Geometry Regents Lomac 2015-2016 **Date** 2/10 **due** 2/11

Similarity: Opposite Adjacent Hypotenuse **7.3R**

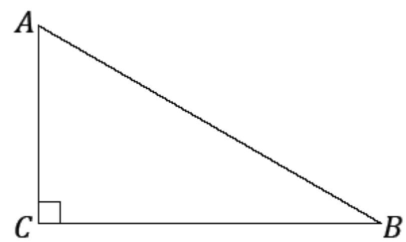
Name ____ **Per**______

LO: I can recognize the connection between a reference angle and a particular side ratio.

☐ **DO NOW** On the back of this packet

☐ (1) **Similar Right Triangles: Opposite**

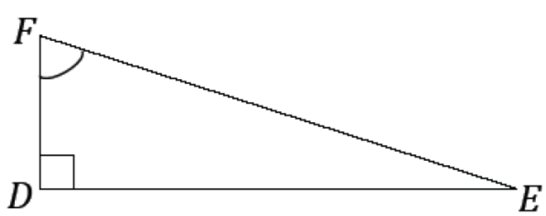
1. Name the side of the triangle opposite ∠A. __________
2. Name the side of the triangle opposite ∠B. __________
3. Name the side of the triangle opposite ∠C. __________



☐ (2) **Similar Right Triangles: Opposite, Hypotenuse, and Adjacent**

For each diagram, label the appropriate sides as opposite, and hypotenuse, with respect to the marked acute angle (**reference** angle).

4.



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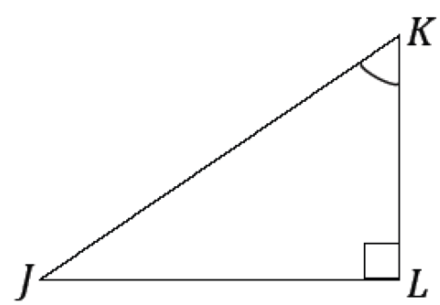

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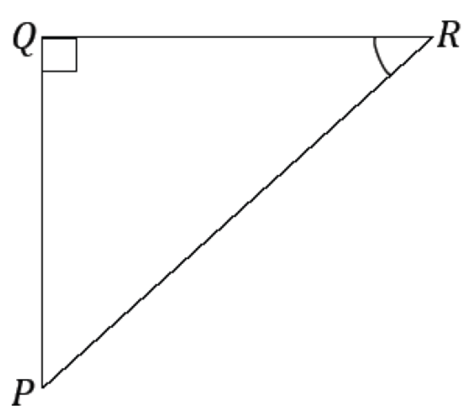
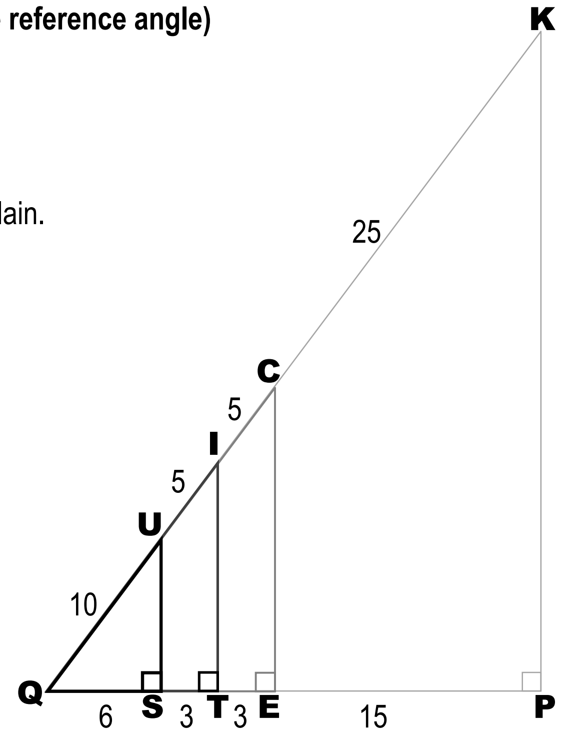


One side of each triangle isn't labeled. Label it "adjacent" now. Adjacent means "next to." Adjacent sides are next to the reference angle.

☐ (3) calculator

Similar Right Triangles: adjacent/hypotenuse (cosine of the reference angle)

Observe the diagram at right.



☐ (a) How many triangles do you see? _________

☐ (b) How many of those triangles are similar? _________ Explain.

