

1. Use this conditional statement: If a figure is a square, then it is a rectangle.

a) What is the hypothesis?

b) What is the conclusion?

Write each of the following statements and give their truth values.

c) converse:

d) inverse:

e) contrapositive

2. Give a counterexample that proves the conjecture false.

If  $\angle 1 \cong \angle 2$ , then  $\angle 1$  and  $\angle 2$  are vertical angles.

3. Rewrite the biconditional statement below as two conditional (if-then) statements.

Two segments are congruent if and only if the segment lengths are equal.

4. Combine the two conditional statements below into one biconditional (if and only if) statement.

If line  $k$  bisects  $\overline{XZ}$  at point  $Y$ , then  $\overline{XY} \cong \overline{YZ}$ . If  $\overline{XY} \cong \overline{YZ}$ , then line  $k$  bisects  $\overline{XZ}$  at point  $Y$ .

5. Write valid conjectures based on the given statements.

a) Given: If two adjacent angles are complementary, then they form a right angle. Angle  $C$  and  $\angle D$  are adjacent and complementary.

b) Given: If  $M$  bisects  $\overline{PQ}$ , then  $\overline{PM} \cong \overline{MQ}$ . If  $\overline{PM} \cong \overline{MQ}$ , then  $M$  is the midpoint of  $\overline{PQ}$ .

c) Given: All baseball players work out. Mike Trout is a baseball player.

6. Find the next two numbers in the pattern: 1, 4, 9, 16, 25, \_\_\_\_\_, \_\_\_\_\_.

7. Tell whether the conclusion was reached by inductive or deductive reasoning.  
*Megan's second period teacher has shown a Tiger Tube episode every Friday since the school year began. Megan concludes that this Friday her teacher will show a Tiger Tube episode.*

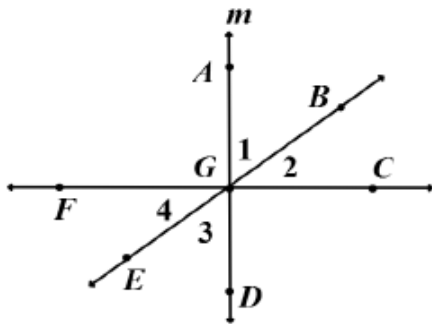
8. Complete the proof and justify each step with a property of algebra.

- a.  $\frac{2}{3}x = 8 - 2x$       a. given \_\_\_\_\_
- b.  $3\left(\frac{2}{3}x\right) = 3(8 - 2x)$       b. \_\_\_\_\_
- c.  $2x =$       c. \_\_\_\_\_
- d.  $8x =$       d. \_\_\_\_\_
- e.  $x =$       e. \_\_\_\_\_

9. Identify the property that justifies each statement.

- a. If  $\angle A \cong \angle B$  and  $\angle B \cong \angle C$ , then  $\angle A \cong \angle C$       b.  $RS = RS$

Use the figure below for #10-20.



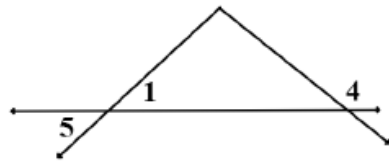
10. Give another name for line  $m$ .
11. Give another name for  $\vec{FG}$ .
12. Name an obtuse angle adjacent to  $\angle BGC$ .
13. Name the sides of  $\angle EGD$ .

Use the figure to complete the statement and give a reason (definition, theorem, postulate, property).

14.  $FG + GC =$  \_\_\_\_\_
15. If  $\vec{GB}$  bisects  $\angle AGC$ , then  $m\angle$ \_\_\_\_\_ =  $m\angle$ \_\_\_\_\_.
16. If  $G$  is the midpoint of  $\overline{AD}$ , then \_\_\_\_\_  $\cong$  \_\_\_\_\_.
17.  $m\angle 1 + m\angle 2 = m\angle$ \_\_\_\_\_.
18.  $\angle 4 \cong \angle$ \_\_\_\_\_
19. If  $m\angle AGF = 90$ , then  $\angle AGF$  is a \_\_\_\_\_ angle.
20. If  $\angle 3$  and  $\angle 4$  are complementary, then  $m\angle 3 + m\angle 4 =$ \_\_\_\_\_.

