

**QUIZ #1 @ 85 points**

Write in a neat and organized fashion. Use a pencil. Show all work to get credit.

1) Write the converse, inverse, and contrapositive of the following statement:

*You cannot comprehend geometry if you do not know how to reason deductively. (P → Q)*  
*if you don't know how to reason deductively, then you cannot comprehend geometry*

Converse (Q → P) *if you cannot comprehend geometry, then you don't know how to reason deductively.*

Inverse (~P → ~Q) *if you know how to reason deductively, then you can comprehend geometry.*

Contrapositive (~Q → ~P) *if you can comprehend geometry, then you know how to reason deductively.*

2) Form a truth table and determine all possible truth values for (P ∨ Q) → P.

Is the given statement a tautology?

P	Q	P ∨ Q	(P ∨ Q) → P
T	T	T	T
T	F	T	F
F	T	T	F
F	F	F	T

*Not a tautologie*

3) Complete the following to make valid arguments:

a) Premise 1: P → Q  
 Premise 2: ~Q  
 Conclusion: ~P

b) Premise 1: P → Q  
 Premise 2: Q → R  
 Conclusion: P → R

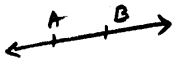
Then give the symbolic form for (a) and prove it using a truth table. State clearly how you know for sure that you have proved the law.

*We'll show that [(P → Q) ∧ ~Q] → ~P is a tautologie*

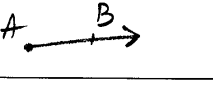
P	Q	(P → Q) ∧ ~Q	[(P → Q) ∧ ~Q] → ~P
T	T	F	T
T	F	F	T
F	T	F	T
F	F	T	T

*(always true, therefore a tautologie)*

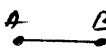
4) Classify the following names as names of *points, lines, segments, distances (lengths), rays, or angles*.  
Make a drawing for each geometric figure

a)  $\overline{AB}$  line 

Check one: geometric figure  real number

b)  $\overline{AB}$  ray 

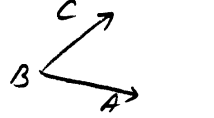
Check one: geometric figure  real number

c)  $\overline{AB}$  line segment 

Check one: geometric figure  real number

d)  $AB$  measure of segment  $\overline{AB}$

Check one: geometric figure  real number

e)  $\angle ABC$  angle 

Check one: geometric figure  real number

5) Given the figure, name:

a) three acute angles  
 $\angle 1, \angle 2, \angle 4$

b) Two right angles  
 $\angle AOC, \angle COE$

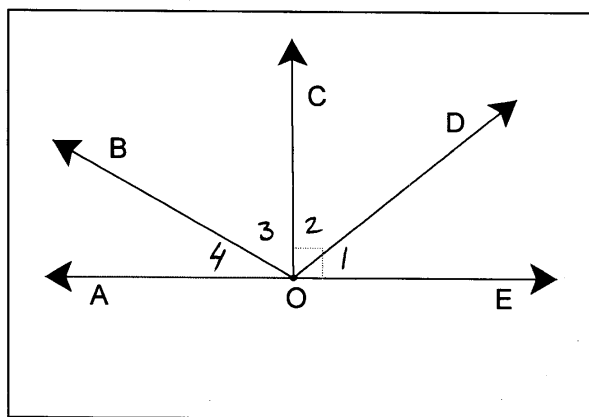
c) One obtuse angle  
 $\angle BOE$

d) One straight angle  
 $\angle AOE$

e) Two complementary angles  
 $\angle 1$  and  $\angle 2$

g) Two adjacent angles  
 $\angle 2$  and  $\angle 3$

i) Two opposite rays  
 $\overrightarrow{OA}$  and  $\overrightarrow{OE}$



f) Two supplementary angles  
 $\angle AOB$  and  $\angle BOE$

h) Two nonadjacent angles  
 $\angle 4$  and  $\angle 2$

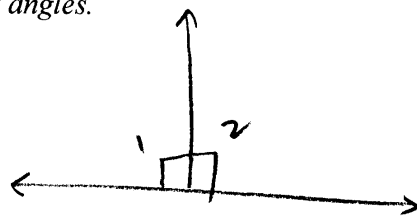
j) Three noncollinear points  
 $A, B, C$

6) a) State the hypothesis and the conclusion for the following statement both in words and using mathematical symbols. Make a drawing to illustrate the statement. Do not prove.

Two equal supplementary angles are right angles.

Hypothesis:

Two supplementary  $\angle$ 's are equal  
 $\begin{cases} m\angle 1 + m\angle 2 = 180^\circ & \text{(supplementary } \angle\text{'s)} \\ m\angle 1 = m\angle 2 & \text{(equal } \angle\text{'s)} \end{cases}$



Conclusion:

The angles are right angles

$$\angle m\angle 1 = m\angle 2 = 90^\circ$$

b) State the converse of the above statement. Is it true? Why or why not?

if two angles are right angles, then they are equal and supplementary.  
 TRUE. They are equal because they are both equal to  $90^\circ$ .  
 (all right  $\angle$ 's are equal)  
 They are supplementary because their sum is  $180^\circ$ .

7) Show a formal proof (two column proof: statements and reasons) for the following:

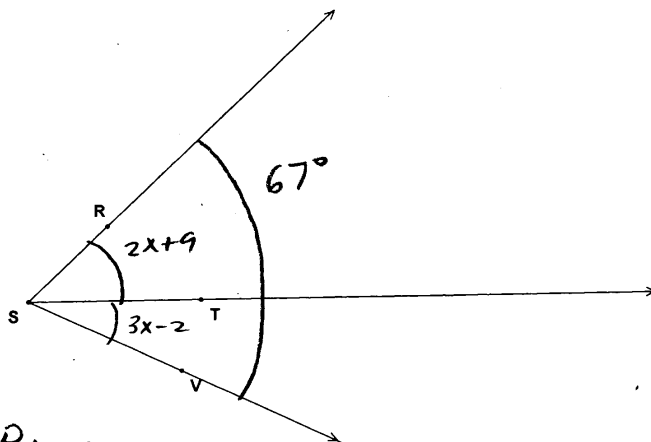
Given:  $m\angle RST = 2x + 9$

$m\angle TSV = 3x - 2$

$m\angle RSV = 67^\circ$

Find: x.

Proof



Statements

Reasons

1.  $TE \text{ int } \angle RST$
2.  $m\angle RST + m\angle TSV = m\angle RSV$
3.  $\begin{cases} m\angle RST = 2x + 9 \\ m\angle TSV = 3x - 2 \\ m\angle RSV = 67^\circ \end{cases}$
4.  $2x + 9 + 3x - 2 = 67$
5.  $5x + 7 = 67$
6.  $5x = 60$
7.  $x = \frac{60}{5} = 12$   
 $x = 12$

1. given in the figure
2. Angle Addition Postulate
3. given
4. substitution
5. simplifying (distributive prop)
6. Add/subtraction prop.  $af =$
7. Mult/division prop.  $af =$