Geometry B Live Lesson Class

U3L7 – Right Triangles and Trigonometry Unit Test

Agenda

1. Review topics and problems from Unit 3, in preparation for the unit test.

2. Use the 2-column note system to take better notes in math class. Bring your math notebook and pen or pencil to each math LiveLesson class.

2-Column Notes Template

1. Announcements/To Do's	1. Write down important details.
2. School-Wide Learner Outcomes	2. What are you going to work on this week?
3. LL Objectives	
4. Vocabulary words	4. Definitions (fill in as we go)
5. Problems	5. Steps to solving problems
6. Summary (End of class)	6. 1 or 2 sentences about the LL class.

Reminders and To – Do's

Information

1. Complete 1 math lesson per day.

2. Check your WebMail every day

3. Be prepared to spend 4 - 6 hours per day on schoolwork.

4. Remind your Learning Coach to take daily attendance

What to do

1. Go to your Planner in Connexus to find the math lesson for the day

2. Go to Connexus to find WebMail

3. Complete lessons for the day from your Planner. Do not get behind on lessons.

4. Have your Learning Coach log into Connexus daily.

Reminders and To – Do's

Information	What to do
5. Go to the Message Board first for information about our math class.	
6. Contact Mr. Elizondo for math questions.	6. Call (559) 549 - 3244 and leave a voicemail if call is not answered.
Remember: You need at least 2 phone calls with Mr. Elizondo per semester.	Make an appointment at: https://elizondo.youcanbook.me
	Send a WebMail

Unit 3 – California Common Core State Standards

- HSG-SRT.C.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

- HSG-SRT.C.6: Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

- HSG-SRT.C.7: Explain and use the relationship between the sine and cosine of complementary angles.

- HSG-SRT.C.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

- HSG-MG.A.1: Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

U3L7 – Objectives

Review lesson material associated with right triangles and trigonometry to prepare for the Unit 3 test.

Make sure to have a scientific calculator for this test. You can go to Desmos.com to find a web-based one to use.
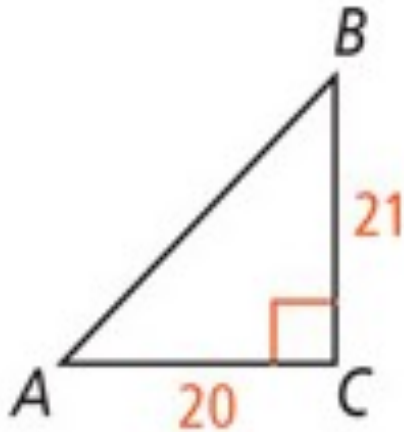
U3L7 – Vocabulary Words

- angle of depression

- angle of elevation

- cosine

- Law of Cosines

- Law of Sines

- Pythagorean Triple

- sine

- tangent

- trigonometric ratios

Find the missing length.

$$a^2 + b^2 = c^2$$

$$20^2 + 21^2 = c^2$$

$$400 + 441 = c^2$$

$$841 = c^2$$

$$\sqrt{c^2} = \sqrt{841}$$

$$c = 29$$

U3L7 – Acute, Obtuse or Right?

$$a^2 + b^2 = c^2 \; Right$$

$$c^2 < a^2 + b^2 \; Acute$$

$$c^2 > a^2 + b^2 \; Obtuse$$

A triangle has side lengths 11m, 12m, and 15m. Is the triangle acute, obtuse, or right?

