10th Grade Assignment – Week #2

Group Assignment: To be done either on Tuesday or Thursday.

Do as much as you can from…

- **Problem Set #4 (***Geometry Basics* unit**):** Group Work sections (#1-9)
- **Problem Set #4:** help each other out with the Euclidean Constructions (#23-31).
- **Problem Set #5:** Group Work sections
- *Puzzle!* The Wizard and the Old Man
  A wizard demanded that an old man give him either his daughter or his son in payment for a debt. The old man could not decide what to do, so the wizard said, "We shall decide it in this way. You must say one sentence. If what you say is true, you must give me your daughter. If what you say is false, you must give me your son." The old man agreed to this plan, thought for a moment, and then said, "I will give you my son." What then happened?

Individual Work

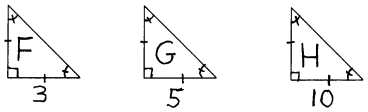
- See how much you can do from the homework sections from the *Geometry Basics* unit, **Problem Sets #4-6.**

Problem Set #4

Group Work

The 45-45-90 Triangle.

For the below exercises, give answers as exact ratios (i.e., as simplified radicals).



Calculate the length of the hypotenuse of…

1) Triangle F.
2) Triangle G.
3) Triangle H.

With ΔF, find the ratio of the
4) Hypotenuse to the leg.

With ΔG, find the ratio of the
5) Hypotenuse to the leg.

With ΔH, find the ratio of the
6) Hypotenuse to the leg.

7) What general rule do your above answers reflect?

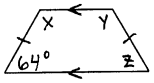
Solve by using ratios.

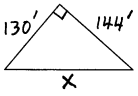
8) What is the length of the hypotenuse of a 45-45-90 triangle if the leg is 7?

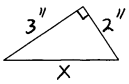
9) What is the length of the leg of a 45-45-90 triangle if the hypotenuse is 9?

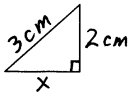
Homework

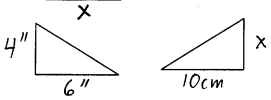
Find each variable. (All pairs of figures are similar.)

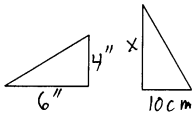
10) 

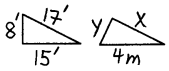
11) 

12) 

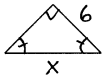
13) 

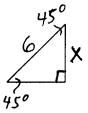
14) 

15) 

16) 

Use the 45-45-90 ratio.

17) 

18) 

Simplifying Square Roots.

19) $\sqrt{18}$

20) $\frac{7}{\sqrt{3}}$

21) $\sqrt{72}$

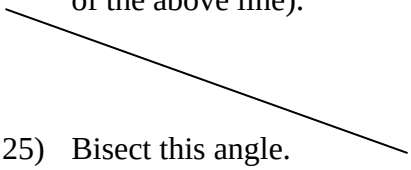
22) $\frac{12}{\sqrt{15}}$

Euclidean Constructions

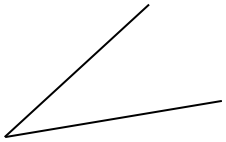
Instructions: Use only a compass and a straight edge. (You may also do these constructions on a separate sheet.)

23) Bisect this line segment.

24) Copy the above line onto this line (thereby cutting off this line at the length of the above line).

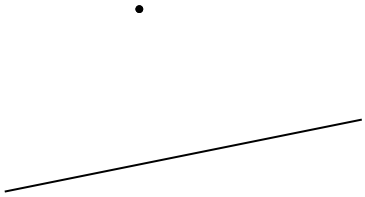


25) Bisect this angle.

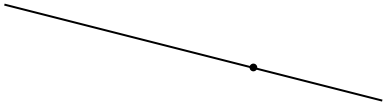


26) Copy the above angle onto the below line at point A.

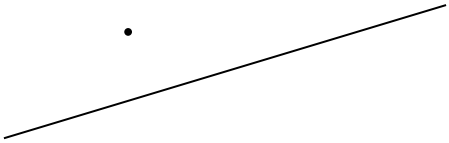
27) Through the given point, draw a line perpendicular to the given line.



28) Through the given point, draw a line perpendicular to the given line.

