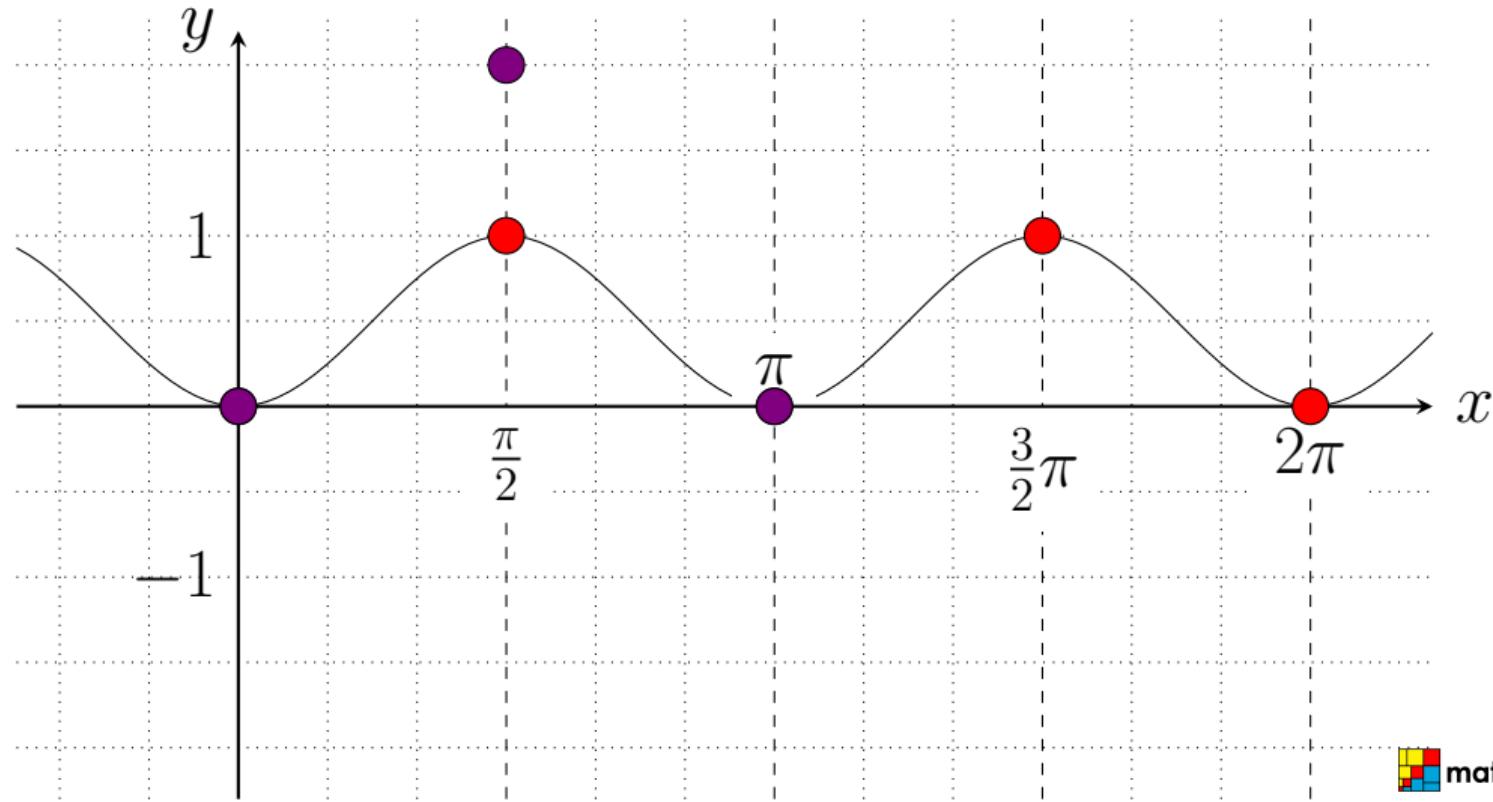
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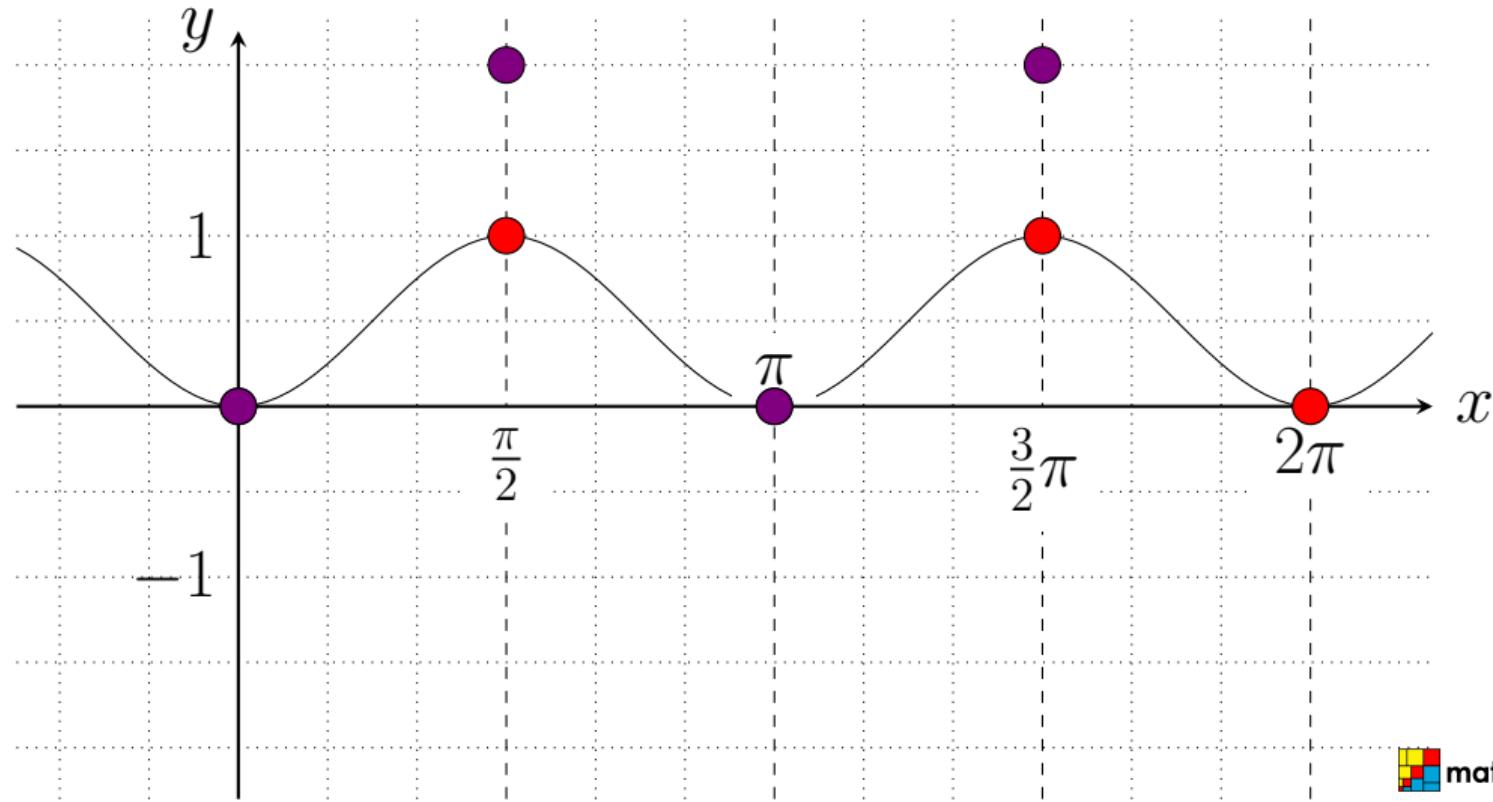
$$(2) \quad y = \sin^2 \theta \quad \rightarrow \quad y = 2 \sin^2 \theta$$



