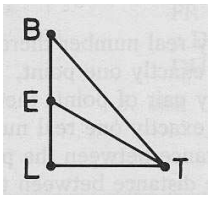
Math 119 – Plane Geometry

Review

7/21/2004

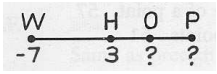
Line Segments

1. In the figure, point E is between points B and L.
   a) Write the equation that follows from this fact.
2. In the figure, point E is the midpoint of $\overline{BL}$.
   a) Write an equation relating BE and EL.
   b) Write an equation relating EL and BL.

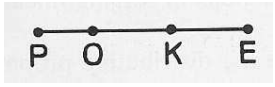


Line Segments

- H is the midpoint of $\overline{WP}$ and O is the midpoint of $\overline{HP}$. The numbers are coordinates on a number line. Find the coordinate of P.



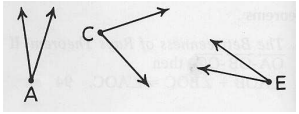
- *Given:* K is the midpoint of $\overline{OE}$.
- *Prove:* PK = PE - OK



Angles

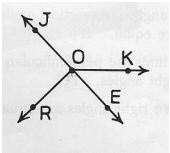
- True or False. Two angles are complementary if, and only if, their measures are 90.

- $\angle A$ is the complement of $\angle C$, and $\angle C$ is the complement of $\angle E$. Also $m\angle A = (x+30)$ and $m\angle E = (9 - 6x)$. Find $m\angle C$.

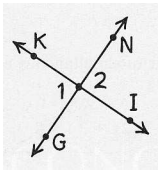


Angles

- $\overline{JE}$ is a line; $m\angle JOR = m\angle ROE$.
  - True or false: $\overline{OR} \perp \overline{OE}$.

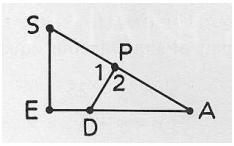


- *Given:*
  - $\angle 1$ and $\angle 2$ are vertical angles
  - $\angle 1$ and $\angle 2$ are supplementary.
- *Prove:*
  - $\overline{KI} \perp \overline{NG}$

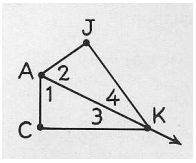


Angles

- *Given:*
  - $\angle 1$ and $\angle 2$ are adjacent
  - $m\angle 1 = m\angle E$ and $m\angle E = m\angle 2$
- *Prove:*
  - $\overline{SA} \perp \overline{PD}$

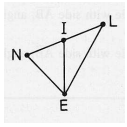


- *Given:*
  - $\overline{AK}$ bisects $\angle JAC$
  - $\angle 1$ and $\angle 3$ are complementary
- *Prove:*
  - $m\angle 2 = 90 - m\angle 3$

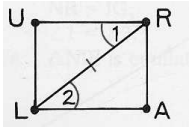


Triangles

- $m\angle N = m\angle NEL$
  - Which triangle in the figure must be isosceles? Why?

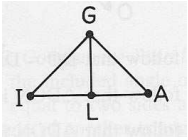


- $m\angle 1 = m\angle 2$
  - If you knew that $m\angle U = m\angle A$, could you prove the triangles congruent by the ASA postulate? Why or why not?

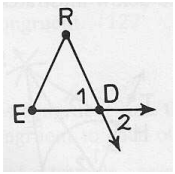


Triangles

- *Given:*
  - L is the midpoint of $\overline{IA}$;
  - $\overline{IG} \cong \overline{AG}$
- *Prove:*
  - $\Delta GIL \cong \Delta GAL$

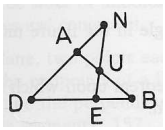


- *Given:*
  - $\overline{RE} \cong \overline{RD}$;
  - $\angle 1$ and $\angle 2$ are vertical angles
- *Prove:*
  - $\angle E \cong \angle 2$

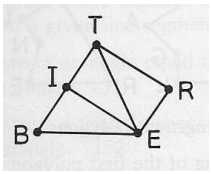


Triangles

- *Given:*
  - $\overline{DN} \cong \overline{DB}$
  - $\angle N \cong \angle B$
- *Prove:*
  - $\overline{NE} \cong \overline{BA}$