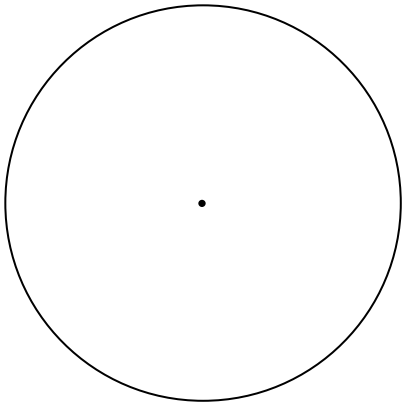


29) Through the given point, draw a line parallel to the given line.



30) Construct a square onto this line segment.

31) Construct a regular pentagon inside this circle.



Problem Set #5

Group Work

The 30-60-90 Triangle.

Triangles P, Q, and R are all 30°-60°-90° triangles. The lengths of their hypotenuses are 6, 8, 11, respectively.

For the below exercises, give answers as exact ratios (i.e., as simplified radicals).

Calculate the lengths of the remaining sides of…

1) Triangle P.
2) Triangle Q.
3) Triangle R.

With ΔP, find the ratio of

4) The long leg to the short leg.
5) The hypotenuse to the short leg.
6) The hypotenuse to the long leg.

With ΔQ, find the ratio of

7) The long leg to the short leg.
8) The hypotenuse to the long leg.

With ΔR, find the ratio of

9) Hypotenuse to short leg.
10) Hypotenuse to long leg.
11) What general rule do your above answers (from #4 to #10) reflect?
12) What is the ratio of the short leg to the long leg to the hypotenuse?

Solve by using ratios.

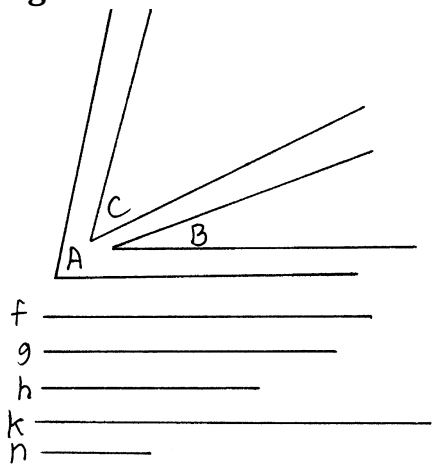
In a 30-60-90 triangle…

13) What is the length of the long leg if the short leg is 13?
14) What is the length of the long leg if the hypotenuse is 10?

Euclidean Triangle Constructions

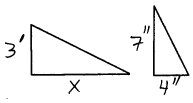
On a separate sheet, use only a compass and straight edge to construct the given triangle.

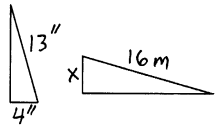
15) Δfgk (SSS)
16) ΔfCg (SAS)
17) ΔCkB (ASA)

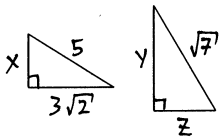


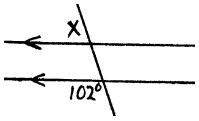
Homework

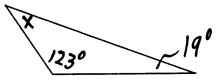
Find each variable. (All pairs of figures are similar.)

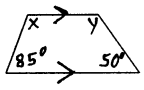
18) 

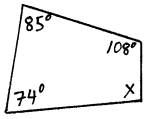
19) 

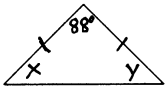
20) 

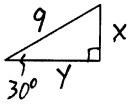
21) 

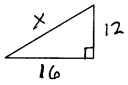
22) 

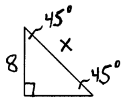
23) 

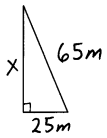
24) 

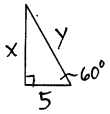
25) 

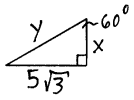
26) 

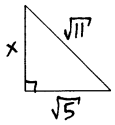
27) 

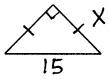
28) 

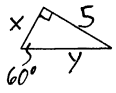
29) 

30) 

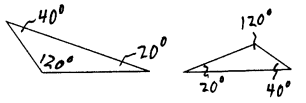
31) 

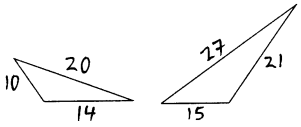
32) 

33) 

34) 

Determine if each pair of triangles is definitely similar, or not.