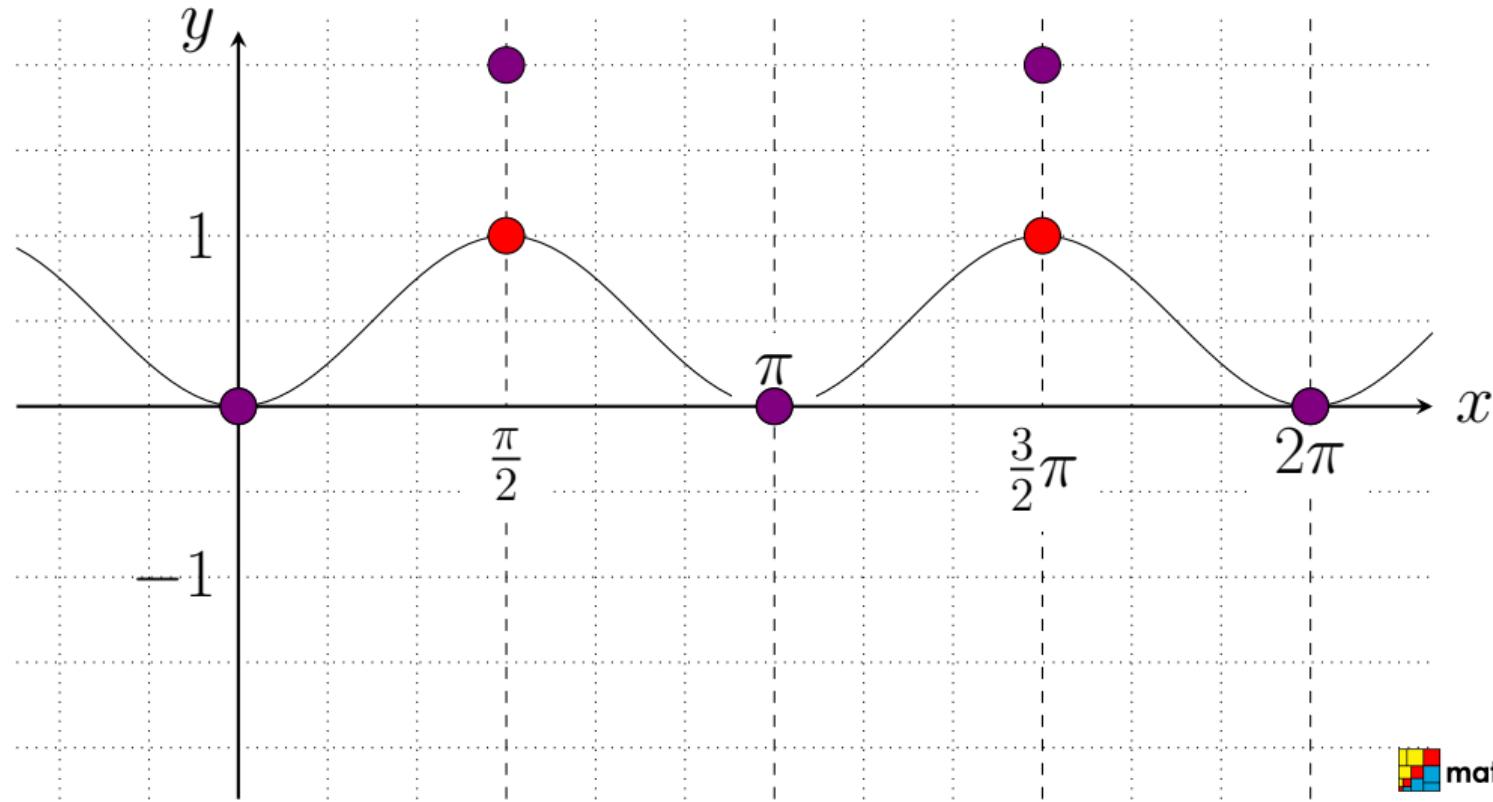
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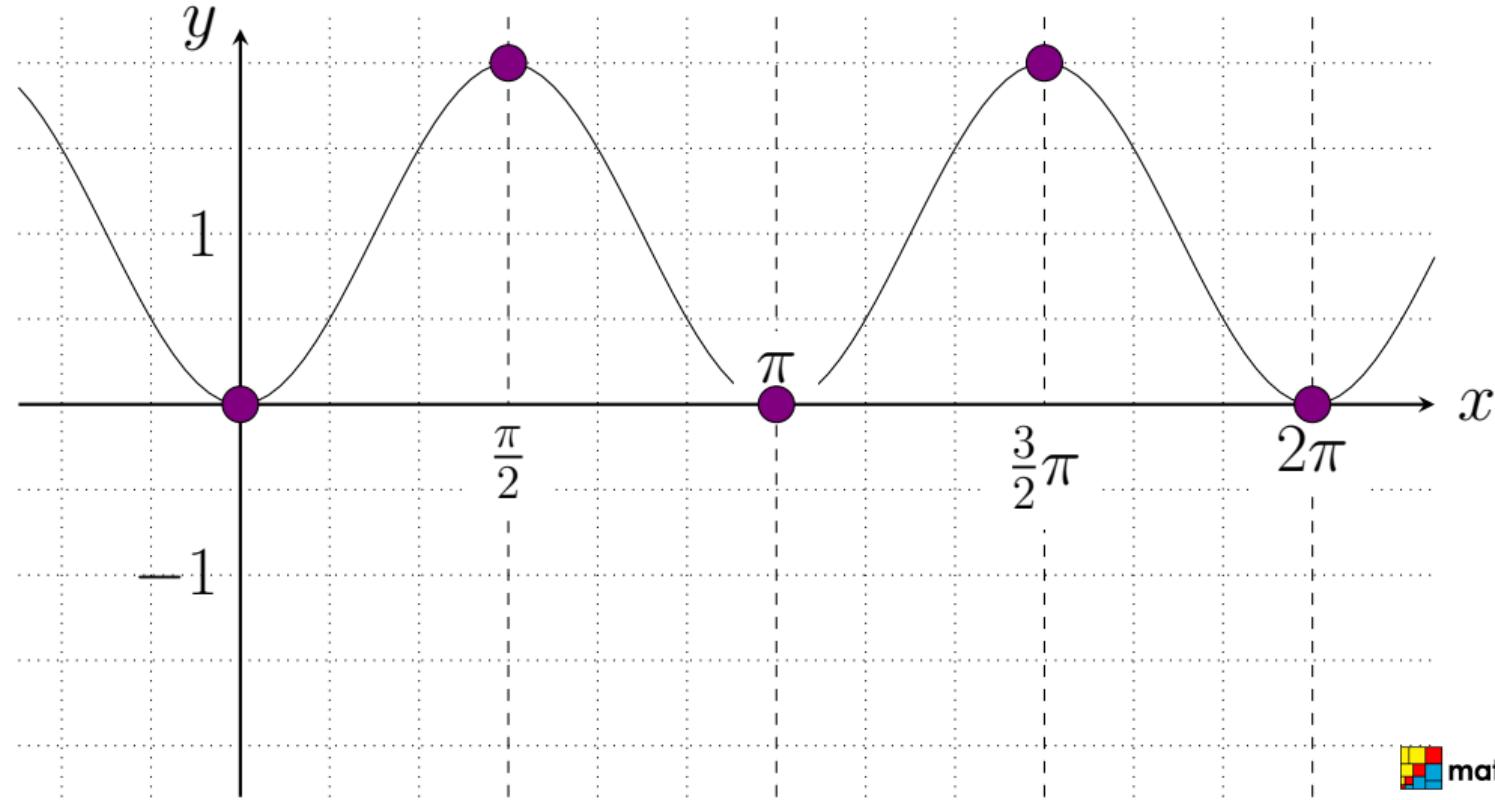
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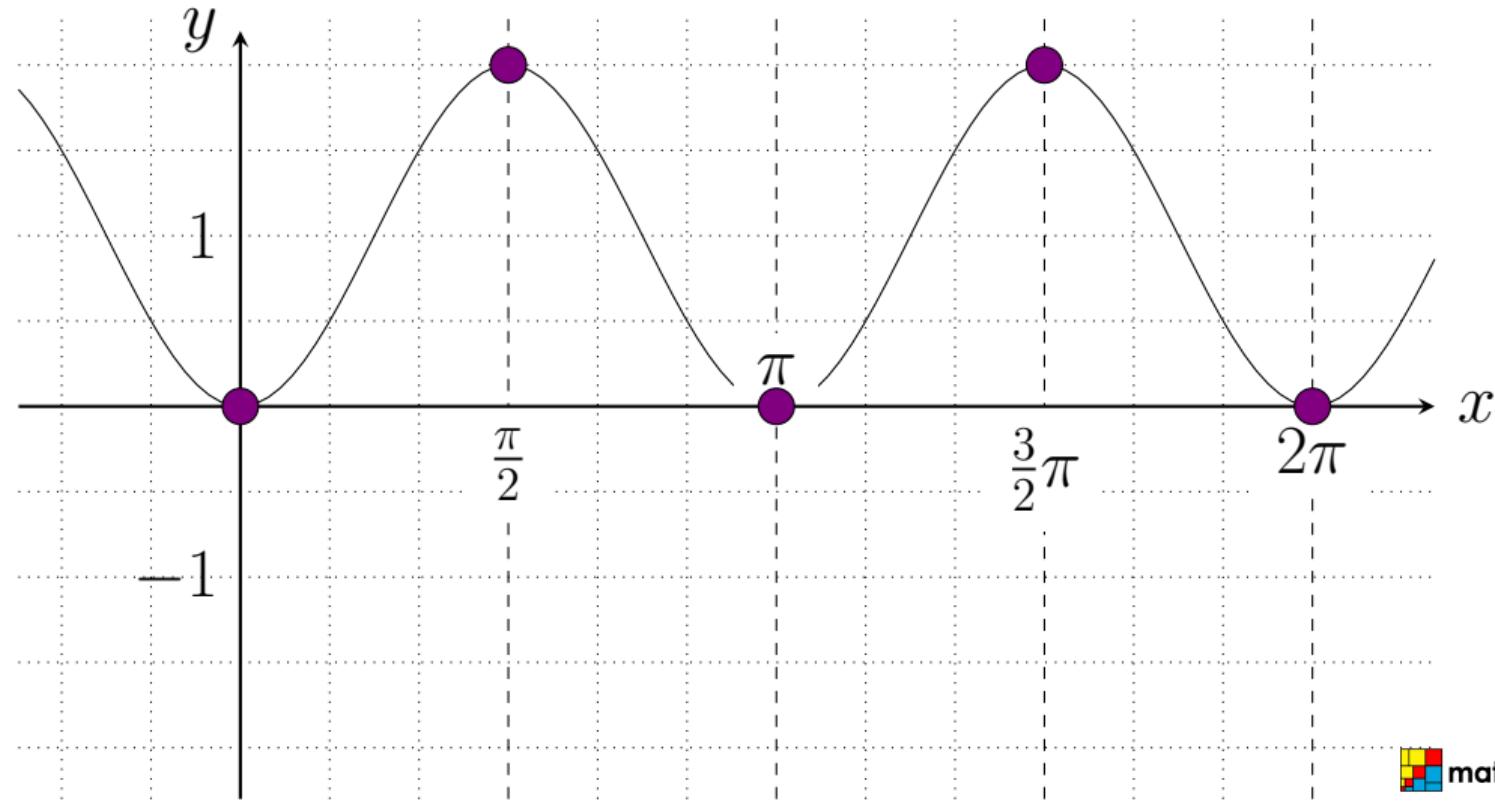
$$(2) \quad y = \sin^2 \theta \quad \rightarrow \quad y = 2 \sin^2 \theta$$



