Name:

UNIT 4 LEARNING GUIDE -TRIGONOMETRY

INSTRUCTIONS:

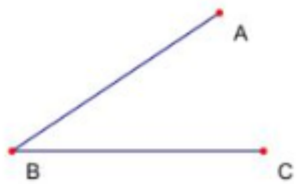
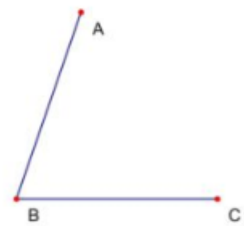
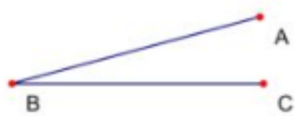
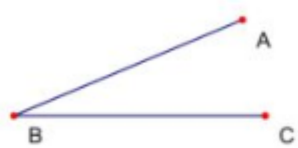
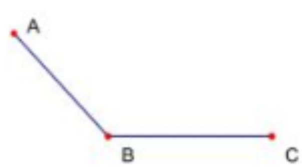
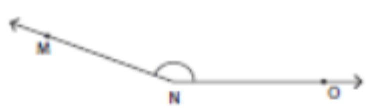
Using a pencil, complete the following questions as you work through the related lessons. Show ALL of your work as is explained in the lessons. Do your best and always ask questions if there is anything that you don't understand.

4.1 ANGLES

1. Sketch an example of each angle and define the angle range.

Angle to Sketch	Sketches
Acute Angle ∠ABC	
Obtuse Angle ∠BAC	
Right Angle ∠PAL	
Straight Angle ∠RGH	
Reflex Angle ∠DEF	

2. Estimate, **then** use a protractor to measure, then identify the angle type.

Angle	Report
	**Estimate:** _______________ **Measurement:** ________________ **Angle Type:** ________________
	**Estimate:** _______________ **Measurement:** ________________ **Angle Type:** ________________
	**Estimate:** _______________ **Measurement:** ________________ **Angle Type:** ________________
	**Estimate:** _______________ **Measurement:** ________________ **Angle Type:** ________________
	**Estimate:** _______________ **Measurement:** ________________ **Angle Type:** ________________
	**Estimate:** _______________ **Measurement:** ________________ **Angle Type:** ________________

3. Use a protractor to draw each angle.

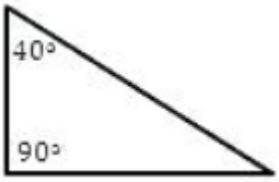
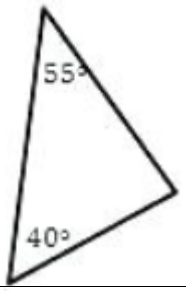
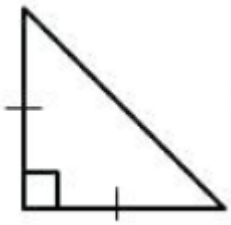
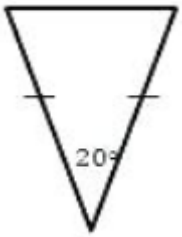
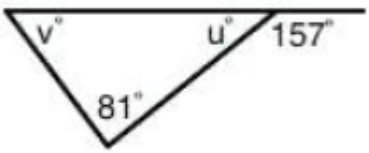
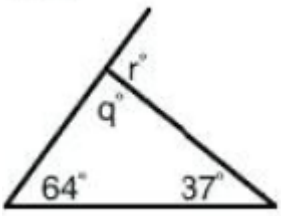
Angle to Sketch	Sketch
$\angle ABC = 32^\circ$	
$\angle BAC = 132^\circ$	
$\angle PAL = 90^\circ$	
$\angle RGH = 99^\circ$	
$\angle DEF = 65^\circ$	
$\angle BRS = 10^\circ$	