$$11^2 + 12^2 \overset{?}{=} 15^2$$
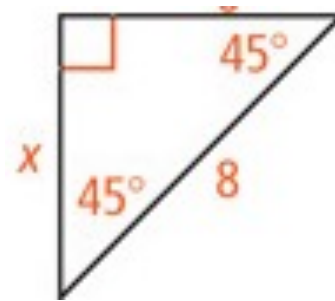
$$121 + 144 \overset{?}{=} 225$$

$$265 > 225$$

Acute

U3L7 – Special Right Triangles

- 45-45-90 Triangles

$x\sqrt{2}$

x

45°

45°
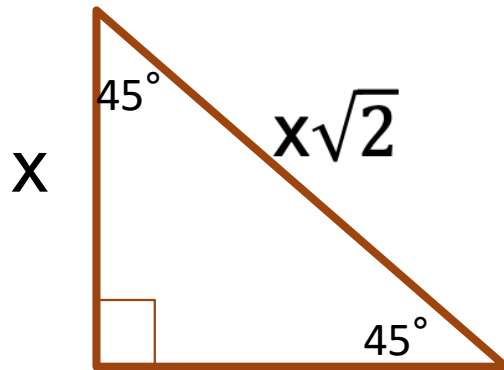
What is the value of x?

45°

x

45°

8

$x\sqrt{2} = 8$

$$\frac{x\sqrt{2}}{\sqrt{2}} = \frac{8}{\sqrt{2}}$$

$$x = \frac{8}{\sqrt{2}}$$

$$x = \frac{8 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}}$$
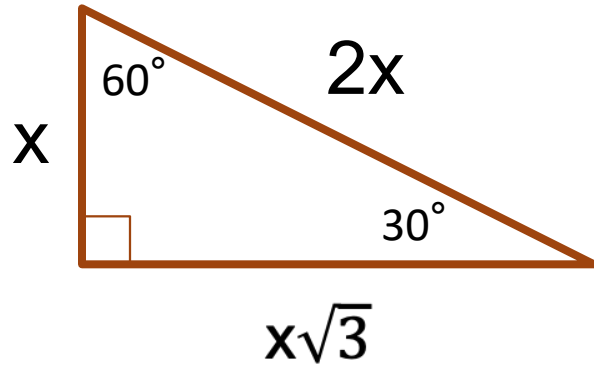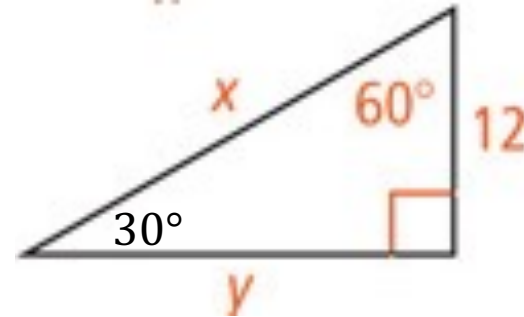
$$x = \frac{8\sqrt{2}}{2}$$

$$\boldsymbol{x = 4\sqrt{2}}$$

U3L7 – Special Right Triangles

30-60-90 Triangles

Find the value of each variable.

$$x = 24$$

$$y = 12\sqrt{3}$$
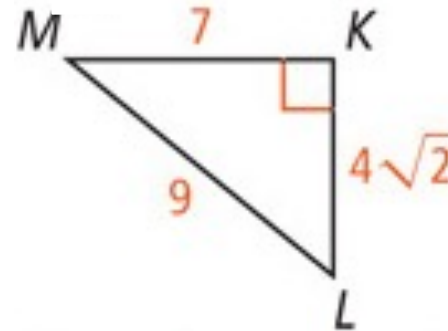
U3L7 – Trigonometric Ratios

$$\sin x = \frac{opposite}{hypotenuse}$$

$$\cos x = \frac{adjacent}{hypotenuse}$$

$$\tan x = \frac{opposite}{adjacent}$$

SOH CAH TOA

Find the ratios of sin M, cos M, and tan M.

$$\sin M = \frac{4\sqrt{2}}{9}$$

$$\cos M = \frac{7}{9}$$

$$\tan M = \frac{4\sqrt{2}}{7}$$

U3L7 – Trigonometric Ratios

Use sin, cos or tan to find sides of a triangle.