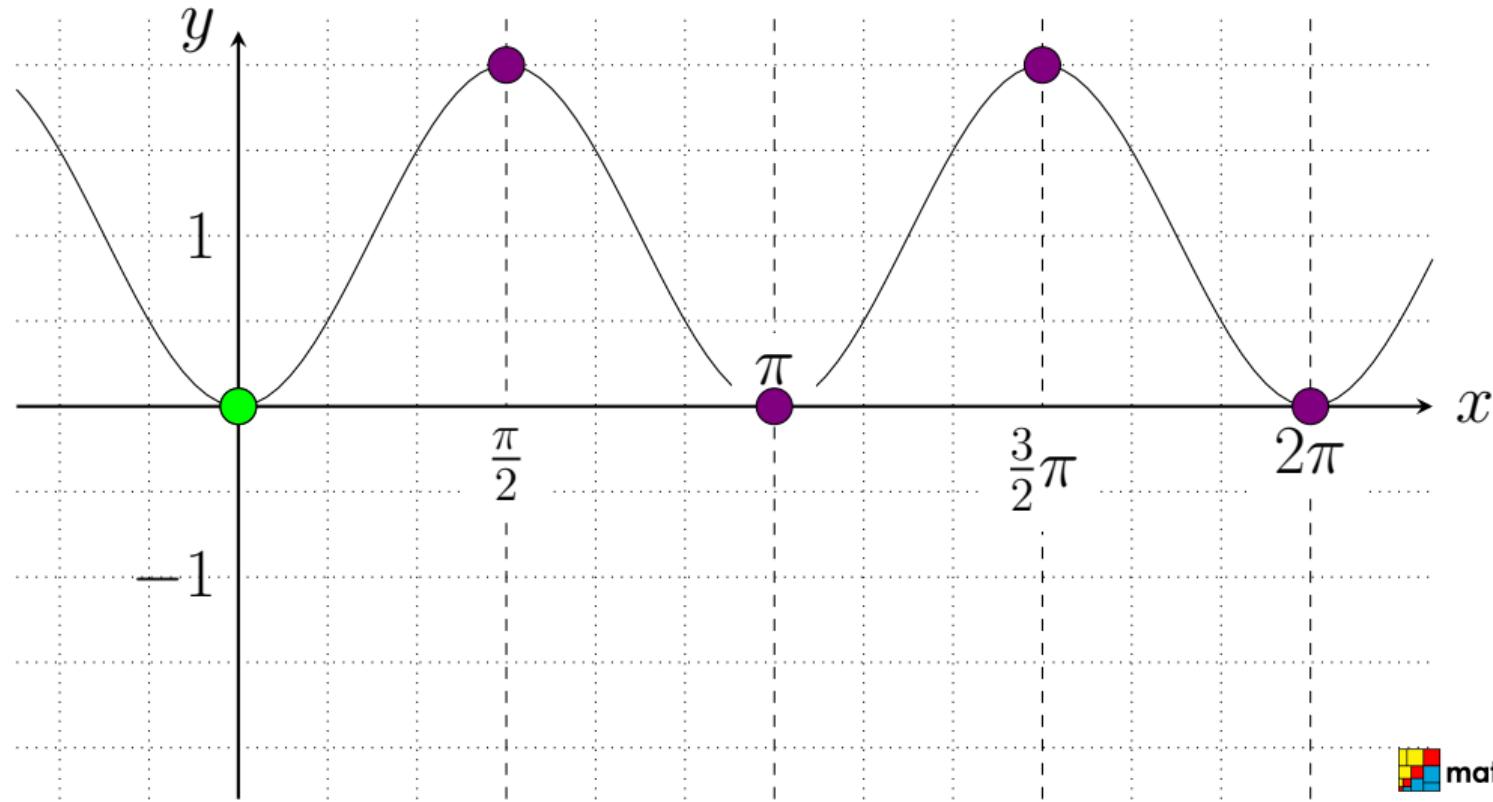
$$(3) \quad y = 2 \sin^2 \theta$$



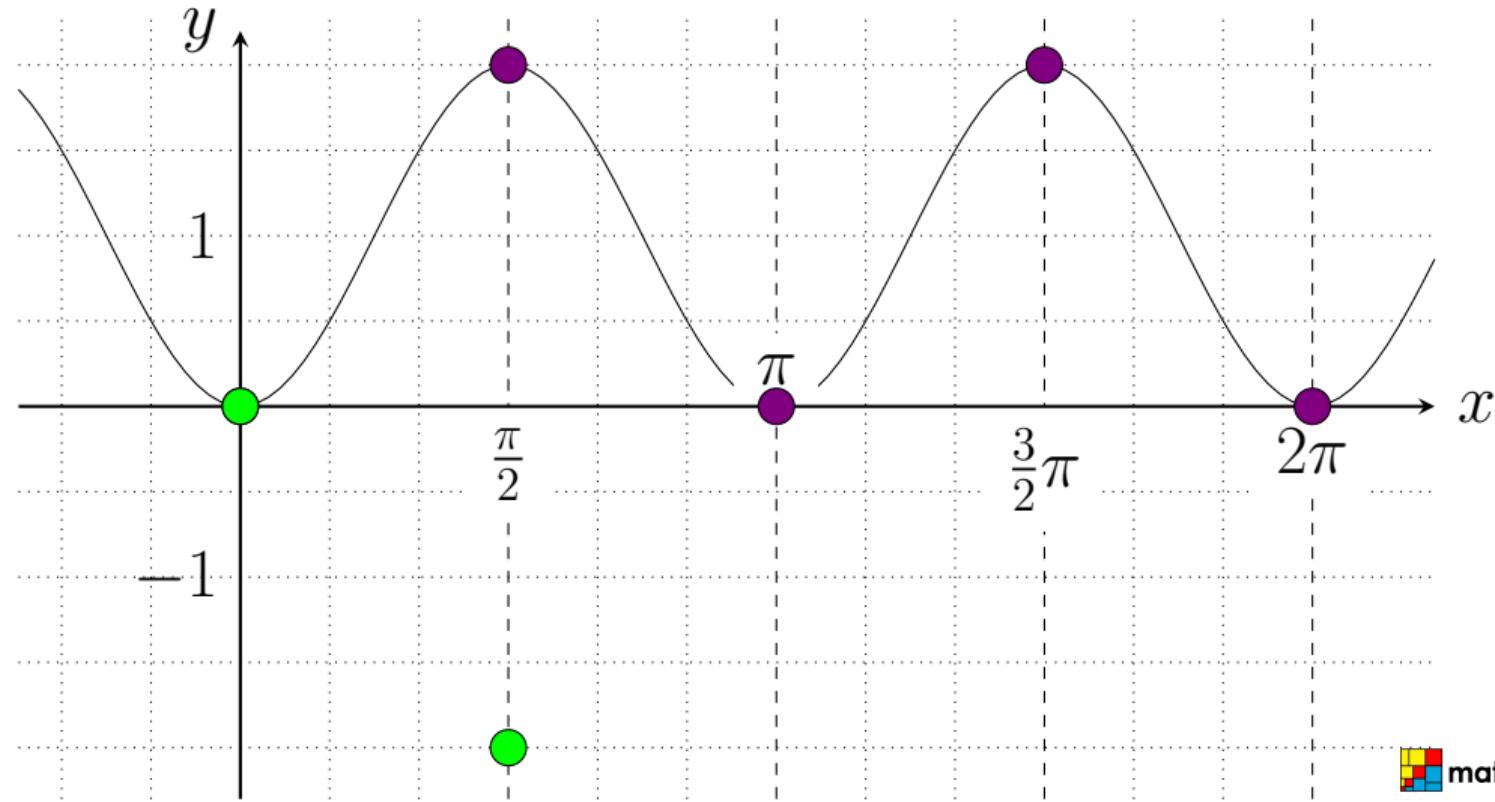
$$(3) \quad y = 2 \sin^2 \theta \quad \rightarrow \quad y = -2 \sin^2 \theta$$



