

Name \_\_\_\_\_

Date \_\_\_\_\_

In addition to ALL of the definitions, properties, postulates, and theorems from Geometry, we will be incorporating the following algebraic properties into our work.

### Algebraic Properties of Equality

Let  $a$ ,  $b$ , and  $c$  be real numbers.

#### Addition Property of Equality

If  $a = b$ , then  $a + c = b + c$ .

#### Subtraction Property of Equality

If  $a = b$ , then  $a - c = b - c$ .

#### Multiplication Property of Equality

If  $a = b$ , then  $a \cdot c = b \cdot c$ ,  $c \neq 0$ .

#### Division Property of Equality

If  $a = b$ , then  $\frac{a}{c} = \frac{b}{c}$ ,  $c \neq 0$ .

#### Distributive Property

$a(b + c) = ab + ac$

#### Substitution Property of Equality

If  $a = b$ , then  $a$  can be substituted for  $b$  (or  $b$  for  $a$ ) in any equation or expression.

### Reflexive, Symmetric, and Transitive Properties of Equality

	<u>Real Numbers</u>	<u>Segment Lengths</u>	<u>Angle Measures</u>
<b>Reflexive Property</b>	$a = a$	$AB = AB$	$m\angle A = m\angle A$
<b>Symmetric Property</b>	If $a = b$ , then $b = a$ .	If $AB = CD$ , then $CD = AB$ .	If $m\angle A = m\angle B$ , then $m\angle B = m\angle A$ .
<b>Transitive Property</b>	If $a = b$ and $b = c$ , then $a = c$ .	If $AB = CD$ and $CD = EF$ , then $AB = EF$ .	If $m\angle A = m\angle B$ and $m\angle B = m\angle C$ , then $m\angle A = m\angle C$ .

For each statement and its conclusion, state the definition, postulate, theorem, or property that justifies it.

1. Given:  $\overline{AM} \cong \overline{WU}$   
 Conclusion:  $AM = WU$

Why: \_\_\_\_\_

2. Given: E is the midpoint of  $\overline{BD}$   
 Conclusion:  $\overline{BE} \cong \overline{ED}$

Why: \_\_\_\_\_

3. Given: A bisects  $\overline{CT}$   
 Conclusion:  $\overline{CA} \cong \overline{AT}$

Why: \_\_\_\_\_

4. Given:  $CO = OL$   
 Conclusion:  $\overline{CO} \cong \overline{OL}$

Why: \_\_\_\_\_

5. Given:  $\angle DAY$  and  $\angle YAK$  are a linear pair.  
 Conclusion:  $\angle DAY$  &  $\angle YAK$  are supplementary