Use sin⁻¹, cos⁻¹, or tan⁻¹ to find angles of a triangle

Find the missing value to the nearest hundredth.

$$\cos x = \frac{24}{25}$$

$$x = cos^{-1}\frac{24}{25}$$
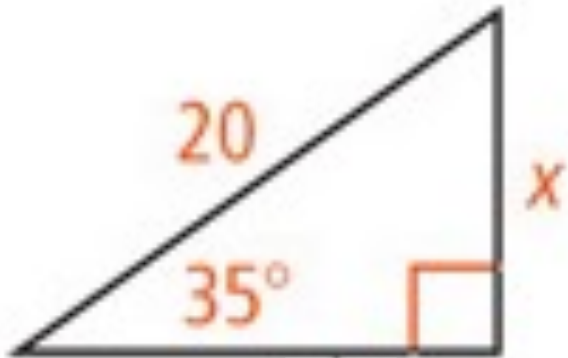
$$x = cos^{-1} 0.96$$

$$\boldsymbol{x = 16.26°}$$

$$\tan x = \frac{24}{7}$$

$$x = tan^{-1}\frac{24}{7}$$

$$x = tan^{-1} 3.42857$$

$$\boldsymbol{x = 73.74°}$$

U3L7 – Trigonometric Ratios
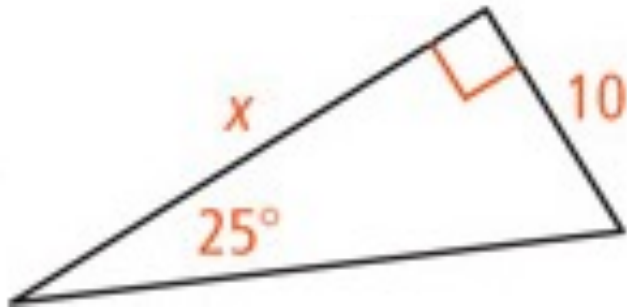

$$sin\ x = \frac{opposite}{hypotenuse}$$

$$sin\ 35° = \frac{x}{20}$$

$$x = 20 \cdot sin\ 35°$$

$$x = 20 \cdot 0.573576$$

$$\boldsymbol{x = 11.471528}$$

U3L7 – Trigonometric Ratios

$$tan\ x = \frac{opposite}{adjacent}$$

$$tan\ 25° = \frac{10}{x}$$

$$x \cdot \tan 25° = 10$$

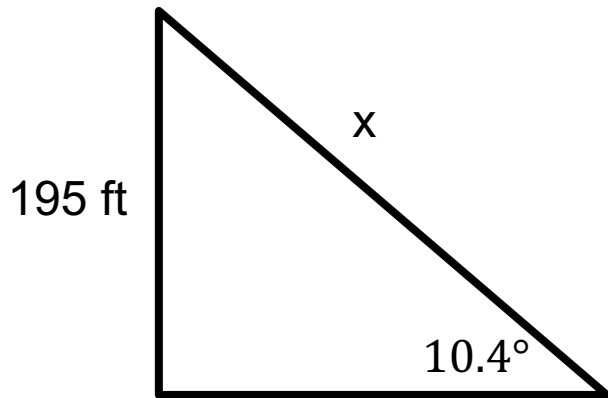$$x = \frac{10}{\tan 25°}$$

$$x = \frac{10}{0.4463}$$

$$\boldsymbol{x = 22.445}$$

U3L7 – Trigonometric Ratios

An escalator in the subway station has a vertical rise of 195 feet and rises at an angle of 10.4 degrees. How long is the escalator?