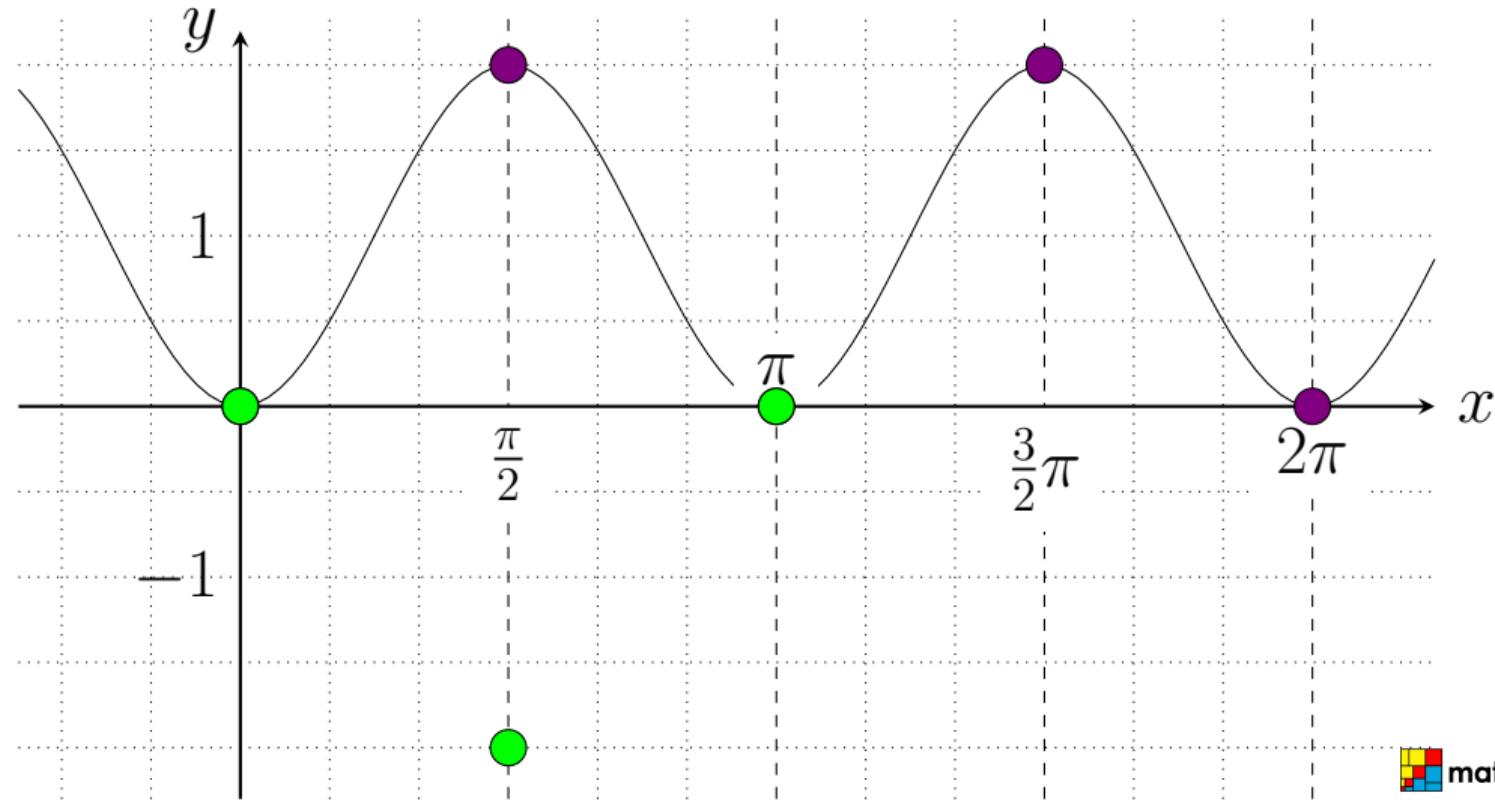
$$(3) \quad y = 2 \sin^2 \theta \quad \rightarrow \quad y = -2 \sin^2 \theta$$



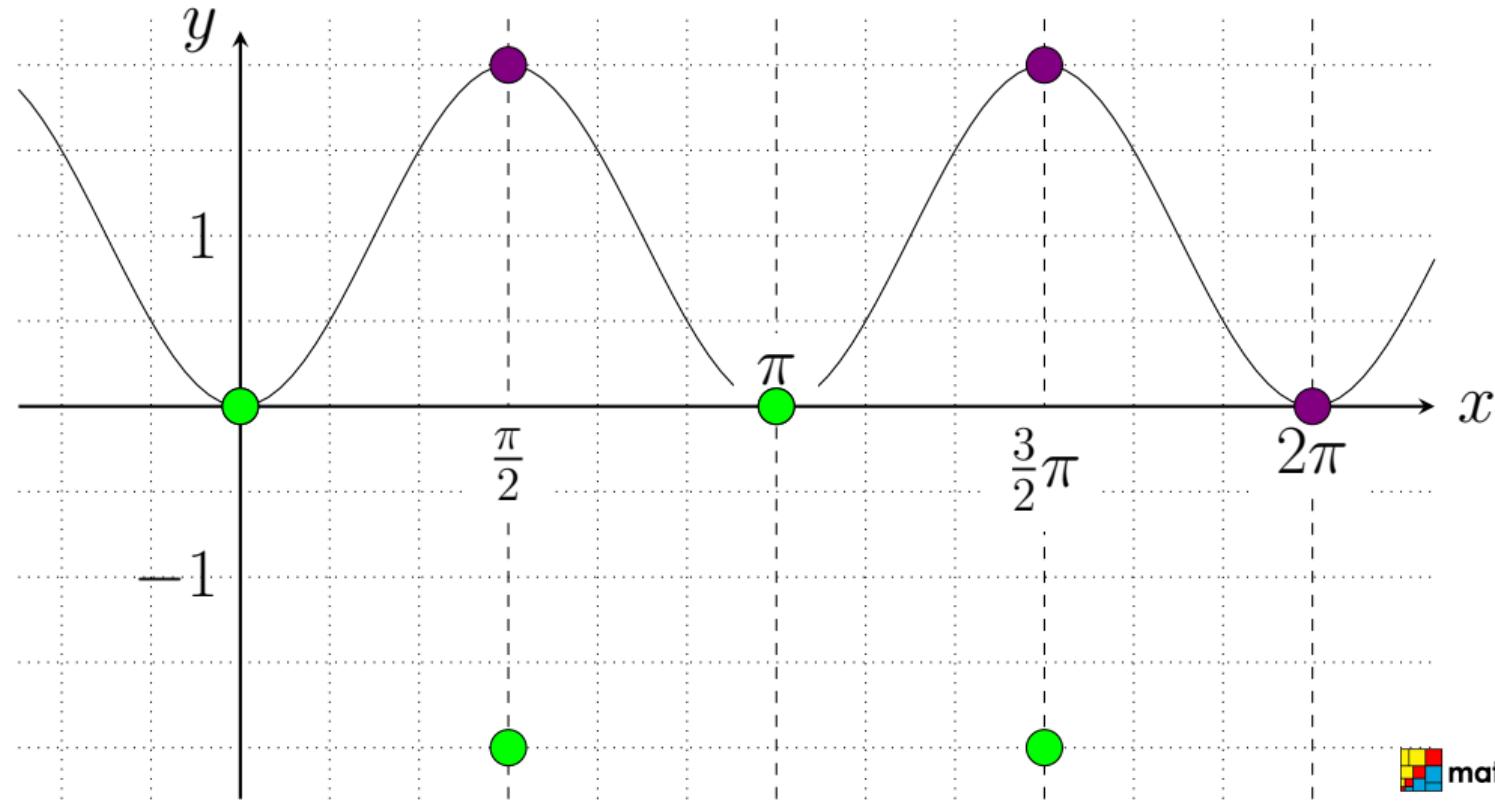
$$(3) \quad y = 2 \sin^2 \theta \quad \rightarrow \quad y = -2 \sin^2 \theta$$



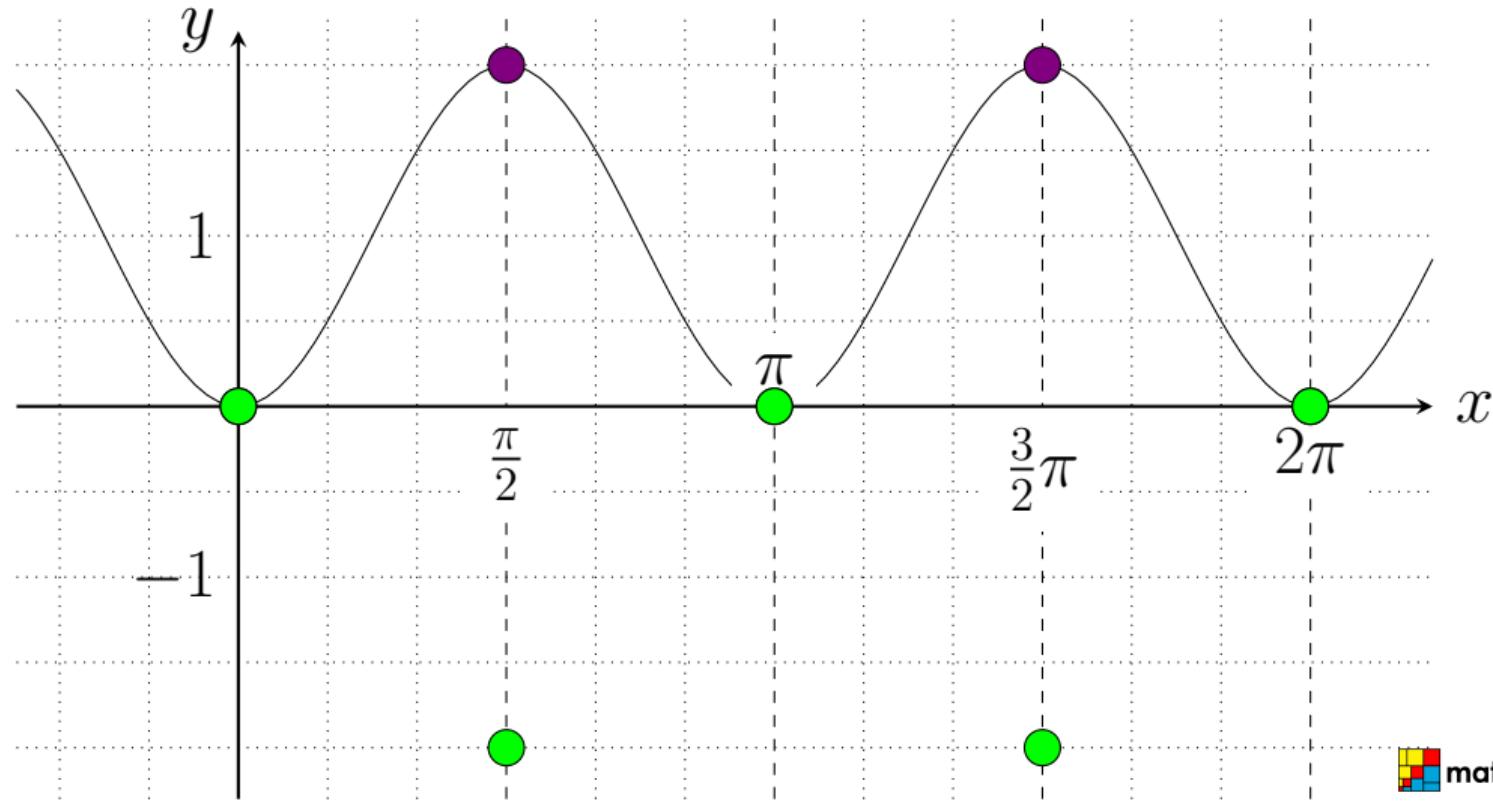
$$(3) \quad y = 2 \sin^2 \theta \quad \rightarrow \quad y = -2 \sin^2 \theta$$



