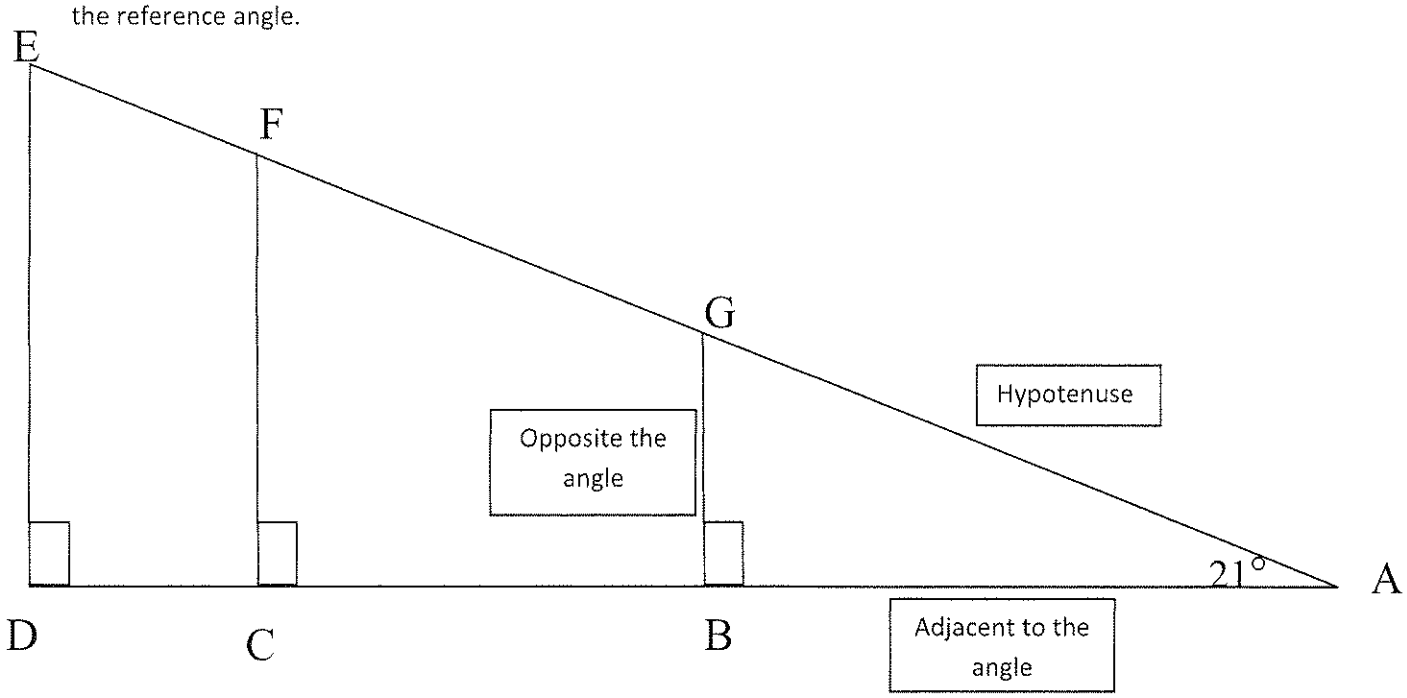
Name:_____KEY_____ Date:_____ Period:_____

A) Observe the triangle below and label the Hypotenuse, opposite side and adjacent side with respect to the reference angle.



B) Find the measure of the sides (cm) and angles of all three right triangles. Use the chart below to record your data for each triangle.

ΔEAD	ΔFAC	ΔGAB
∠ EAD ≈ 21	∠ FAC ≈ 21	∠ GAB ≈ 21
∠ ADE ≈ 90	∠ ACF ≈ 90	∠ ABG ≈ 90
∠ DEA ≈ 69	∠ CFA ≈ 69	∠ BGA ≈ 69
Segment EA ≈ 19.5 cm	Segment FA ≈ 16.2 cm	Segment GA ≈ 9.5 cm
Segment AD ≈ 18.3 cm	Segment AC ≈ 15 cm	Segment AB ≈ 8.9 cm
Segment DE ≈ 7.2 cm	Segment CF ≈ 6 cm	Segment BG ≈ 3.5 cm

For each triangle, form ratios using its segment lengths, then write them in decimal form:

ΔGAB: $\frac{GA}{AB} = \frac{9.5}{8.9} = 1.067$ $\frac{GA}{BG} = \frac{9.5}{3.5} = 2.71$ **ΔFAC:** $\frac{FA}{AC} = 1.08$ $\frac{FA}{CF} = 2.7$ ΔEAD: $\frac{EA}{AD} = 1.066$ $\frac{EA}{DE} = 2.708$

$\frac{AB}{GA} = \frac{8.9}{9.5} = .937$ $\frac{AB}{BG} = \frac{8.9}{3.5} = 2.54$ $\frac{AC}{FA} = .926$ $\frac{AC}{CF} = 2.50$ $\frac{AD}{EA} = .938$ $\frac{AD}{DE} = 2.542$

$\frac{BG}{GA} = \frac{3.5}{9.5} = .368$ $\frac{BG}{AB} = \frac{3.5}{8.9} = .393$ $\frac{CF}{FA} = .370$ $\frac{CF}{AC} = .400$ $\frac{DE}{EA} = .369$ $\frac{DE}{AD} = .393$

Name:_____KEY_____ Date:_____ Period:_____

C) Write a sentence describing what you notice about your data. All 3 triangles have the same angle measures even though the lengths are different. The ratios for the corresponding sides are very close.

D) After comparing your data with the data of your group, what do you notice about your group's data?

Our measurements are close and our ratios are similar for each triangle even though the triangles are not the same length.