4.2 Triangles

1. Sketch an example of each triangle (note: you'll label one of them as impossible).

Triangle to Sketch	Sketch
Equilateral Triangle $\triangle ABC$	
Isosceles Triangle $\triangle BAC$	
Scalene Triangle $\triangle PAL$	
Right Triangle $\triangle DEF$	
Right-Isosceles Triangle $\triangle HIJ$	
Right-Scalene Triangle $\triangle LMN$	
Right-Equilateral Triangle $\triangle WYZ$	

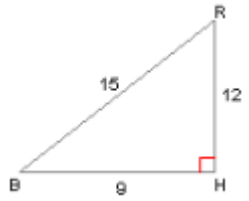
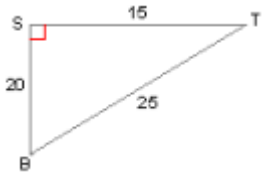
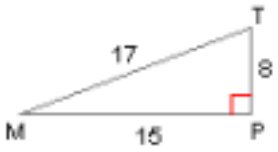
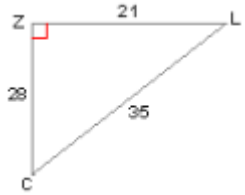
2. Determine the unknown angle(s) and show work.

Triangle	Angles
	**Unknown Angle = _____** **Calculation Work:**
	**Unknown Angle = _____** **Calculation Work:**
	**Unknown Angle = _____** **Calculation Work:**
	**Unknown Angle = _____** **Calculation Work:**
	**Unknown Angles = _____, _____** **Calculation Work:**
	**Unknown Angles = _____, _____** **Calculation Work:**

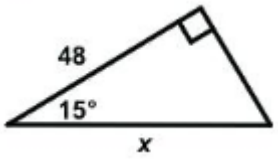
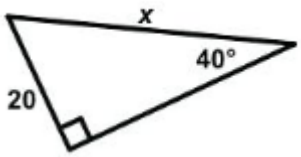
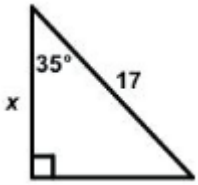
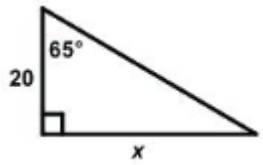
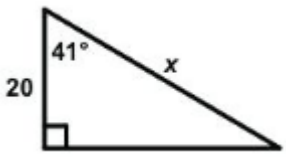
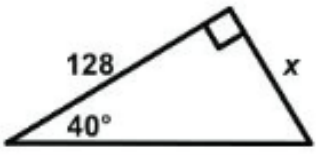
4.3 TRIGONOMETRY

1. Basic trig ratios ONLY work with _____ triangles.
2. Describe a good way to remember the trigonometric ratios.

3. Report the ratios as reduced fractions and decimals. The first one has been done for you.

Triangle	Ratios
	**TAN(B) =** $\frac{12}{9} = \frac{4}{3} = 1.33$ **COS(R) =**
	**SIN(B) =** **TAN(T) =**
	**COS(T) =** **COS(M) =**
	**COS(L) =** **SIN(C) =**