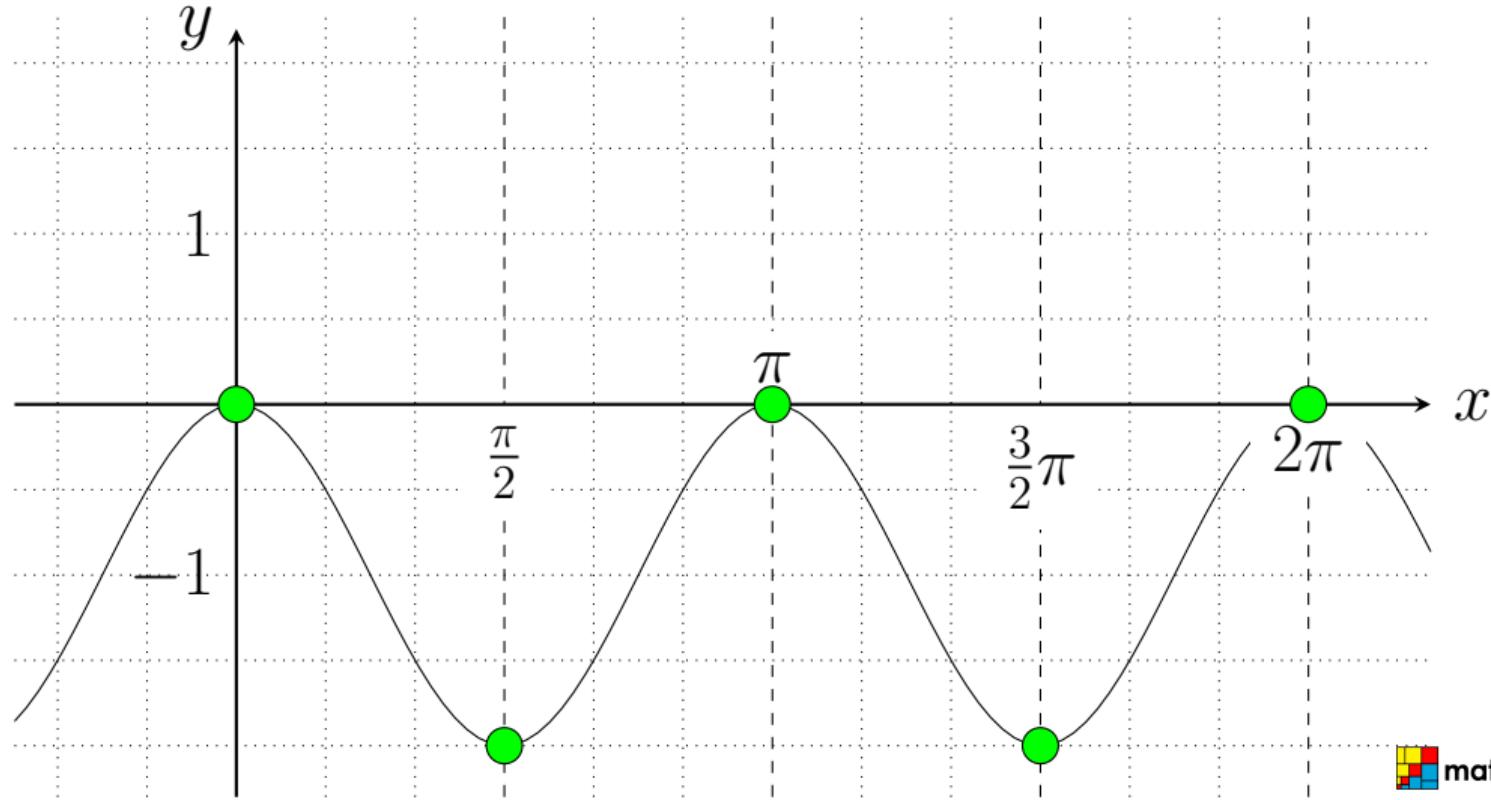
$$(3) \quad y = 2 \sin^2 \theta \quad \rightarrow \quad y = -2 \sin^2 \theta$$



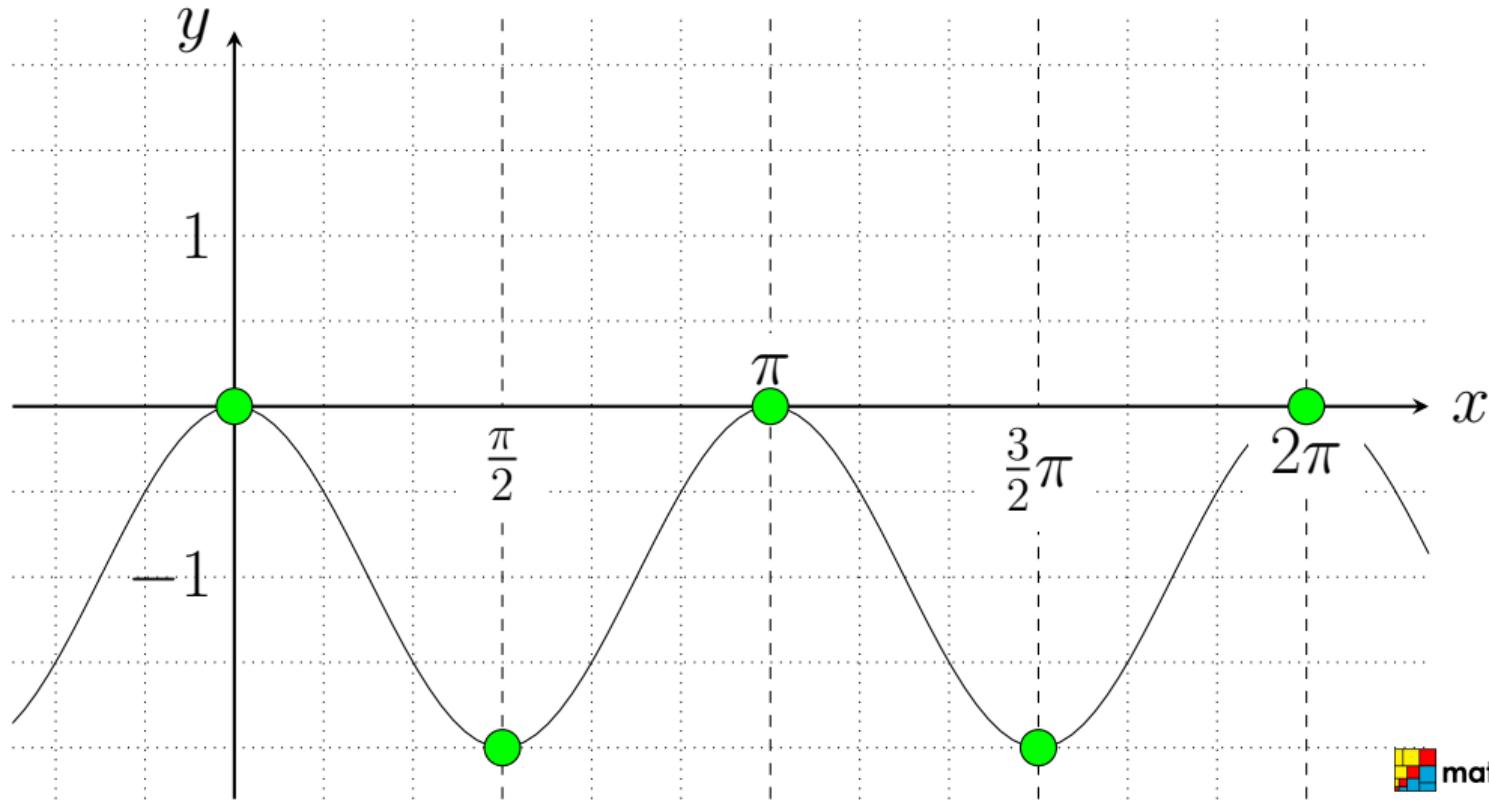
$$(3) \quad y = 2 \sin^2 \theta \quad \rightarrow \quad y = -2 \sin^2 \theta$$