☐ (c) Write 4 "within triangle" ratios, one for each triangle.
Write the ratios so their values are all less than one.

with letters:

_______ _______ _______ _______

with numbers:

_______ _______ _______ _______

as a decimal:

_______ _______ _______ _______

☐ (d) What do you notice about all of the ratios you wrote for part (c) ?___________________________________

☐ (e) Would the ratios still be equal if the triangles were floating apart from one another in the plane? __________

☐ (f) Is angle Q the same measure for all of the triangles? _____ because ________________________________

☐ (g) Angle Q is our reference angle. Mark it.
That means 10, 15, 20, and 45 are each the _________________________________of a triangle.

AND 6, 9, 12, and 27 are all _____________________________________ sides.

☐ (h) Based on what you wrote in part (g), all of the ratios you wrote for part (c) relate the __________________

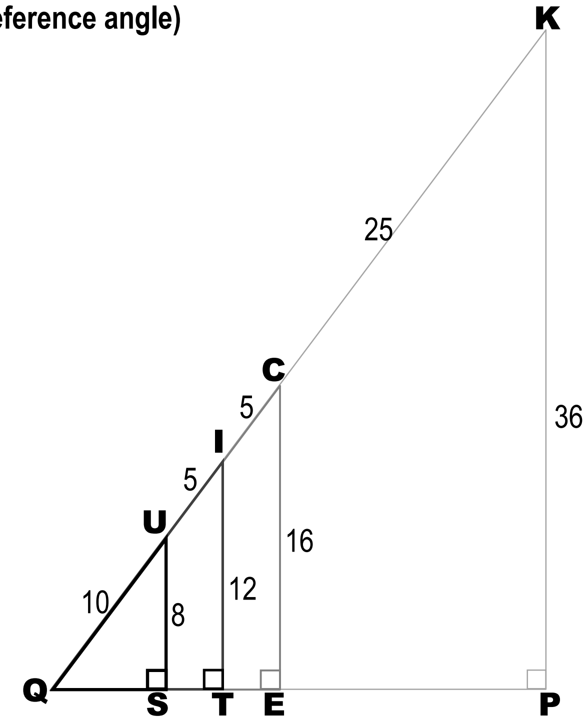
to the _________________ which were written ______________________________.

☐ (i) Angle Q in the diagram is 53.13°.
The ratio adjacent/hypotenuse for all of the triangles in the diagram is __________.
ALL right triangles with a 53.13° reference angle will have adjacent/hypotenuse ratios that are equal to _____

Type cos(53.13°) into your calculator. Do you get the same decimal value you did in part c?_________
That is because, you are saying to your calculator: ***"Hey, calculator. I have this triangle with a 53.13° angle and I want to know the ratio of the adjacent side to the hypotenuse. What is it?*** The way you ask all of this is to type: cos(53.13)

☐ (4) calculator **Similar Right Triangles: opposite/hypotenuse (sine of the reference angle)**

☐ Observe the diagram at right.



☐ (c) Write 4 "within triangle" ratios, one for each triangle.
Write the ratios so their values are all less than one.

with letters:

_______ _______ _______ _______

with numbers:

_______ _______ _______ _______

as a decimal:

_______ _______ _______ _______

☐ (d) What do you notice about all of the ratios you wrote for part (c) ?___________________________________

☐ (e) Would the ratios still be equal if the triangles were floating apart from one another in the plane? __________

☐ (f) Is angle Q the same measure for all of the triangles? _____ because _______________________________

☐ (g) Angle Q is our reference angle. Mark it.
That means 10, 15, 20, and 45 are each the ________________________________of a triangle.

AND 8, 12, 16, and 36 are all ____________________________________ sides.

☐ (h) Based on what you wrote in part (g), all of the ratios you wrote for part (c) relate the __________________

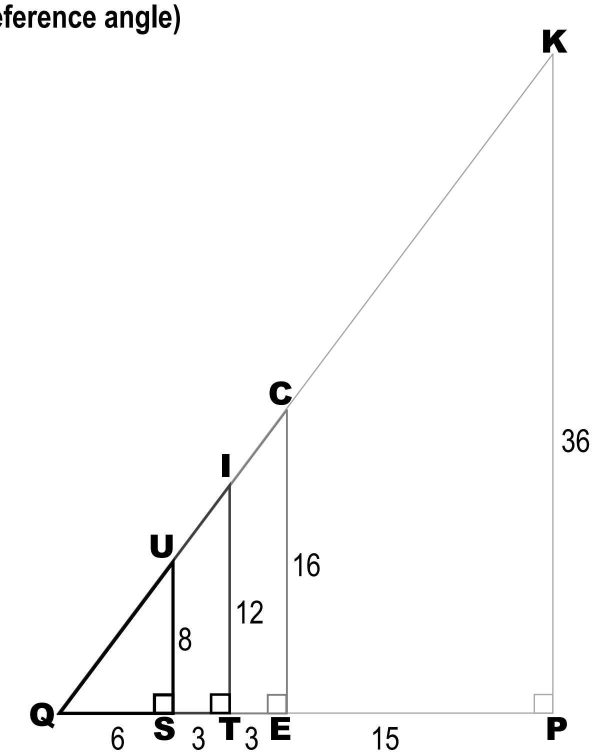
to the ________________ which were written ______________________________.

