

Watch. Practice. Understand. | Lesson 150

The Heart and Soul Trigonometry Lesson with a Unit Circle (Day 7, 8 and 9 and 10)

Watch the matching video: <https://www.youtube.com/watch?v=MlgEcGJ0NFI>

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: Right and special right triangles

Original extra practice matched to the listed lesson topic.

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

05 Find the hypotenuse of a right triangle with legs 9 and 12.

06 A 45-45-90 triangle has leg 7. Find its other leg and hypotenuse.

07 A 30-60-90 triangle has short leg 5. Find its long leg and hypotenuse.

08 The altitude to a right triangle's hypotenuse splits it into lengths 4 and 9. Find the altitude.

Worked answers | Lesson 150

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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: Right and special right triangles

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05 Find the hypotenuse of a right triangle with legs 9 and 12.

$$c = \sqrt{(81 + 144)} = 15.$$

06 A 45-45-90 triangle has leg 7. Find its other leg and hypotenuse.

The other leg is 7; hypotenuse is $7\sqrt{2}$.

07 A 30-60-90 triangle has short leg 5. Find its long leg and hypotenuse.

Long leg $5\sqrt{3}$; hypotenuse 10, using ratio $1:\sqrt{3}:2$.

08 The altitude to a right triangle's hypotenuse splits it into lengths 4 and 9. Find the altitude.

Altitude theorem: $h^2 = 4(9)$, so $h = 6$.