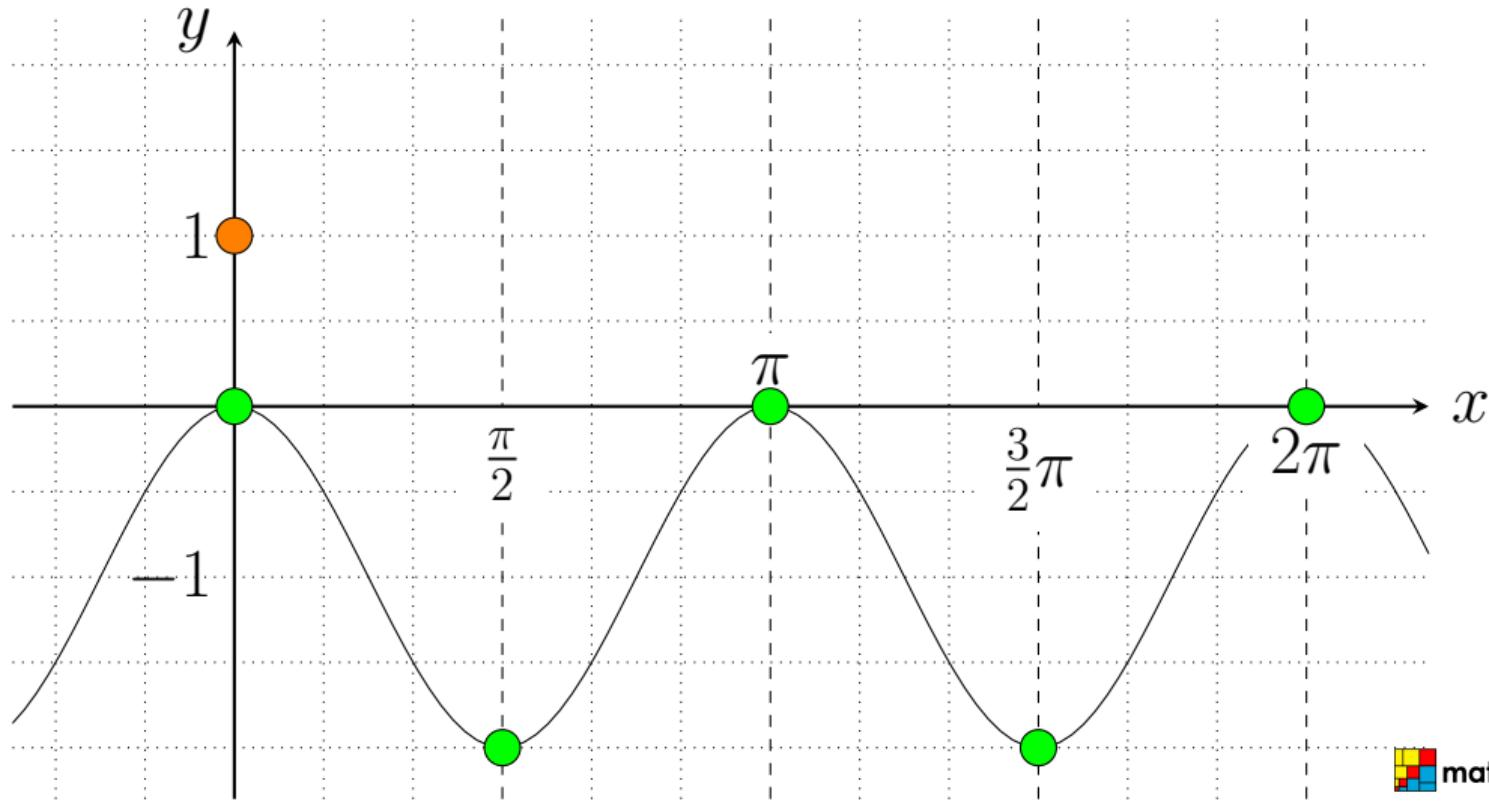
$$(4) \quad y = -2 \sin^2 \theta$$



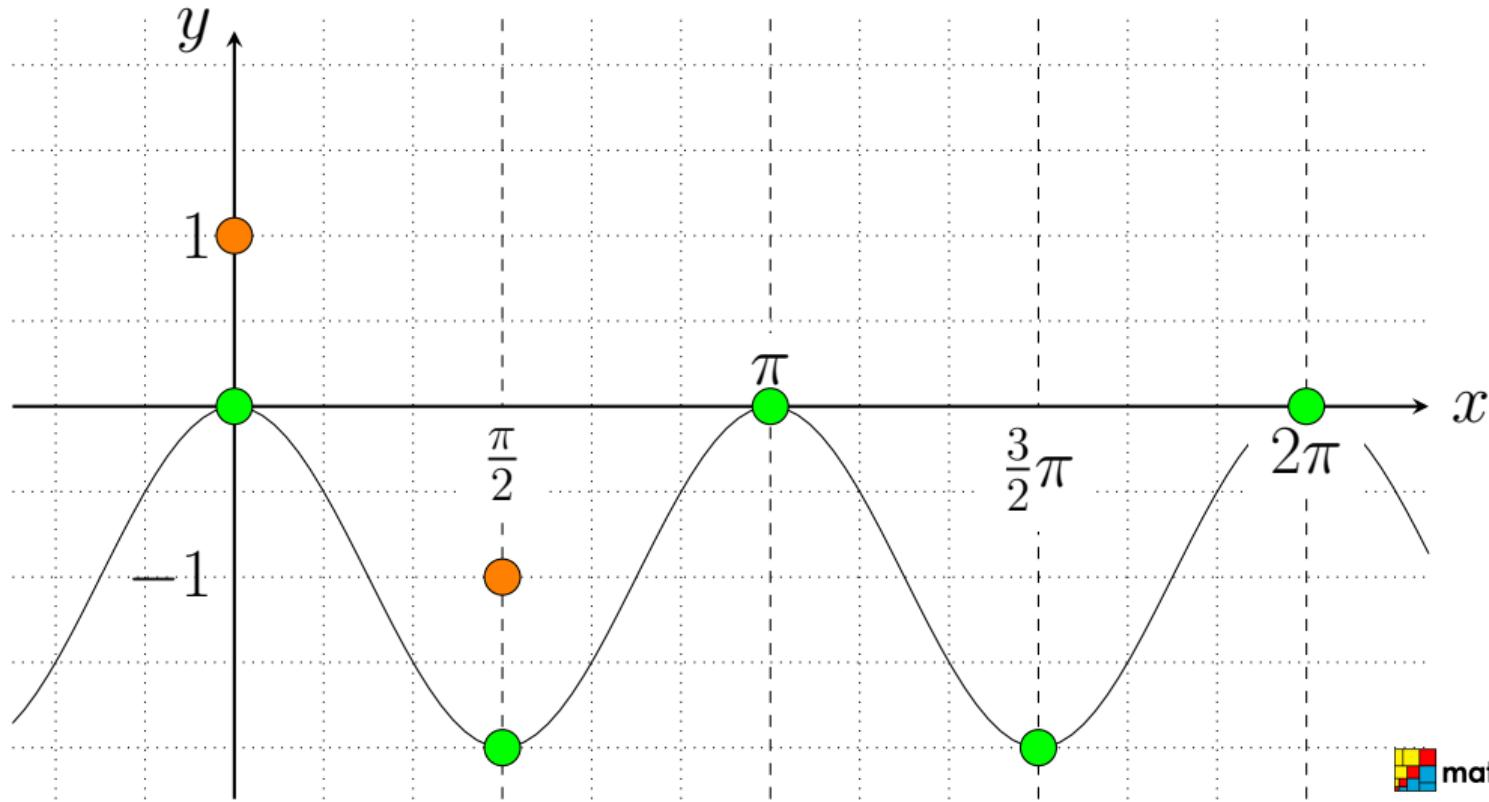
$$(4) \quad y = -2 \sin^2 \theta \quad \rightarrow \quad y = -2 \sin^2 \theta + 1$$