4. Fill in the missing pieces in the following ratios.

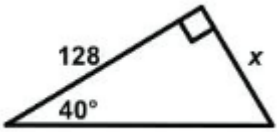
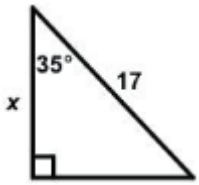
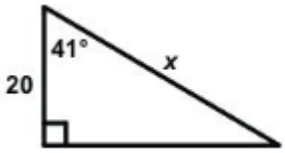
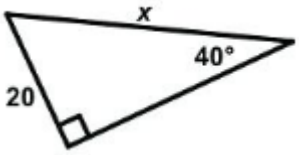
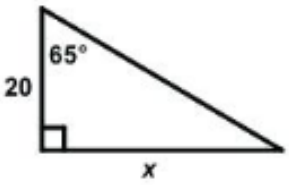
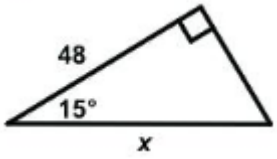
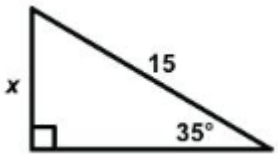
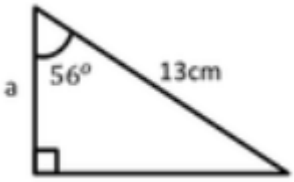
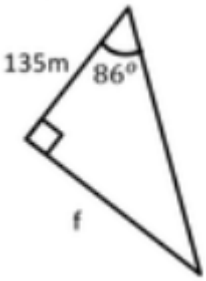
Angle	Ratio
	$\text{COS}(15) = \frac{\_}{X}$
	$\_\_\_\_(40) = \frac{20}{X}$
	$\text{COS}(\_\_\_) = \frac{X}{17}$
	$\text{TAN}(65) = \frac{\_}{20}$
	$\text{COS}(41) = \frac{20}{\_}$
	$\_\_\_\_\_(40) = \frac{X}{128}$

5. Use your calculator to determine the following (round to 3 decimal places):
   a) SIN(15) = _____
   b) COS(70) = _____
   c) TAN(45) = _____
   d) SIN(45) = _____
   e) COS(45) = _____
   f) SIN(10) = _____
   g) COS(80) = _____

4.4 Solve for a Side

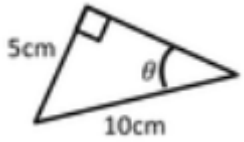
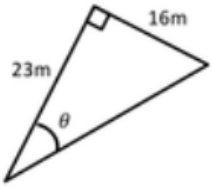
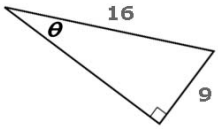
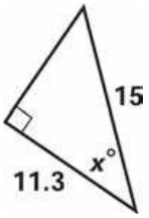
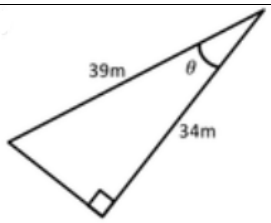
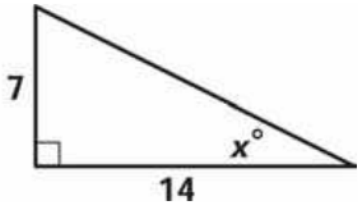
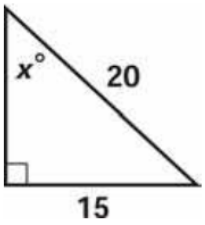
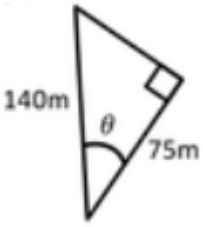
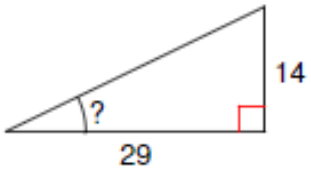
1. In your own words, list the 6 steps of solving for a side using diagrams to demonstrate.

2. Determine the unknown side to 1 decimal (showing all work in the box provided below each):

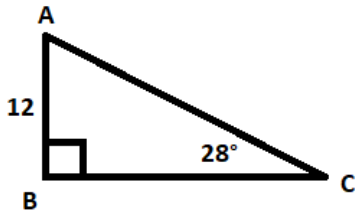
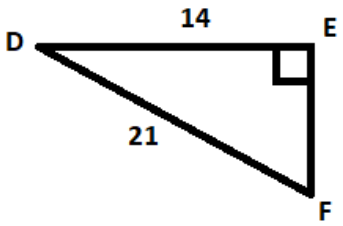
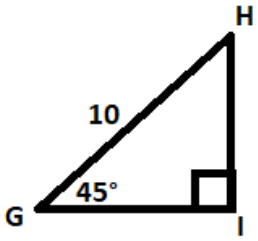
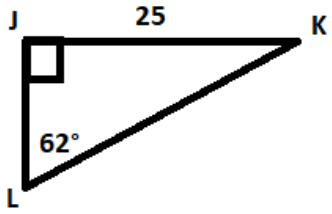
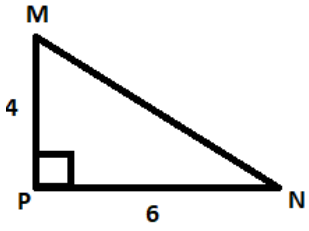
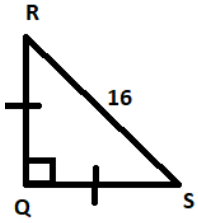
4.5 Solve for an Angle

