

Instructor: Yi Wang

Name(Print)_____ Section _____ Grade_____

Attention: **Answers without supporting work shown on the paper will receive NO credits.**

1. (2 points) The square of every real number x is nonnegative. Find the if-then conditional of this statements, and find its converse and contrapositive.
2. Given that K, P, Q , and T are points on a line such that $P-K-Q$ and $P-K-T$, Q is the midpoint of \overline{KT} , $PK = 8$, and $PT = 16$, find QT .
3. Consider the following relationships among three angles: $\angle 1$ is supplementary to $\angle 2$ and complementary to $\angle 3$, and $\angle 2$ and $\angle 3$ are a linear pair. Find $m\angle 1$.
4. Under the Protractor Postulate, the coordinates of rays \overrightarrow{CM} and \overrightarrow{CN} , are, respectively, 48 and 115 with respect to some half-plane containing \overrightarrow{CM} and \overrightarrow{CN} . What must the coordinate of the bisector of $\angle MCN$ be?
5. Let two lines ℓ , and m lie in the plane P , discuss the possible relations between them.

6. Prove that for $A \neq B$, $\overline{AB} \subseteq \overrightarrow{AB} \subseteq \overleftarrow{AB}$.

7. Prove that if A , B , and C are any three distinct, collinear points, then either $A - B - C$, $A - C - B$, or $B - A - C$.

8. Prove two angles that are complementary to the same angle have equal measures.

9. Show that the opposing ray of a given ray is unique.

10. Consider the following axiomatic system:

Undefined terms: point, line

AXIOMS:

1. Each line is a set of four points.
 2. Each point is contained by precisely two lines.
 3. Two distinct lines that intersect do so in exactly one point.
- 1) Find two distinctly different models for this set of axioms.

2) Is this system categorical?