☐ (i) Angle Q in the diagram is 53.13°.
The opposite/hypotenuse ratio for all of the triangles in the diagram is __________.
ALL right triangles with a 53.13° reference angle will have opposite/hypotenuse ratios that are equal to _____

Type sin(53.13°) into your calculator. Do you get the same decimal value you did in part c?_________
That is because, you are saying to your calculator: ***"Hey, calculator. I have this triangle with a 53.13° angle and I want to know the ratio of the opposite side to the hypotenuse. What is it?*** The way you ask all of this is to type: sin(53.13)

☐ (5) calculator **Similar Right Triangles: opposite/adjacent (tangent of the reference angle)**

☐ Observe the diagram below.



☐ (c) Write 4 "within triangle" ratios, one for each triangle.
Write the ratios so their values are all greater than one.

with letters:

_______ _______ _______ _______

with numbers:

_______ _______ _______ _______

as a decimal:

_______ _______ _______ _______

☐ (d) What do you notice about all of the ratios you wrote for part (c) ?________________________________

☐ (e) Would the ratios still be equal if the triangles were floating apart from one another in the plane? __________

☐ (f) Is angle Q the same measure for all of the triangles? _____ because ______________________________

☐ (g) Angle Q is our reference angle. Mark it.
That means 8, 12, 16, and 36 are each the _______________________________of a triangle.

AND 6, 9, 12, and 27 are all ___________________________________ sides.

☐ (h) Based on what you wrote in part (g), all of the ratios you wrote for part (c) relate the _________________

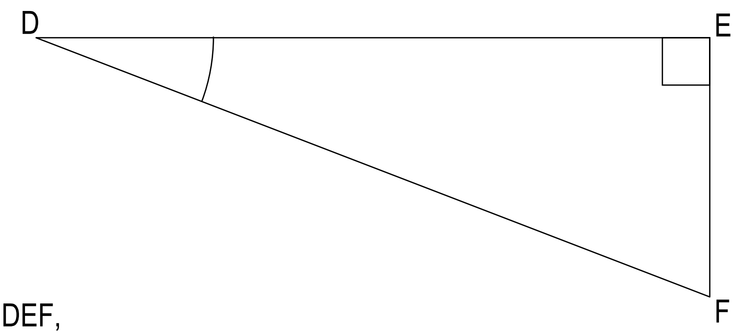
to the ________________ which were written ____________________________.

☐ (i) Angle Q in the diagram is 53.13°.
The opposite/adjacent ratio for all of the triangles in the diagram is __________.
ALL right triangles with a 53.13° reference angle will have opposite/ adjacent ratios that are equal to _____

Type tan(53.13°) into your calculator. Do you get the same decimal value you did in part c?_________
That is because, you are saying to your calculator: ***"Hey, calculator. I have this triangle with a 53.13° angle and I want to know the ratio of the opposite side to the adjacent side. What is it?*** The way you ask all of this is to type: tan(53.13)

☐ (3) calculator

Similar right triangles: Summary



In the diagram of triangle DEF,

the reference angle is ______________

the opposite side is _____________

the hypotenuse is _____________

the adjacent side is _____________

Label the reference angle, opposite, hypotenuse, and adjacent in the diagram

Right triangles with congruent reference angles are ____

Because right triangles with congruent reference angles are ________________________________ we can use the reference angle and a calculator to find the values for the ratios of pairs of sides. Sine, cosine, and tangent give us ratios comparing different sides.

parts (opp, hyp, adj)	side names (DE, EF, FD)
sin∠D = _____________________________	sin∠D = _____________________________
cos∠D = _____________________________	cos∠D = _____________________________
tan∠D = _____________________________	tan∠D = _____________________________