Why: \_\_\_\_\_

6. Given:  $\angle TOM$  is the supplement of  $\angle SUE$   
 Conclusion:  $m\angle TOM + m\angle SUE = 180^\circ$

Why: \_\_\_\_\_

7. Given: A and B lie in Plane JOG  
 Conclusion: A and B are collinear

Why: \_\_\_\_\_

8. Given: A is in the interior of  $\angle GLD$   
 Conclusion:  $m\angle GLA + m\angle ALD = m\angle GLD$

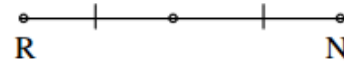
Why: \_\_\_\_\_

9. Given:  $\angle 1$  is the complement to  $\angle 3$   
 Conclusion:  $m\angle 1 + m\angle 3 = 90^\circ$

Why: \_\_\_\_\_

10. Given:  $\angle HAM$  is vertical to  $\angle EAT$   
 Conclusion:  $\angle HAM \cong \angle EAT$

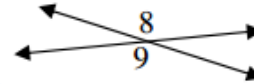
Why: \_\_\_\_\_



11. Given:

Conclusion: U is the midpoint of  $\overline{RN}$

Why: \_\_\_\_\_



12. Given:

Conclusion:  $\angle 8$  and  $\angle 9$  are congruent

Why: \_\_\_\_\_

13. Given:  $m\angle NAT + m\angle WED = 90^\circ$

Conclusion:  $\angle NAT$  &  $\angle WED$  are complementary

Why: \_\_\_\_\_

14. Given:  $\overline{FA} \cong \overline{RM}$

Conclusion:  $FA = RM$

Why: \_\_\_\_\_

15. Given:  $MA = TH$

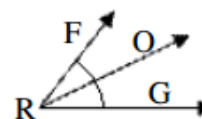
Conclusion:  $\overline{MA} \cong \overline{TH}$

Why: \_\_\_\_\_

16. Given:  $m\angle AFD + m\angle BAT = 180^\circ$

Conclusion:  $\angle AFD$  &  $\angle BAT$  are supplementary

Why: \_\_\_\_\_



17. Given:

Conclusion:  $\angle FRO \cong \angle ORG$

Why: \_\_\_\_\_

18. Given:  $m\angle 2 = m\angle 6$

Conclusion:  $\angle 2 \cong \angle 6$

Why: \_\_\_\_\_

For each question, form a conclusion from the given information, and state the definition, postulate, theorem, or property that justifies it.

1. Given:  $\overline{TO} \cong \overline{AN}$

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

2. Given: E is the midpoint of  $\overline{BD}$

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

3. Given: A bisects  $\overline{CT}$

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

4. Given:  $CO = OL$

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

5. Given:  $\angle DAY$  and  $\angle YAK$  are a linear pair

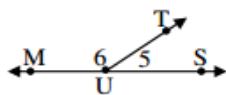
Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

6. Given:  $\angle TOM$  is the supplement of  $\angle SUE$

Conclusion: \_\_\_\_\_

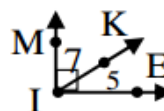
Justification: \_\_\_\_\_



7. Given:

Conclusion: \_\_\_\_\_

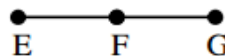
Justification: \_\_\_\_\_



8. Given:

Conclusion: \_\_\_\_\_

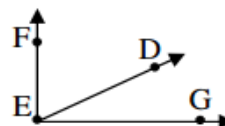
Justification: \_\_\_\_\_



9. Given:

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_



10. Given:

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

11. Given:  $m\angle ABC = m\angle HIJ$

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

12. Given:  $\angle CAT$  and  $\angle RAP$  are vertical angles.

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

13. Given:  $\angle SAT \cong \angle ACT$

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

14. Given: A is in the interior of  $\angle GLD$

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

15. Given:  $\overline{FA} \cong \overline{RM}$

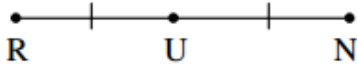
Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

16. Given:  $\angle HAM$  is vertical to  $\angle EAT$

Conclusion: \_\_\_\_\_

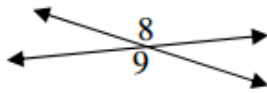
Justification: \_\_\_\_\_



17. Given:

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_



18. Given;

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

19. Given:  $m\angle NAT + m\angle WED = 90^\circ$

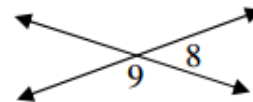
Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

20. Given:  $\overline{UB}$  bisects  $\angle RUY$

Conclusion: \_\_\_\_\_

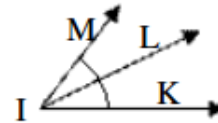
Justification: \_\_\_\_\_



21. Given:

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_



22. Given:

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

23. Given:  $\angle PAI$  and  $\angle IAR$  are a linear pair

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

24. Given:  $\angle CAT$  and  $\angle RAP$  are complementary angles.

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

25. Given:  $m\angle NAT + m\angle WED = 180^\circ$

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_

26. Given: A is between J and M

Conclusion: \_\_\_\_\_

Justification: \_\_\_\_\_