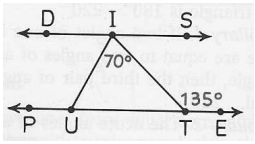


- *Given:*
  - $\Delta BIE \cong \Delta ERT$
  - $\Delta TIE \cong \Delta ERT$
  - $\angle BIE$ and $\angle TIE$ are adjacent
- *Prove:*
  - $\overline{BT} \perp \overline{IE}$

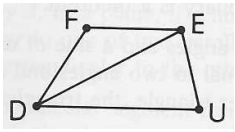


Parallel

- $\overline{DS} \parallel \overline{PE}$. Find the measures of the following angles:
  - $\angle SIT$
  - $\angle IUT$
  - $\angle PUI$

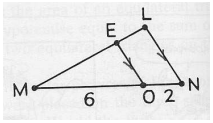


- *Given:*
  - $\overline{DE}$ bisects $\angle FDU$
  - $\overline{DF} \cong \overline{FE}$
- *Prove:*
  - $\overline{FE} \parallel \overline{UD}$

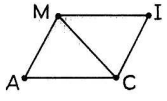


Parallel

1. $\overline{EO} \parallel \overline{LN}$. Find the following:
   a) EO/LN.
   b) LE/EM

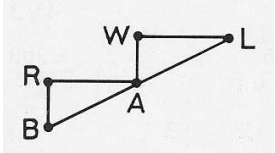


- *Given:*
  - $\overline{MA} \cong \overline{IC}$
  - $m\angle AMC - m\angle MCI$
- *Prove:*
  - MICA is a parallelogram



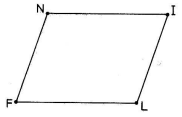
Parallel

- Given:
  - Angles R and W are right angles
  - $\overline{RA} \parallel \overline{WL}$ with transversal $\overline{BL}$
  - $\overline{BA} \cong \overline{AL}$
- Prove:
  - Triangles ARB and LWA are congruent

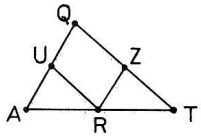


Quadrilaterals

- Given FILN is a parallelogram. What is m∠NFL + m∠FLI?

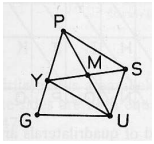


- *Given:*
  - U, Z, and R are the midpoints of the sides of ΔQAT
- *Prove:*
  - QURZ is a parallelogram

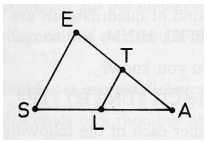


Quadrilaterals

- *Given:*
  - In quadrilateral GPSU, $\overline{PU}$ and $\overline{YS}$ bisect each other
  - $\overline{PS} \cong \overline{GU}$
- *Prove:*
  - $\overline{GU} \cong \overline{YU}$

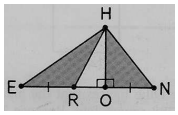


- *Given:*
  - L is the midpoint of $\overline{AS}$
  - T is the midpoint of $\overline{AE}$
  - m∠TLA > m∠A
- *Prove:*
  - EA > ES



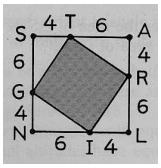
Area

1. ΔJAY has sides of lengths 21, 29, and 20.
   - Is ΔJAY a right triangle?
   - Find the area of ΔJAY.
2. ΔOWL is a right triangle whose hypotenuse is 41 and one of whose legs is 9.
   - Find the length of its other leg.
   - Find the area of ΔOWL.
3. $\overline{HO}$ is perpendicular to $\overline{EN}$; ER = ON
   - Can you conclude that ΔHRE ≅ ΔHON?
   - Can you conclude that the areas of ΔHRE and ΔHON are equal?

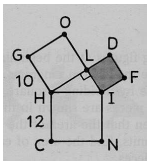


Areas

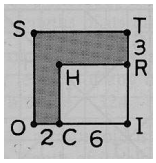
- Find the area of the shaded region.



