

Watch. Practice. Understand. | Lesson 153

Reviewing Fundamental Trigonometry Concepts in Less 14 Minutes

Watch the matching video: <https://www.youtube.com/watch?v=MPU8eS-0-fA>

Practice focus: Unit circle and exact values

Related course review; confirm topics with your teacher.

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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Watch the matching video: <https://www.youtube.com/watch?v=MPU8eS-0-fA>

Practice focus: Right-triangle trigonometry

Related course review; confirm topics with your teacher.

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

- 05** Relative to angle θ , a right triangle has opposite side 3, adjacent side 4 and hypotenuse 5. Find all six ratios.

- 06** A right triangle has angle 30° and hypotenuse 12. Find the opposite leg.

- 07** A ladder reaches 8 m up a wall and makes a 60° angle with level ground. Find its length exactly.

- 08** In a right triangle, the opposite and adjacent legs are 5 and 12. Find θ to the nearest tenth of a degree.

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Practice focus: Inverse trigonometric functions

Related course review; confirm topics with your teacher.

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

09 Evaluate $\arcsin(1/2)$, $\arccos(-1/2)$, and $\arctan(-1)$. Use principal values.

10 Evaluate $\arcsin(\sin(5\pi/6))$.

11 Evaluate $\cos(\arctan(3/4))$.

12 Solve $\sin x = 1/2$ on $0 \leq x < 2\pi$.

Worked answers | Lesson 153

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Practice focus: Unit circle and exact values

Related course review; confirm topics with your teacher.

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.

Worked answers | Lesson 153

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Practice focus: Right-triangle trigonometry

Related course review; confirm topics with your teacher.

- 05** Relative to angle θ , a right triangle has opposite side 3, adjacent side 4 and hypotenuse 5. Find all six ratios.

$$\sin \theta = 3/5, \cos \theta = 4/5, \tan \theta = 3/4; \csc \theta = 5/3, \sec \theta = 5/4, \cot \theta = 4/3.$$

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- 06** A right triangle has angle 30° and hypotenuse 12. Find the opposite leg.

$$\sin 30^\circ = x/12; x = 12(1/2) = 6.$$

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- 07** A ladder reaches 8 m up a wall and makes a 60° angle with level ground. Find its length exactly.

$$\sin 60^\circ = 8/L, \text{ so } L = 8/(\sqrt{3}/2) = 16\sqrt{3}/3 \text{ m.}$$

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- 08** In a right triangle, the opposite and adjacent legs are 5 and 12. Find θ to the nearest tenth of a degree.

$$\tan \theta = 5/12, \text{ so } \theta = \arctan(5/12) \approx 22.6^\circ.$$

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Related course review; confirm topics with your teacher.

09 Evaluate $\arcsin(1/2)$, $\arccos(-1/2)$, and $\arctan(-1)$. Use principal values.
 $\pi/6$, $2\pi/3$, and $-\pi/4$ respectively, using the principal-value ranges.

10 Evaluate $\arcsin(\sin(5\pi/6))$.
 $\arcsin$ outputs values in $[-\pi/2, \pi/2]$. Since $\sin(5\pi/6) = 1/2$, the result is $\pi/6$.

11 Evaluate $\cos(\arctan(3/4))$.
Take a right triangle with opposite 3, adjacent 4, hypotenuse 5. Cosine is $4/5$.

12 Solve $\sin x = 1/2$ on $0 \leq x < 2\pi$.
Unit-circle solutions in quadrants I and II: $x = \pi/6, 5\pi/6$. Inverse sine alone gives only the first.