$$sin\ x = \frac{opposite}{hypotenuse}$$

$$sin\ 10.4° = \frac{195}{x}$$

$$x \cdot sin\ 10.4° = 195$$

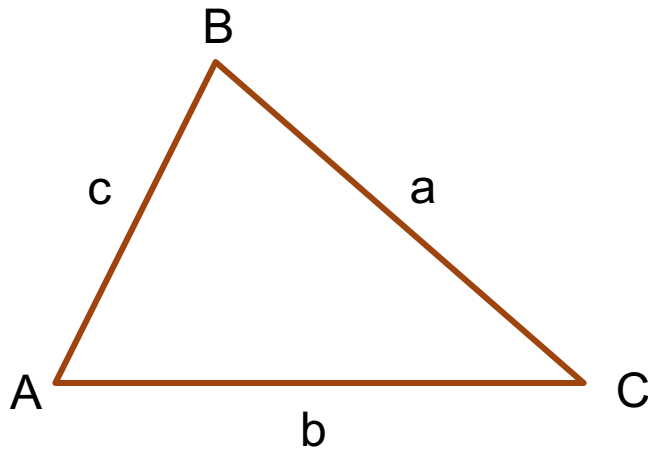$$x = \frac{195}{sin\ 10.4°}$$

$$x = \frac{195}{0.180519}$$

$$\boldsymbol{x = 1080.2187\ feet}$$

U3L7 – Law of Sines and Law of Cosines
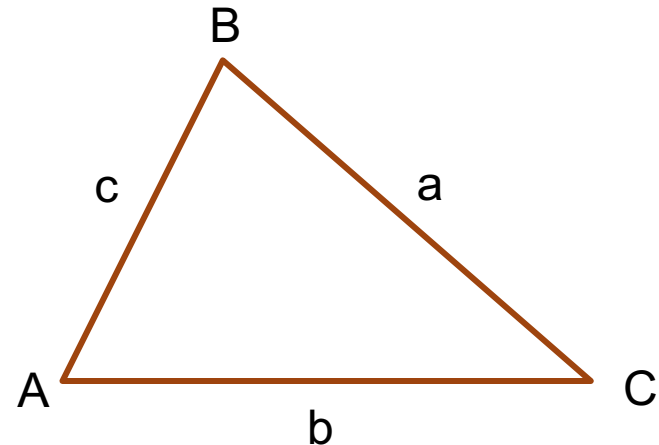
- Law of Sines

  Use for non-right triangles

  $$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

- Law of Cosines

  Use for non-right triangles
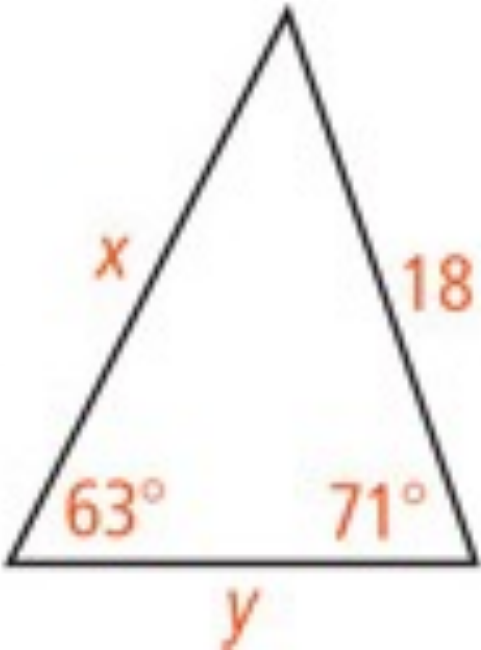

  $$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$
  $$b^2 = a^2 + c^2 - 2ac \cdot \cos B$$
  $$c^2 = a^2 + b^2 - 2ab \cdot \cos C$$

Use the Law of Sines to find the values of x and y.

