

Precalculus

Trigonometric functions computable with algebraic numbers using special angles

Todor Milev

2019

Example

Find the exact value of the trigonometric function using radicals.

$$\cos(105^\circ)$$

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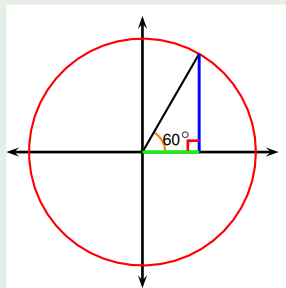
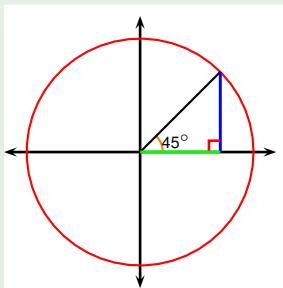
$$\cos(105^\circ) = \cos(45^\circ + 60^\circ)$$

Example

Find the exact value of the trigonometric function using radicals.

$$\cos(105^\circ) = \cos(45^\circ + 60^\circ)$$

we know the trig
f-ns of 45° and 60°



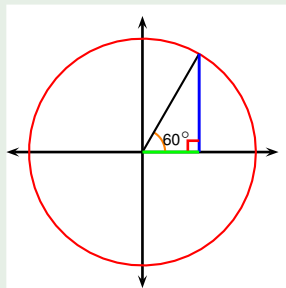
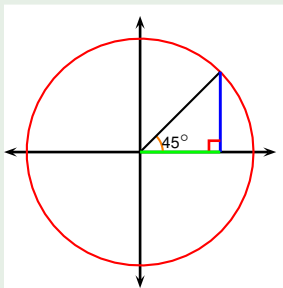
Example

Find the exact value of the trigonometric function using radicals.

$$\cos(105^\circ) = \cos(45^\circ + 60^\circ)$$

$$=?$$

we know the trig
f-ns of 45° and 60°
Angle sum f-la



Example

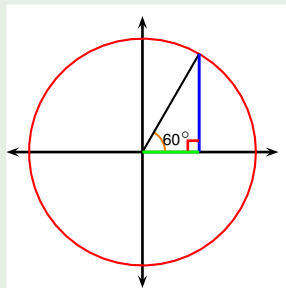
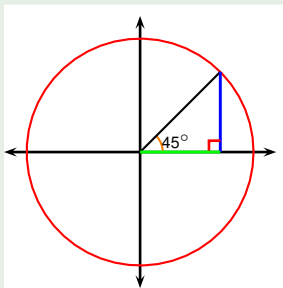
Find the exact value of the trigonometric function using radicals.

$$\cos(105^\circ) = \cos(45^\circ + 60^\circ)$$

$$= \cos(45^\circ) \cos(60^\circ) - \sin(45^\circ) \sin(60^\circ)$$

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Angle sum f-la



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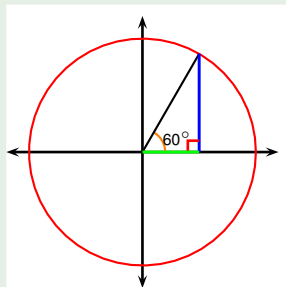
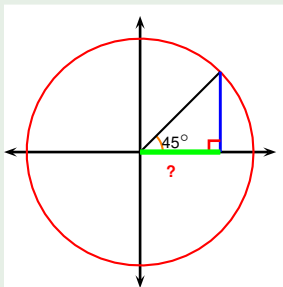
$$\cos(105^\circ) = \cos(45^\circ + 60^\circ)$$

$$= \cos(45^\circ) \cos(60^\circ) - \sin(45^\circ) \sin(60^\circ)$$

$$= ? \cdot ? - ? \cdot ?$$

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Angle sum f-la



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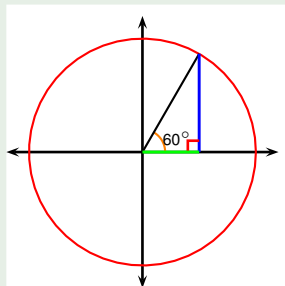
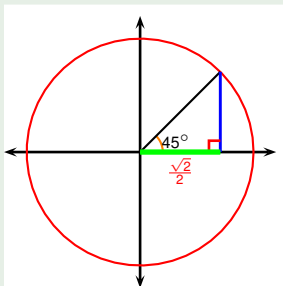
$$\cos(105^\circ) = \cos(45^\circ + 60^\circ)$$

$$= \cos(45^\circ) \cos(60^\circ) - \sin(45^\circ) \sin(60^\circ)$$

$$= \frac{\sqrt{2}}{2} \cdot ? - ? \cdot ?$$

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Angle sum f-la



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Find the exact value of the trigonometric function using radicals.