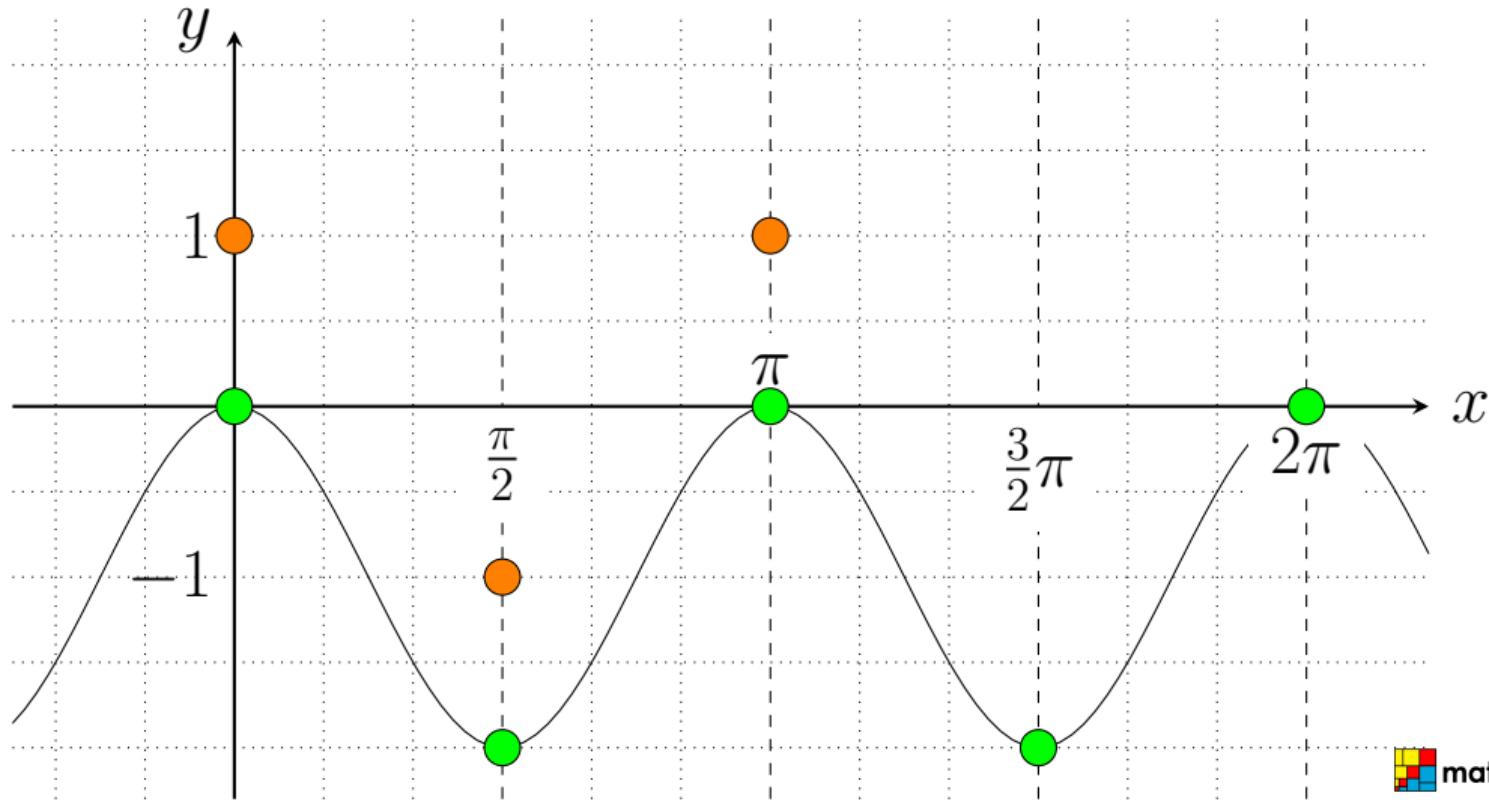
$$(4) \quad y = -2 \sin^2 \theta \quad \rightarrow \quad y = -2 \sin^2 \theta + 1$$



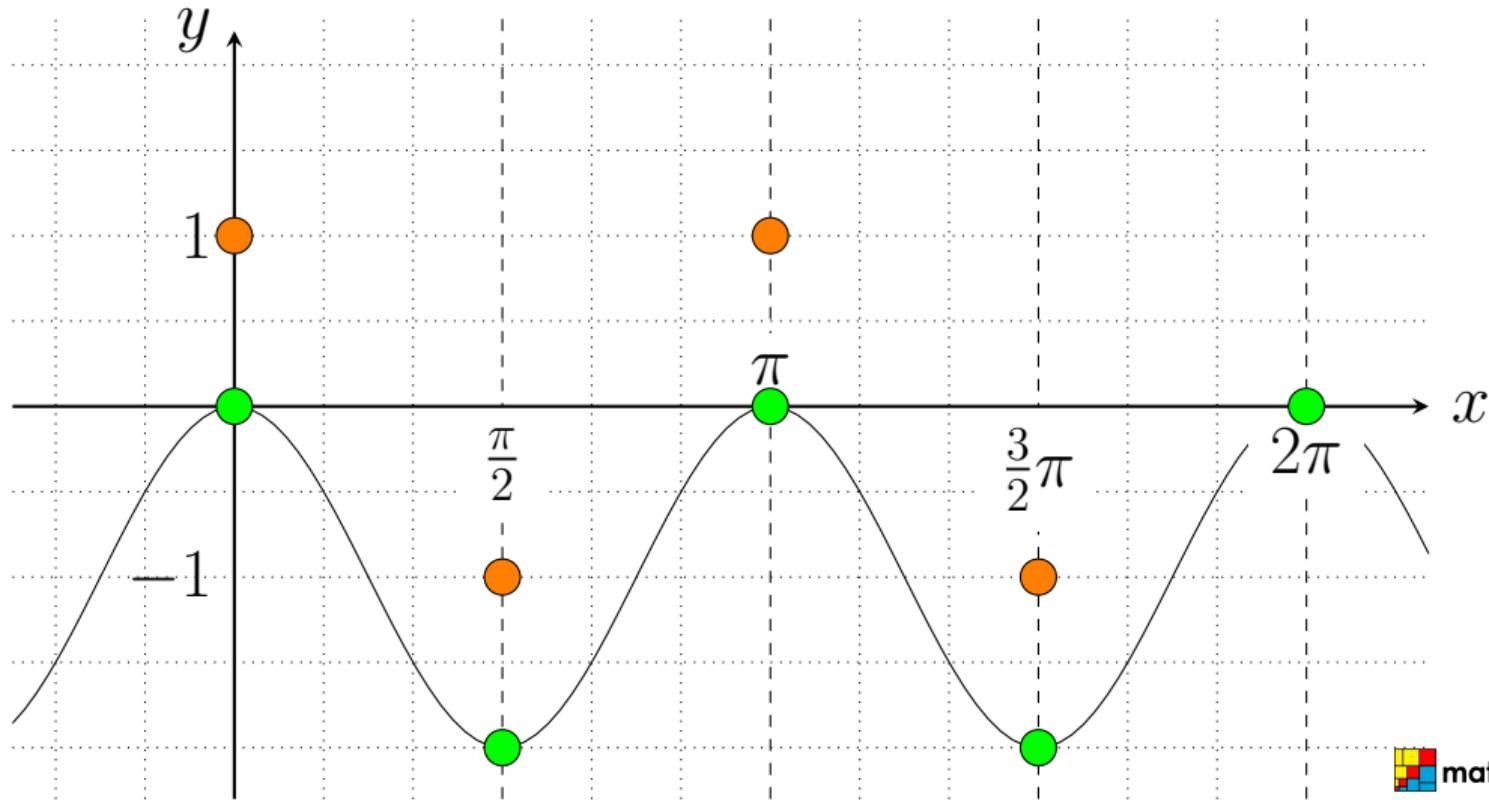
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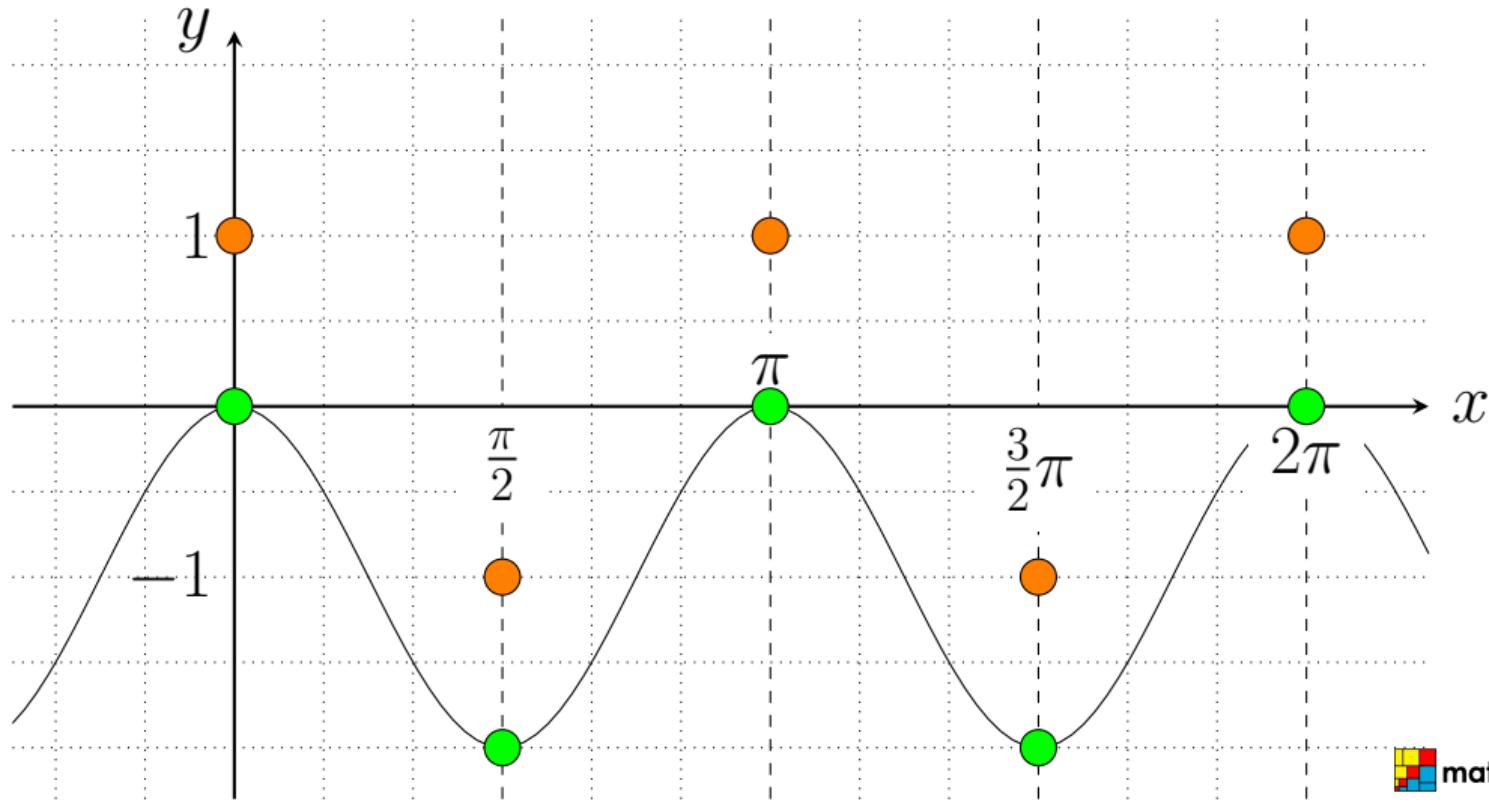
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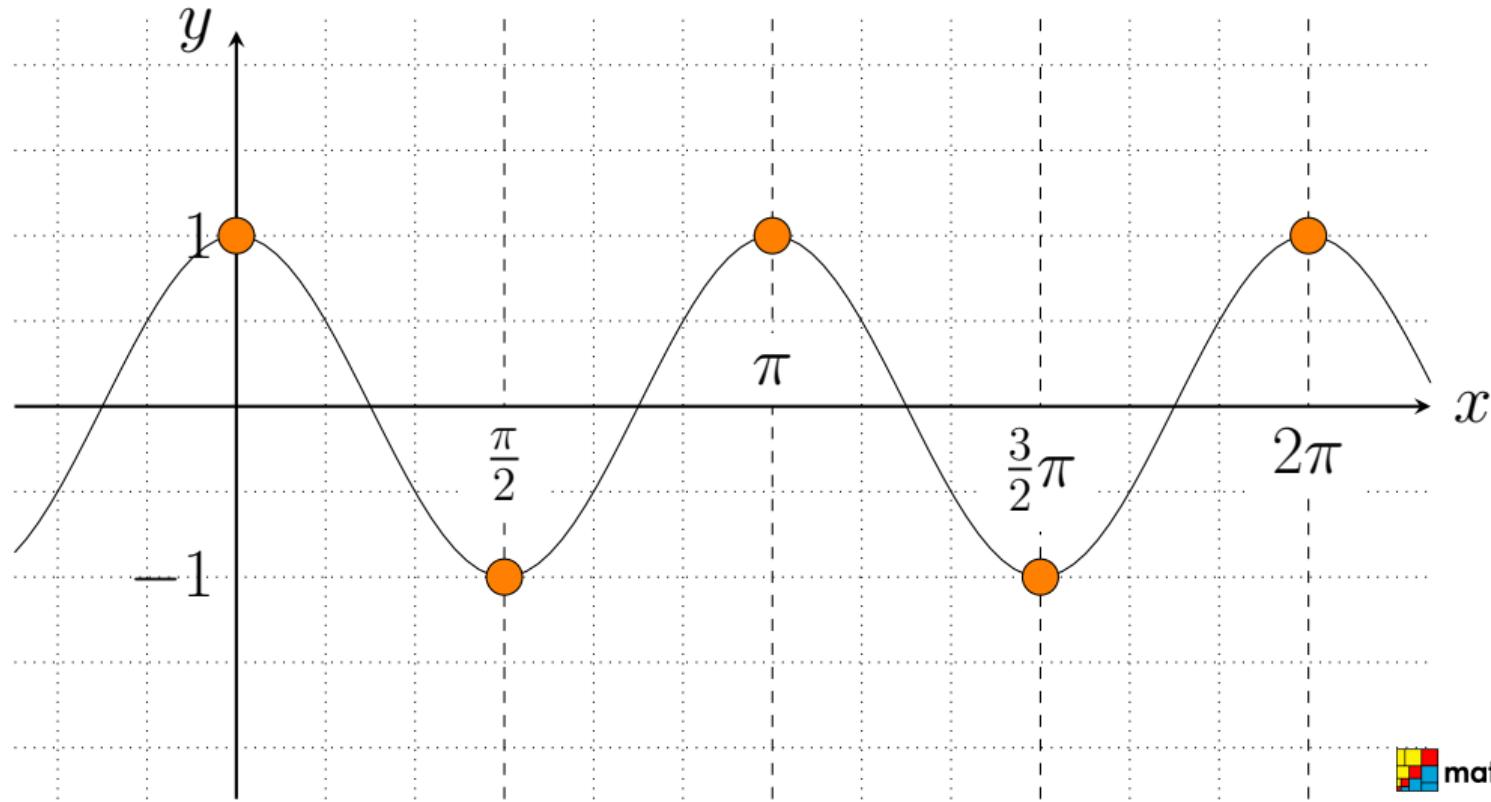
$$(4) \quad y = -2 \sin^2 \theta \quad \rightarrow \quad y = -2 \sin^2 \theta + 1$$