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\frac{\sin 63°}{18} = \frac{\sin 71°}{x}$$

$$x \cdot \sin 63° = 18 \cdot \sin 71°$$

$$x = \frac{18 \cdot \sin 71°}{\sin 63°}$$
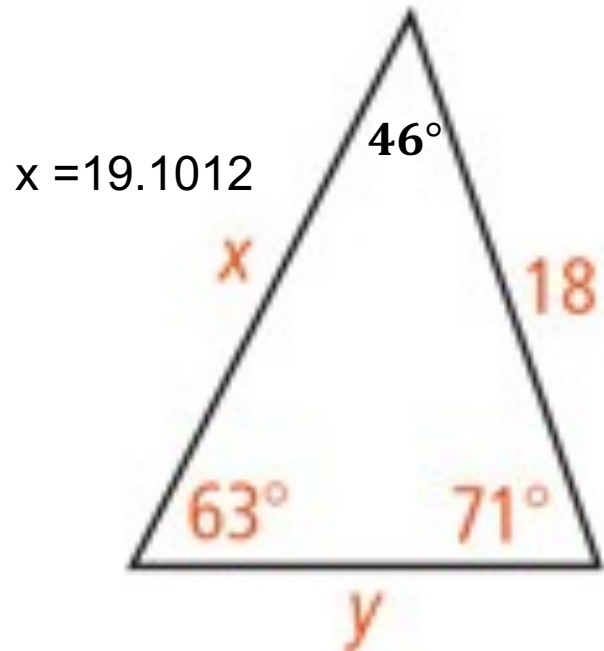
$$x = \frac{18 \cdot 0.945518}{0.891006}$$

$$x = \frac{17.019324}{0.891006}$$

$$x = \mathbf{19.1012}$$

Use the Law of Sines to find the values of x and y.

x = 19.1012

46°

x

18

63°   71°

y

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\frac{\sin 63°}{18} = \frac{\sin 46°}{y}$$

$$y \cdot \sin 63° = 18 \cdot \sin 46°$$

$$y = \frac{18 \cdot \sin 46°}{\sin 63°}$$
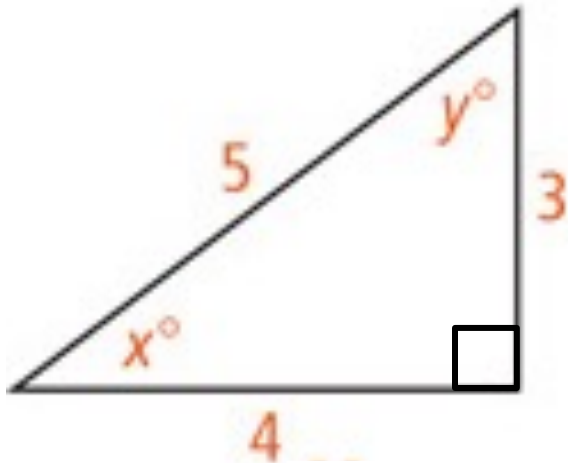
$$y = \frac{18 \cdot 0.719339}{0.891006}$$

$$y = \frac{12.948116}{0.891006}$$

$$y = 14.532$$

U3L7 – Law of Sines and Law of Cosines

Use the Law of Cosines to find the values of x and y.

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$3^2 = 4^2 + 5^2 - 2(4)(5) \cdot \cos x°$$

$$9 = 16 + 25 - 40 \cdot \cos x°$$

$$9 = 41 - 40 \cdot \cos x°$$

$$-32 = -40 \cdot \cos x°$$

$$\frac{-32}{-40} = \frac{-40 \cdot \cos x°}{-40}$$

$$0.8 = \cos x°$$

$$x° = cos^{-1}\, 0.8$$

$$x° = 36.8698 \qquad y° = 53.1301$$

U3L7 – Things to know for the Test

- Pythagorean Theorem

- Acute, obtuse, or right triangle?

- Special right triangles (45-45-90 and 30-60-90)

- Trigonometric ratios (sine, cosine, tangent)
  - Application in word problems
  - Inverse trig ratios
  - Angle of elevation and depression

- Law of sines and law of cosines

- How to use a calculator to find trigonometric ratios

Questions?

- Check the Message Board first

- Send a WebMail

- You can also make an appointment at
  https://elizondo.youcanbook.me

- You can also call me at (559) 549-3244. If
  I'm not available to answer your call, please
  leave a voicemail with your full name and
  phone number.