1. Determine the unknown angle to 1 decimal (showing all work in the box provided below each):

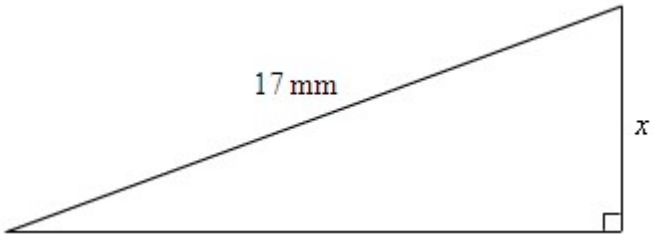
4.6 Applications

1. Determine **ALL** angles and sides (showing all work in the box provided below each):

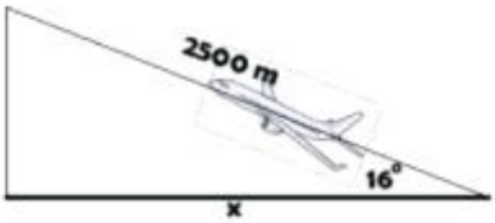
		
		

2. In ΔEFG , $\angle G = 90°$, $EF = 15$ cm and $EG = 13$ cm. Draw the triangle and label it with the information given then calculate the measure of $\angle F$.

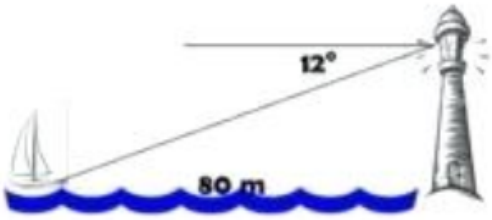
3. Using a protractor, measure one of the unknown angles and determine the length of side x .



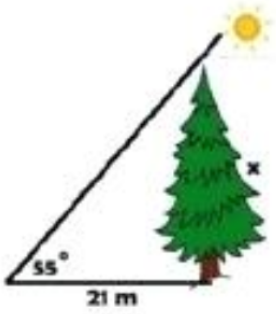
4. An airplane climbs at an angle of 16 degrees with the ground. Find the ground distance the plane travels as it moves 2500 m through the air. Show all work.



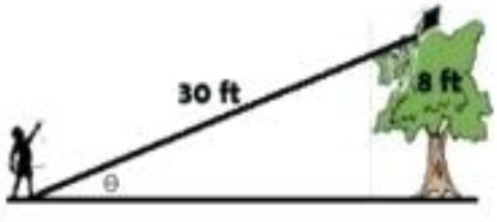
5. A lighthouse operator sights a boat at an angle of depression of 12 degrees. If the sailboat is 80 m away, how tall is the lighthouse? Show all work.



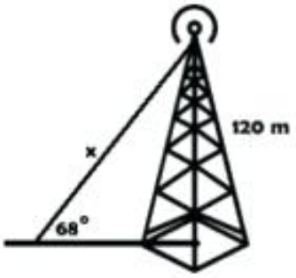
6. A tree casts a shadow 21 meters long. The angle of elevation of the sun is 55 degrees. What is the height of the tree? Show all work.



7. You are flying a kite and have let out 30 feet of string, but it got caught in an 8 foot tree. What is the angle of elevation to the top of the tree? Show all work.