E) Create a hypothesis about the relationships among the length of the sides of the right triangles based on the information that your group gathered and discussed. Get ready to do the Commit and Toss activity. The ratios can be used to calculate the other lengths of a triangle (answers will vary)

F) Using your scientific calculator, Press the SIN key. Then enter the reference angle you used above. The key strokes/order of entry may be different on different types of calculators. Write your answer in the appropriate box. Repeat using COS and TAN keys.

Triangle Name	Reference angle measure	Sin	Cos	Tan
Ex: ΔCUB	angle U = 55°	0.8192	.5736	1.4281
1. ΔGAB	21°	0.3584	0.9336	0.3839
2. ΔFAC	21°	0.3584	0.9336	0.3839
3. ΔEAD	21°	0.3584	0.9336	0.3839
4. ΔGAB	69 °	0.9336	0.3584	2.6051
5. ΔFAC	69°	0.9336	0.3584	2.6051
6. ΔEAD	69°	0.9336	0.3584	2.6051
7. ΔGAB	90°	1	0	----
8. ΔFAC	90°	1	0	----
9. ΔEAD	90°	1	0	----

G) Compare your two charts. What do you notice? How can this be helpful? The ratios of certain sides give an answer very close to the sin, cos and tan that was used on the calculator. (answers will vary for how this could be helpful)

H) Compare your findings with your group and write what you discover. The above is true for everyone in the group.

Name:_____KEY_____ Date:_____ Period:_____

I) Based on this activity, what is the ratio for Sin A where A is a variable that represents an angle measure? Cos A? Tan A? *Hint: Use both of your charts and write a ratio using the location of the segments!! $Sin\ A = \frac{opposite}{hypotenuse}, Cos\ A = \frac{adjacent}{hypotenuse}, Tan\ A = \frac{opposite}{adjacent}$

J) How would your answers from your chart change if you used the other acute angle in the triangle to do this activity? By using a different reference angle, the ratios will change, but the calculation will be similar between the similar triangles.

Kuta Software - Infinite Geometry

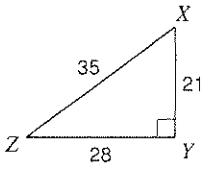
Name_____

Trigonometric Ratios

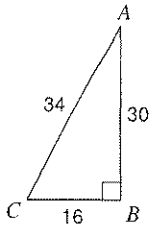
Date_____ Period____

Find the value of each trigonometric ratio.

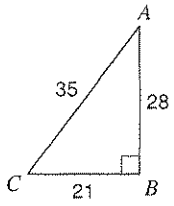
1) tan Z $\frac{3}{4}$



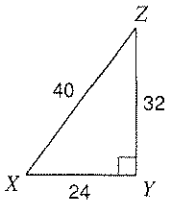
2) cos C $\frac{8}{17}$



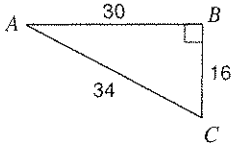
3) sin C $\frac{4}{5}$



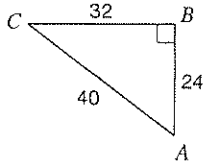
4) tan X $\frac{4}{3}$



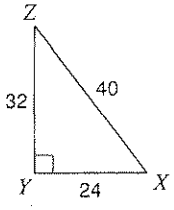
5) cos A $\frac{15}{17}$



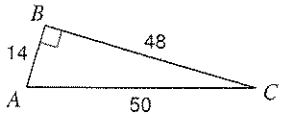
6) sin A $\frac{4}{5}$



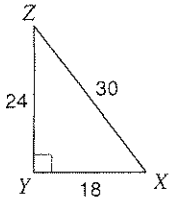
7) sin Z $\frac{3}{5}$



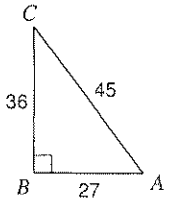
8) sin C $\frac{7}{25}$



9) cos Z $\frac{4}{5}$

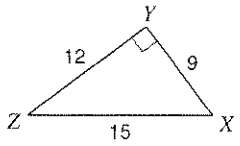


10) tan C $\frac{3}{4}$



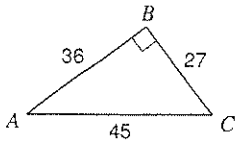
Find the value of each trigonometric ratio to the nearest ten-thousandth.

11) cos Z



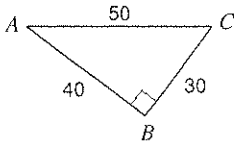
0.8000

12) cos C



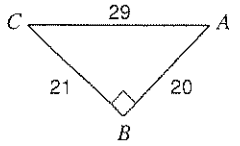
0.6000

13) tan C



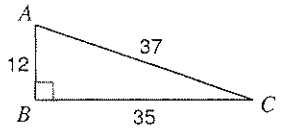
1.3333

14) tan A



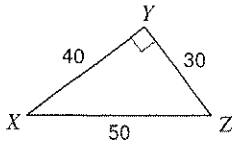
1.0500

15) tan C



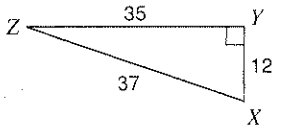
0.3429

16) tan X



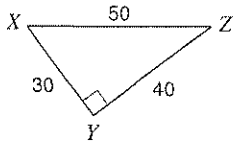
0.7500

17) sin Z



0.3243

18) sin Z



0.6000

19) sin 48°

0.7431

20) sin 38°

0.6157

21) cos 61°

0.4848

22) cos 51°

0.6293

Critical thinking questions:

23) Can the sine of an angle ever equal 2? Why or why not?

No, the hypotenuse > opposite side.

24) $\sin x = \frac{1}{3}$

Find cos x.

$\frac{2\sqrt{2}}{3}$