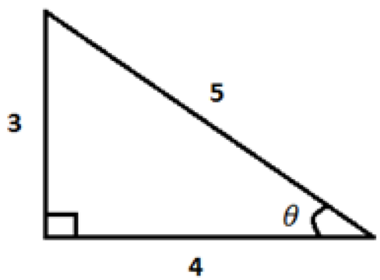
☐ (7) calculator

Exit Ticket

ON THE LAST PAGE

☐ (8) compass and straightedge

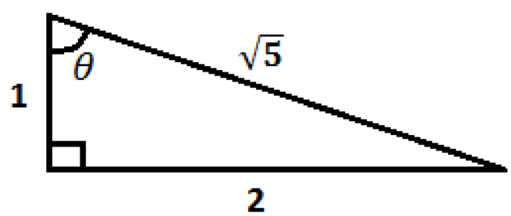
Homework



Opposite side =

Adjacent side =

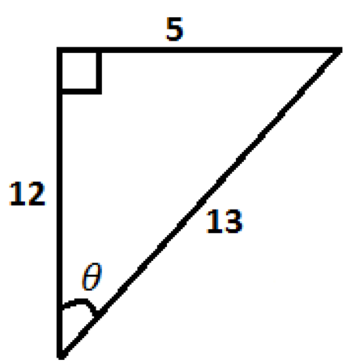
Hypotenuse =



Opposite side =

Adjacent side =

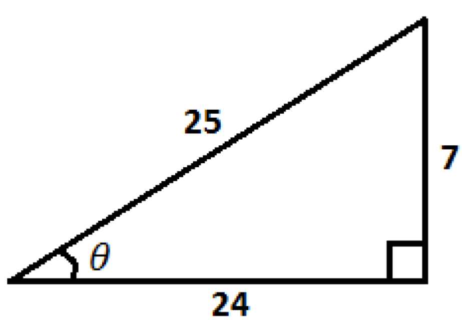
Hypotenuse =



Opposite side =

Adjacent side =

Hypotenuse =



Opposite side =

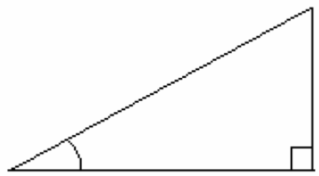
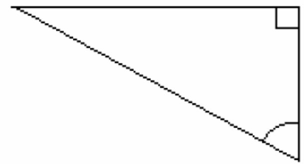
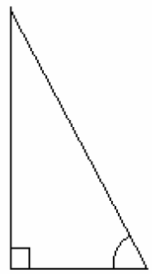
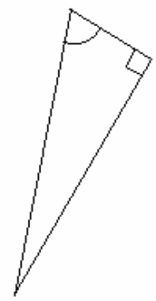
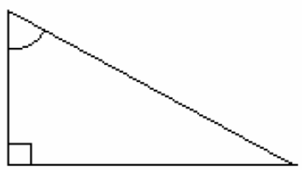
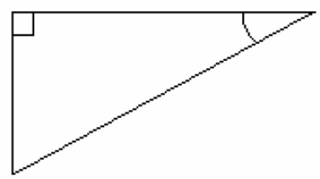
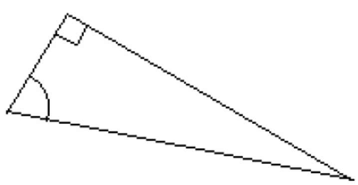
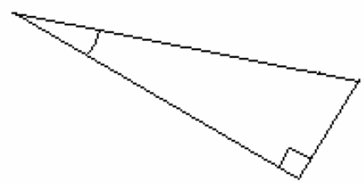
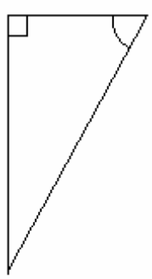
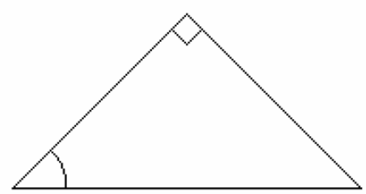
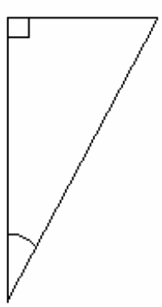
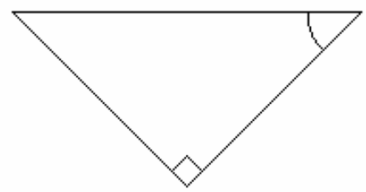
Adjacent side =

Hypotenuse =

☐ (8) calculator

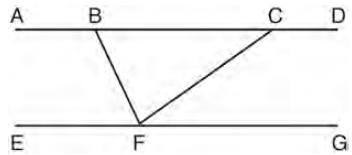
Homework

Label the opposite, hypotenuse, and adjacent for each triangle.