- SALN is a square.



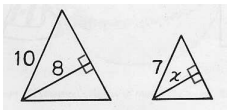
- Squares are drawn on the sides of a right triangle.

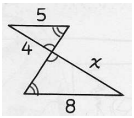


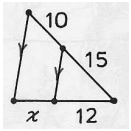
- OSTI is a square and CHRI is a rectangle.

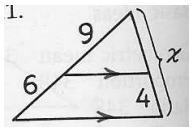
Similarity

▶ Find x.

1) 

2) 

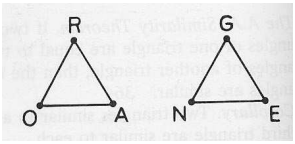
3) 

4) 

Similarity

▶ Can you conclude that ΔORA ~ ΔNGE if you know that:

- Both triangles are equilateral?
- RO = RA = GN = GE?
- m∠R = m∠G = 59; m∠O = 60, and m∠N = 61?



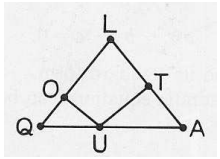
Similarity

▶ Given:

- Isosceles ΔLQA with $\overline{LQ} \cong \overline{LA}$
- $\overline{UO} \perp \overline{LQ}$
- $\overline{UT} \perp \overline{LA}$

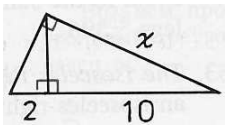
▶ Prove:

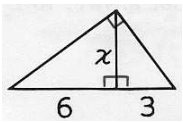
- ΔQOU ~ ΔATU

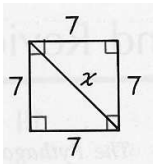


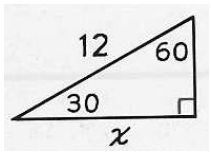
Right Triangles

▶ Find x.

1) 

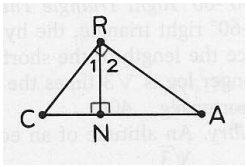
2) 

3) 

4) 

Right Triangles

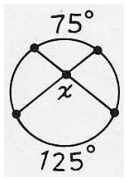
► Why is m∠1 = m∠A?



Circles

► Solve for x.

1)



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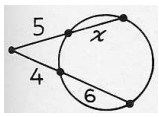
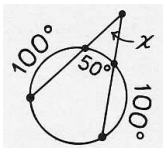


3)



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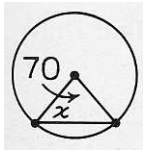
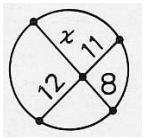


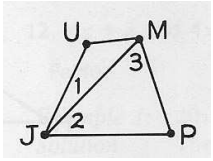
5)



Inequalities

► Facts:

1. m∠U > m∠UMP
2. m∠P > m∠UJP
3. m∠UJP = m∠1 + m∠2
4. m∠UJP > m∠3



► Tell which fact (or facts) and which property of inequality can be used to prove:

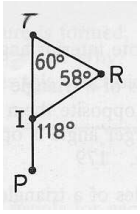
a) m∠U – mUMP > 0

b) m∠P > m∠3

Inequalities

► RIP is an exterior angle of ΔTRI.

- Which side of ΔTRI is the longest?

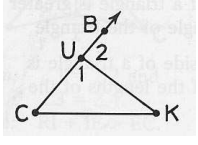


► *Given:*

- m∠1 > m∠2
- ∠2 is an exterior angle of ΔUKC

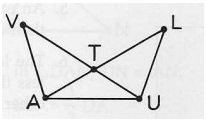
► *Prove:*

- CK > UK



Inequalities

- *Given:*
  - m∠VAU = m∠LUA
  - m∠VUA = m∠LAU
- *Prove:*
  - AV + AU > AL



- *Given:*
  - $\overline{SI} \perp \overline{KP}$
  - ∠1 is an exterior angle of ΔSIP
- *Prove:*
  - ∠3 is acute