Math 61 Spring 2007 Name:

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:

Vertical angles are congruent.

if two angles are vertical angles, then they are congruent.
$P \longrightarrow Q$

Converse $Q \to P$: if two angles are $\cong$, then they are vertical angles

Inverse $\sim P \to \sim Q$: if two angles are not vertical, then they are not $\cong$.

Contrapositive $\sim Q \to \sim P$: if two angles are not $\cong$, then they are not vertical.

2) Form a truth table and determine all possible truth values for $[(P \to Q) \wedge P] \to Q$.
Is the given statement a tautology?

P	Q	$(P \to Q)$	$\wedge$	P	$[(P \to Q) \wedge P]$	$\to$	Q
T	T	T	T	T	T	T	T
T	F	F	F	T	F	T	F
F	T	T	F	F	F	T	T
F	F	T	F	F	F	T	F

Yes, the statement is a tautology

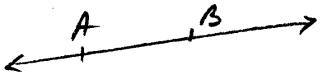
3) Complete the following to make valid arguments:

a) Premise 1: $P \to Q$
Premise 2: $\sim Q$
Conclusion: $\sim P$

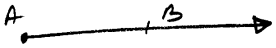
b) Premise 1: $P \to Q$
Premise 2: $Q \to R$
Conclusion: $P \to R$

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

a) $\overleftrightarrow{AB}$ line — Check one: geometric figure ☑ real number ☐



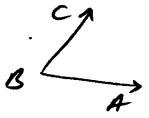
b) $\overrightarrow{AB}$ ray — Check one: geometric figure ☑ real number ☐



c) $\overline{AB}$ line segment — Check one: geometric figure ☑ real number ☐

d) AB length of segment $\overline{AB}$ — Check one: geometric figure ☐ real number ☑

e) $\angle ABC$ angle — Check one: geometric figure ☑ real number ☐



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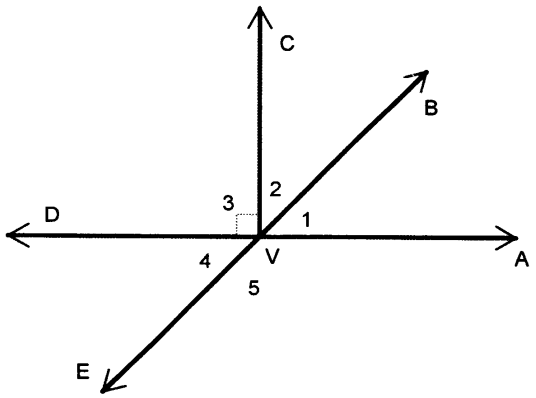
5) Given the figure, name:



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

b) Two right angles $\angle AVC, \angle 3$

c) One obtuse angle $\angle AVE$

d) One straight angle $\angle AVD$

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

f) Two supplementary angles
$\angle 3$ and $\angle AVC$

g) Two adjacent angles
$\angle 3$ and $\angle 4$

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

i) Two opposite rays
$\overrightarrow{VE}$ and $\overrightarrow{VB}$

j) Three noncollinear points.
D, C, A

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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.

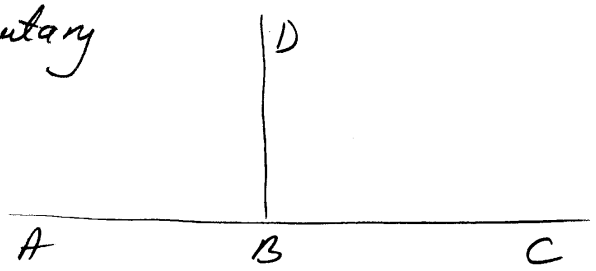
if two angles are supplementary and equal, then they are right angles

Two equal supplementary angles are right angles.

Hypothesis: $\angle ABD, \angle CBD$ = supplementary

$m\angle ABD = m\angle CBD$

Conclusion: $\angle ABD, \angle CBD$ = right $\angle$'s



Need to show that $m\angle ABD = m\angle CBD = 90°$

Prove the theorem (two column proof: statements and reasons)

Proof

Statements	Reasons
1. $\angle ABD, \angle DBC$ = supplementary	1. given
2. $m\angle ABD + m\angle DBC = 180°$	2. definition of supplm. $\angle$'s
3. $m\angle ABD = m\angle DBC$	3. given
4. $m\angle DBC + m\angle DBC = 180°$	4. substitution
(2,3) 5. $2m\angle DBC = 180°$	5. simplify (combining like terms)
6. $m\angle DBC = 90°$	6. ·/÷ property of =
7. $m\angle ABD = 90°$	7. substitution
(3,6) 8. $\angle DBC, \angle ABD$ =	8. definition of right $\angle$'s
(6,7) = right $\angle$'s	

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

[if two angles are right angles, then they are supplementary and equal.

The converse is true.

If $\angle A, \angle B$ = right $\angle$'s

$\Rightarrow m\angle A = m\angle B = 90°$ (def. of right $\angle$'s)

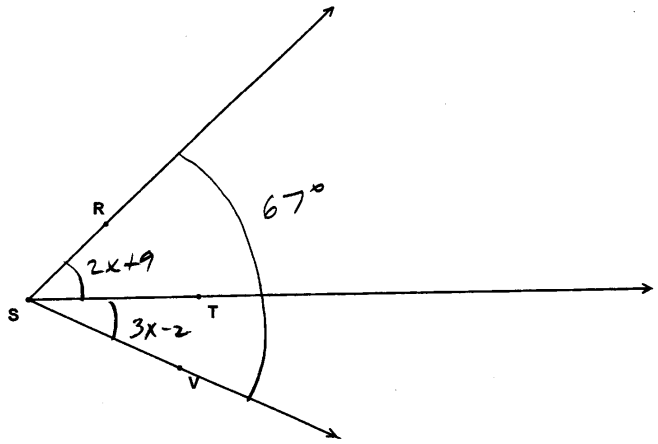
$\Rightarrow \angle A, \angle B$ = supplementary

Also, $m\angle A = m\angle B$

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

1. $T \in int \angle RST$	1. given
2. $m\angle RST + m\angle TSV = m\angle RSV$	2. Angle-Addition Postulate
3. $m\angle RST = 2x+9$, $m\angle TSV = 3x-2$, $m\angle RSV = 67^\circ$	3. given
4. $2x+9+3x-2=67$	4. substitution
(3,2)	
5. $5x+7=67$	5. simplifying
6. $5x=60$	6. +/- property of =
7. $x=\frac{60}{5}=12$	7. ·/÷ prop. of =
$x=12$	