1. 	7. 
2. 	8. 
3. 	9. 
4. 	10. 
5. 	11. 
6. 	12. 

☐ (8) calculator **Homework**

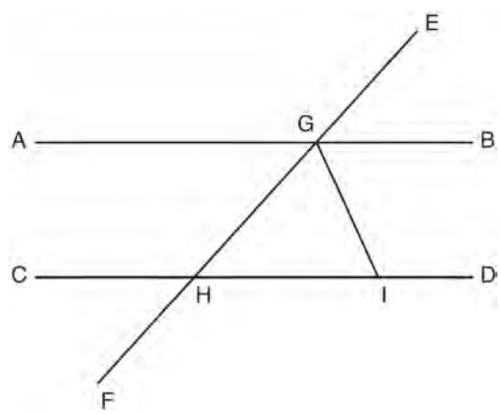
(13) Steve drew line segments *ABCD*, *EFG*, *BF*, and *CF* as shown in the diagram below. Scalene $\triangle BFC$ is formed.



Which statement will allow Steve to prove $\overline{ABCD} \parallel \overline{EFG}$?

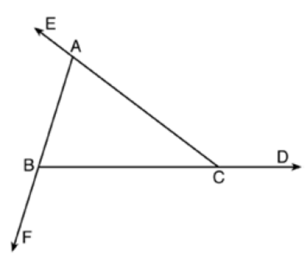
1 $\angle CFG \cong \angle FCB$
2 $\angle ABF \cong \angle BFC$
3 $\angle EFB \cong \angle CFB$
4 $\angle CBF \cong \angle GFC$

(14) In the diagram below, $\overline{EF}$ intersects $\overline{AB}$ and $\overline{CD}$ at *G* and *H*, respectively, and $\overline{GI}$ is drawn such that $\overline{GH} \cong \overline{IH}$.



(15) If $m\angle EGB = 50°$ and $m\angle DIG = 115°$, explain why $\overline{AB} \parallel \overline{CD}$.

Prove the sum of the exterior angles of a triangle is 360°.

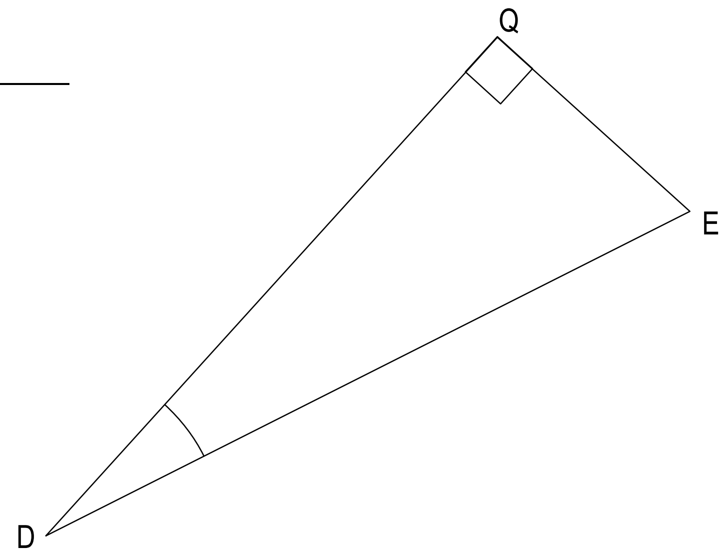


Exit Ticket **Name________________________________ Date ___________ Per______** **7.3R**

(1) The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

Use the diagram below to complete each part.

(a) Identify the reference angle ______________



(b) Identify each side

Opposite ____________

Hypotenuse __________

Adjacent __________

(c) Complete each ratio with names of sides.

Is this the sine, cosine or tangent ratio? (circle one)

$\dfrac{\textit{opposite}}{\textit{hypotenuse}}$	________________	sine cosine tangent
$\dfrac{\textit{adjacent}}{\textit{hypotenuse}}$	________________	sine cosine tangent
$\dfrac{\textit{opposite}}{\textit{adjacent}}$	_________________	sine cosine tangent

(d) Can a triangle ABC exist that has the same tangent, sine, and cosine ratios as triangle DQE, but is not congruent to triangle DQE? Explain. You may also make a sketch or draw on the diagram at the top of the page to help you answer this question.

DO NOW **Name**________________________________ **Date** ___________ **Per**______ **7.3R**

Write each expression in simplest form

(1) $\sqrt{270}$

(2) $\sqrt{6} \cdot \sqrt{18}$

(3) $5\sqrt{7} - 2\sqrt{14}$

(4) What about the tree below is supposed to relate to the first three problems of the do now?