35) 

36) 

Problem Set #6

Group Work

Triangle Congruency Theorems

Look at the section *Euclidean Triangle Constructions* on the last problem set. Using the same angles (A, B, C) and same line segments (g, h, k, n) do the following constructions.

1) ΔAfB
2) ΔfCg
3) ΔfgC
4) ΔgfC
5) ΔhfC

6) What type of constuction (SSS, ASA, SAS, or SSA) was each of the above?

7) (Review) For each type of construction, state under what circumstances there can be either no solution, or multiple solutions.

Very much related to these are the *Triangle Congruency Theorems*, which we will abbreviate as:

SSS ≅ Th
SAS ≅ Th
ASA ≅ Th
AAS ≅ Th
HL ≅ Th

Example: In words, state the HL ≅ Th.

Solution: "If the hypotenuse and one leg of one right triangle is congruent to the hypotenuse and one leg of another right triangle, then the two triangles must be congruent."

Example: In words, state the SSS ≅ Th.

Solution: "If all three sides of one triangle are congruent to the three sides of a second triangle, then the two triangles must be congruent."

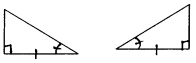
In words, state the…

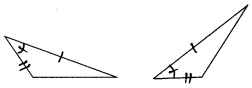
8) SAS ≅ Th.
9) ASA ≅ Th.
10) AAS ≅ Th.

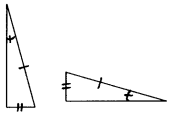
11) How are AAS and ASA different?

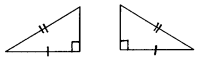
12) Once the ASA ≅ Th. has been proven, how do we know that the AAS ≅ Th. must also be true?

For each pair of triangles, state the congruency theorem that proves they are definitely congruent, or state that they are not definitely congruent.

13) 

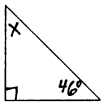
14) 

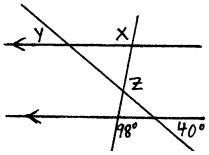
15) 

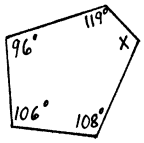
16) 

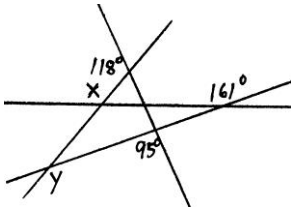
Homework

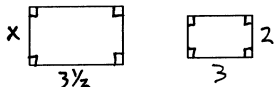
Find each variable. (All pairs of figures are similar.)

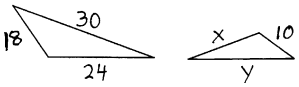
17) 

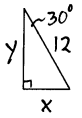
18) 

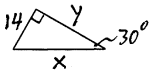
19) 

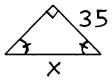
20) 

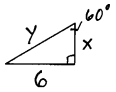
21) 

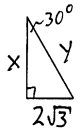
22) 

23) 

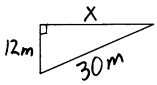
24) 

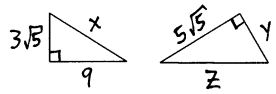
25) 

26) 

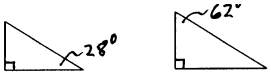
27) 

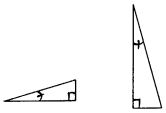
28) 

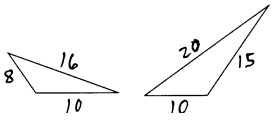
29) 

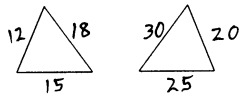
30) 

Determine if each pair of triangles is definitely similar, or not.

31) 

32) 

33) 

34) 

Triangle Constructions.

Use the same angles (A, B, C) and line segments (g, h, k, n) from the previous problem set.

35) Δghf
36) Δhkn
37) ΔAhC
38) ΔkBh
39) ΔkhB
40) ΔhkB
41) ΔnkB