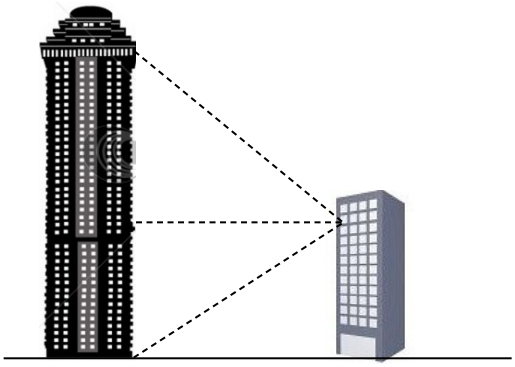
8. A guy wire reaches from the top of a 120 m television transmitter tower to the ground. The wire make a 68 degree angle with the ground. Find the length of the guy wire. Show all work.



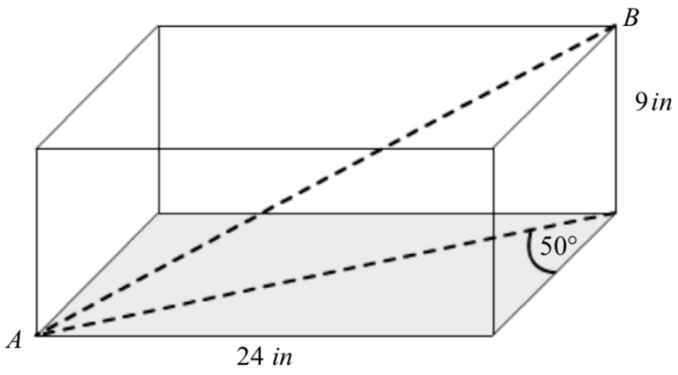
9. Calculate the angle of elevation of the line of sight of a person 27.5 m away from a tree, whose eye is 1.8 m above the ground, and is looking at the top of a 19.4 tree. (draw a diagram and answer to the nearest degree)

10. A building is 53 feet high. At a distance away from the building, a 6 foot tall observer notices the angle of elevation to the top of the building is 43º. How far is the observer from the base of the building? (draw a diagram and answer rounded to one decimal place)

11. Two office towers are 75 m apart. From the 10th floor of the shorter tower, the angle of elevation to a revolving restaurant at the top of the taller tower is 40° and the angle of depression to the base is 32°. Find the height of the restaurant to the ground. (answer rounded to one decimal place)



12. Find the length of diagonal AB in the rectangular prism. (answer rounded to one decimal place)



ANSWER KEY

SECTION 4.1

1. varies
2. 33°, 70°, 16°, 22°, 132°, 160°
3. check with protractor

SECTION 4.2

1. varies (last one is impossible)
2. 50°, 85°, 45°, 80°, 23°, 76°, 79°, 101° (all work shown)

SECTION 4.3

1. right
2. varies
3. 1.33, 0.80, 0.60, 1.33, 0.47, 0.88, 0.60, 0.60
4. 48, SIN, 35, X, X, TAN
5. 0.259, 0.342, 1, 0.707, 0.707, 0.174, 0.174

SECTION 4.4

1. varies
2. 107.4, 13.9, 26.5, 31.1, 42.9, 49.7, 8.6, 7.3, 1930.6

SECTION 4.5

1. 30.0°, 34.8°, 34.2°, 41.1°, 29.3°, 26.6°, 48.6°, 57.6°, 25.8°

SECTION 4.6

1. 62°, 22.6, 25.6 48.2°, 41.8°, 15.7, 45°, 7.1, 7.1, 28°, 13.3, 28.3, 33.7°, 56.3°, 7.2, 45°, 45°, 11.3, 11.3
2. 60°
3. 5.8 mm
4. 2403 m
5. 17 m
6. 30 m
7. 15.5°
8. 129.4 m
9. 32.6°
10. 50.4 ft.
11. 109.8 m
12. 32.6 in.