

Watch. Practice. Understand. | Lesson 165

Proving Pythagorean Identities with Unit Circle and Algebra

Watch the matching video: <https://www.youtube.com/watch?v=3Cr0SE6Jj0Q>

Practice focus: Unit circle and exact values

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Evaluate $\sin(\pi/6)$, $\cos(\pi/3)$ and $\tan(\pi/4)$.

02 Evaluate $\sin(4\pi/3)$ and $\cos(4\pi/3)$.

03 If $\cos \theta = -3/5$ and θ is in quadrant II, find $\sin \theta$ and $\tan \theta$.

04 Explain why $\sin^2 \theta + \cos^2 \theta = 1$.

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Practice focus: Radians, reference and coterminal angles

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

05 Convert 150° to radians.

06 Convert $7\pi/4$ radians to degrees.

07 Find the reference angle for 225° , and one positive coterminal angle greater than 360° .

08 Find the unit-circle coordinates at $5\pi/6$.

Worked answers | Lesson 165

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Practice focus: Unit circle and exact values

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01 Evaluate $\sin(\pi/6)$, $\cos(\pi/3)$ and $\tan(\pi/4)$.

Each follows from special triangles: $1/2$, $1/2$, 1 .

02 Evaluate $\sin(4\pi/3)$ and $\cos(4\pi/3)$.

Quadrant III with reference angle $\pi/3$: $-\sqrt{3}/2$ and $-1/2$.

03 If $\cos \theta = -3/5$ and θ is in quadrant II, find $\sin \theta$ and $\tan \theta$.

$\sin^2 \theta = 1 - 9/25 = 16/25$; positive in quadrant II, so $\sin \theta = 4/5$ and $\tan \theta = -4/3$.

04 Explain why $\sin^2 \theta + \cos^2 \theta = 1$.

On the unit circle $(x, y) = (\cos \theta, \sin \theta)$ and $x^2 + y^2 = 1$ by the distance formula.

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Practice focus: Radians, reference and coterminal angles

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05 Convert 150° to radians.

$$150\pi/180 = 5\pi/6.$$

06 Convert $7\pi/4$ radians to degrees.

$$(7\pi/4)(180/\pi) = 315^\circ.$$

07 Find the reference angle for 225° , and one positive coterminal angle greater than 360° .

Reference angle = $225 - 180 = 45^\circ$. A coterminal angle is $225 + 360 = 585^\circ$.

08 Find the unit-circle coordinates at $5\pi/6$.

Reference angle $\pi/6$ in quadrant II: $(\cos \theta, \sin \theta) = (-\sqrt{3}/2, 1/2)$.