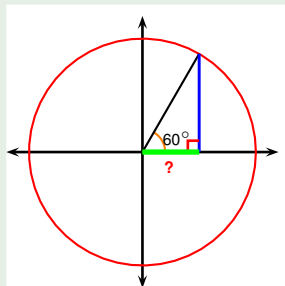
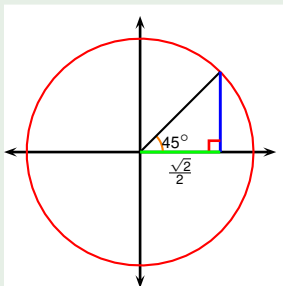
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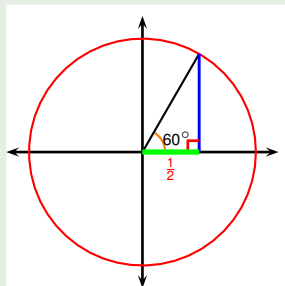
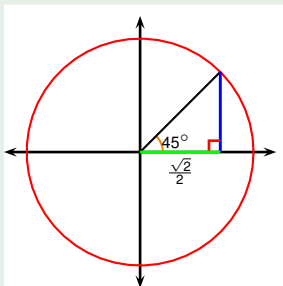
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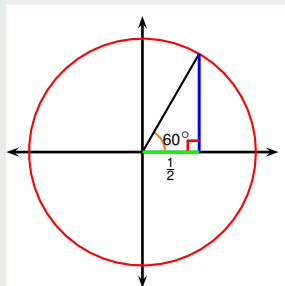
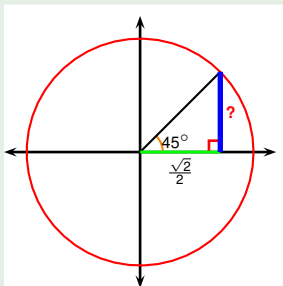
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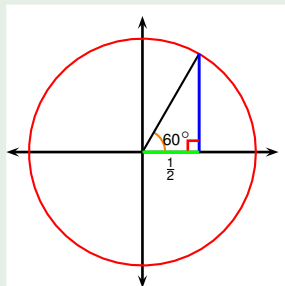
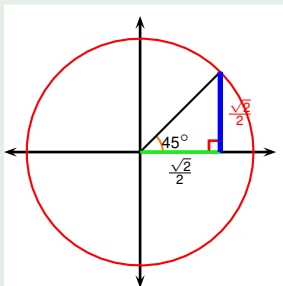
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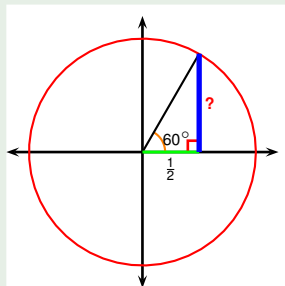
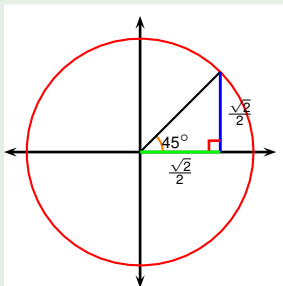
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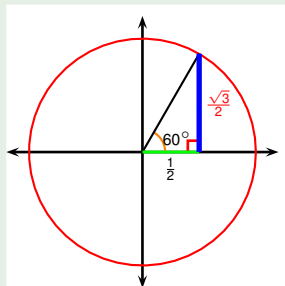
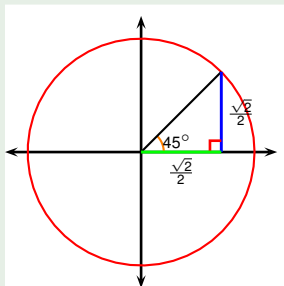
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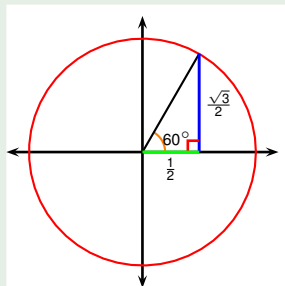
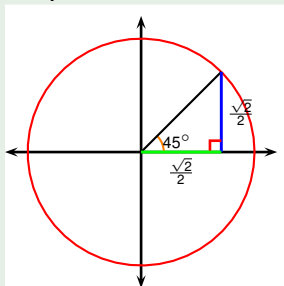
$$= \cos(45^\circ) \cos(60^\circ) - \sin(45^\circ) \sin(60^\circ)$$

$$= \frac{\sqrt{2}}{2} \cdot \frac{1}{2} - \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2}$$

$$= \frac{\sqrt{2} - \sqrt{6}}{4}$$

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