

Watch. Practice. Understand. | Lesson 019

Summer Geometry Semester 1 Unit 4 Pretest Analysis SohCahToa, Law of Sines, Cosine...

Watch the matching video: <https://www.youtube.com/watch?v=xhaw0YsfCv0>

Practice focus: Right-triangle trigonometry

Original extra practice matched to the listed lesson topic.

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

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

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

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

- 04** 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: Law of sines and ambiguous cases

Original extra practice matched to the listed lesson topic.

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

05 In triangle ABC, $A = 30^\circ$, $B = 45^\circ$ and $a = 10$. Find b exactly.

06 Given $A = 30^\circ$, $a = 5$ and $b = 8$, determine the number of triangles and possible B angles.

07 Given $A = 30^\circ$, $a = 3$ and $b = 8$, explain why no triangle exists.

08 Given $A = 40^\circ$ and $B = 65^\circ$, find C and state a formula for c if $a = 7$.

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Practice focus: Law of cosines, area and bearings

Original extra practice matched to the listed lesson topic.

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

09 Two sides are 5 and 7 with included angle 60° . Find the third side.

10 Find the angle opposite side 13 in a triangle with sides 5, 12, 13.

11 Find the area with sides 8 and 10 and included angle 30° .

12 A ship travels 10 km on bearing 030° (clockwise from north). Find east and north displacement.

Worked answers | Lesson 019

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Practice focus: Right-triangle trigonometry

Original extra practice matched to the listed lesson topic.

- 01** 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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- 02** 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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- 03** 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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- 04** 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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Practice focus: Law of sines and ambiguous cases

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05 In triangle ABC, $A = 30^\circ$, $B = 45^\circ$ and $a = 10$. Find b exactly.

$$b/\sin 45^\circ = 10/\sin 30^\circ, \text{ so } b = 10\sqrt{2}.$$

06 Given $A = 30^\circ$, $a = 5$ and $b = 8$, determine the number of triangles and possible B angles.

$$\sin B = 8\sin 30^\circ/5 = 0.8. B \approx 53.13^\circ \text{ or } 126.87^\circ. \text{ Both leave } C > 0, \text{ so two triangles.}$$

07 Given $A = 30^\circ$, $a = 3$ and $b = 8$, explain why no triangle exists.

$$\sin B = 8\sin 30^\circ/3 = 4/3 > 1, \text{ impossible.}$$

08 Given $A = 40^\circ$ and $B = 65^\circ$, find C and state a formula for c if $a = 7$.

$$C = 75^\circ. \text{ By sine law } c = 7\sin 75^\circ/\sin 40^\circ \text{ (approximately } 10.52\text{).}$$

Worked answers | Lesson 019

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09 Two sides are 5 and 7 with included angle 60° . Find the third side.

$$c^2 = 25 + 49 - 2(5)(7)\cos 60^\circ = 39. \text{ Thus } c = \sqrt{39}.$$

10 Find the angle opposite side 13 in a triangle with sides 5, 12, 13.

$$\cos C = (25 + 144 - 169)/(2 \cdot 5 \cdot 12) = 0, \text{ so } C = 90^\circ.$$

11 Find the area with sides 8 and 10 and included angle 30° .

$$A = (1/2)ab \sin C = (1/2)(8)(10)(1/2) = 20.$$

12 A ship travels 10 km on bearing 030° (clockwise from north). Find east and north displacement.

$$\text{East} = 10\sin 30^\circ = 5 \text{ km}; \text{ north} = 10\cos 30^\circ = 5\sqrt{3} \text{ km}.$$