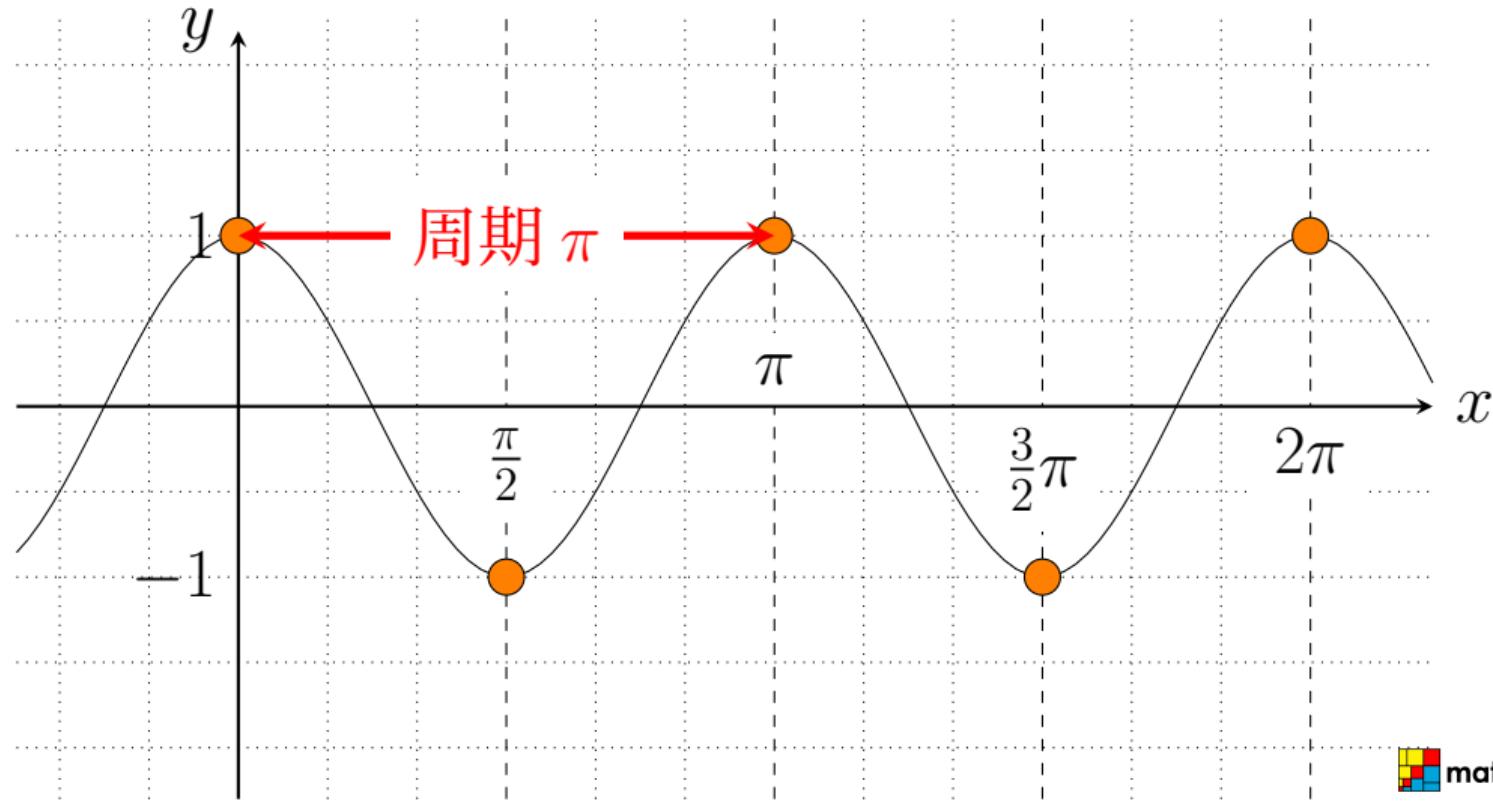
$$(4) \quad y = -2 \sin^2 \theta \quad \rightarrow \quad y = -2 \sin^2 \theta + 1$$



$$(5) \quad y = -2 \sin^2 \theta + 1$$



$$(5) \quad y = -2 \sin^2 \theta + 1$$



今回の学習目標

倍角公式をグラフの視点から

- $\cos 2\theta = 2 \cos^2 \theta - 1$ は、なぜ等しいのか？