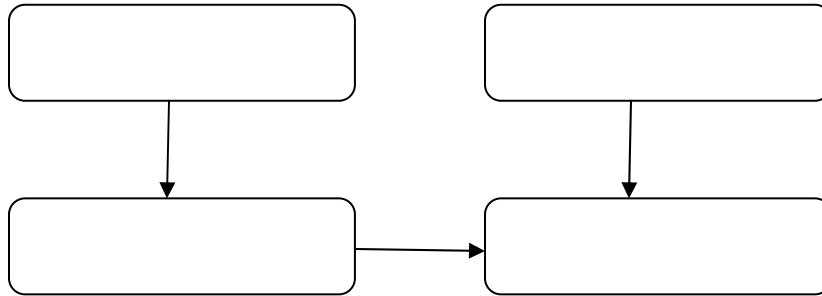
21. Given:  $\angle 1$  and  $\angle 4$  are supplementary

Prove:  $m\angle 5 + m\angle 4 = 180$



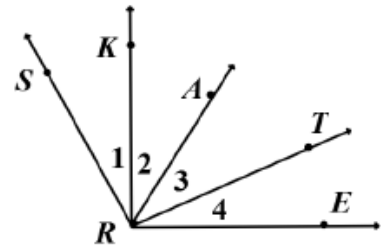
STATEMENTS	REASONS
1. $\angle 1$ and $\angle 4$ are supplementary	1.
2. $m\angle 1 + m\angle 4 = 180$	2.
3. $m\angle 1 = m\angle 5$	3.
4.	4.

Make a flow proof from the proof above.



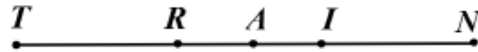
22. Given:  $m\angle 1 = m\angle 4$ ;  $\vec{RA}$  bisects  $\angle KRT$

Prove:  $m\angle SRA = m\angle ERA$



STATEMENTS	REASONS
1. $\vec{RA}$ bisects $\angle KRT$	1.
2. $m\angle 2 = m\angle 3$	2.
3. $m\angle 1 = m\angle 4$	3.
4. $m\angle 2 + m\angle 1 = m\angle 3 + m\angle 4$	4.
5. $m\angle 2 + m\angle 1 = m\angle \underline{\hspace{2cm}}$ $m\angle 3 + m\angle 4 = m\angle \underline{\hspace{2cm}}$	5.
6.	6.

23. Given:  $A$  is the midpoint of  $\overline{RI}$ ;  $TA = AN$

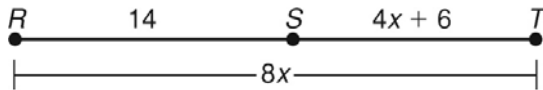


Prove:  $TR = IN$

STATEMENTS	REASONS
1. $TA = AN$	1.
2. $TA = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$ $AN = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$	2.
3. $TR + RA = AI + IN$	3.
4. $A$ is the midpoint of $\overline{RI}$	4.
5. $RA = AI$	5.
6.	6.

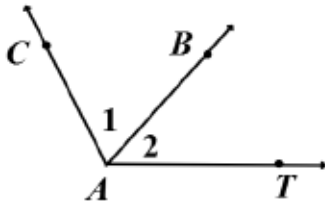
Solve each problem. SHOW WORK.

24.  $RT =$



25. Point  $A$  is the midpoint of  $\overline{CT}$ ,  $CA = 8x + 6$ , and  $AT = 11x - 3$ . Find the length of  $\overline{CT}$ .

26.  $\overrightarrow{AB}$  bisects  $\angle CAT$ ,  $m\angle 1 = 4x + 15$  and  $m\angle 2 = 6x - 11$ . Find  $m\angle CAT$ .



27. Find  $x$ .  
 $5(2x - 6) + 8 = -3(4x - 1) + 19$