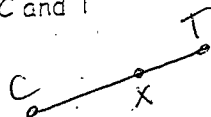


# Geometry - Proofs (Review)

1. Given: X is between C and T

$$CX = 8$$

$$TX = 3$$



Prove:  $CT = 11$

Statements	Reasons
① X is between C + T	① Given
② $CX = 8$	② Given
③ $TX = 3$	③ Given
④ $CT = CX + TX$	④ Seg. Add. Post.
⑤ $CT = 8 + TX$	⑤ Subst. (2 → 4)
⑥ $CT = 8 + 3$	⑥ Subst. (3 → 5)
⑦ $CT = 11$	⑦ Simplify.

3. Given:  $RS - TV = 5$

$$XY - TV = 5$$

Prove:  $RS = XY$

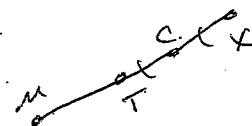
Statements	Reasons
① $RS - TV = 5$	① Given
② $XY - TV = 5$	② Given
③ $RS - TV = XY - TV$	③ Subst (2 → 1)
④ $RS - TV + TV = XY - TV + TV$	④ Addition
⑤ $RS + 0 = XY + 0$	⑤ Inv. Add.
⑥ $RS = XY$	⑥ Ident. Add.

Name Key

2. Given: T is between M and C

C is midpoint of TX

$$CX = 9$$



Prove:  $MC = MT + 9$

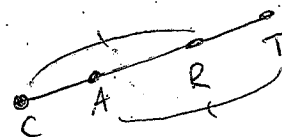
Statements	Reasons
① T is between M + C	① Given
② C is midpt of TX	② Given
③ $CX = 9$	③ Given
④ $MC = MT + TC$	④ Seg. Add. Post.
⑤ $TC = CX$	⑤ Defn. of midpt
⑥ $TC = 9$	⑥ Subst. (3 → 5)
⑦ $MC = MT + 9$	⑦ Subst. (6 → 4)

4. Given: A is between C and R

R is between A and T

$$CR = AT$$

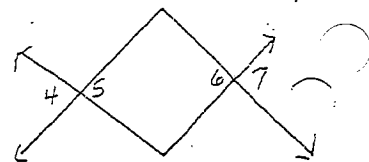
Prove:  $CA = RT$



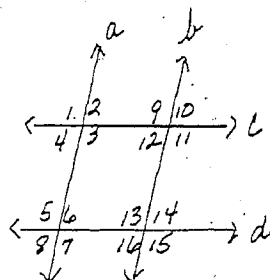
Statements	Reasons
① A is between C + R	① Given
② R is between A + T	② Given
③ $CR = AT$	③ Given
④ $CR = CA + AR$	④ Seg. Add. Post.
⑤ $AT = AR + RT$	⑤ Seg. Add. Post.
⑥ $AT = CA + AR$	⑥ Subst. (3 → 4)
⑦ $CA + AR = AR + RT$	⑦ Subst. (6 → 5)
⑧ $CA + AR - AR = AR + RT - AR$	⑧ Subtraction
⑨ $CA + 0 = RT + 0$	⑨ Inv. Add.
⑩ $CA = RT$	⑩ Ident. Add.

5. Given:  $\overrightarrow{CT}$  bisects  $\angle ACE$   
 $\angle ACT = 80^\circ$   
 Prove:  $\angle TCE = 80^\circ$

6. Given:  $\angle 5 = \angle 6$   
 Prove:  $\angle 4 = \angle 7$



7. Given:  $a \parallel b$ ;  $c \parallel d$   
 Prove:  $\angle 1 \cong \angle 15$



8. Given:  $\angle C$  and  $\angle D$  are complementary angles  
 $\angle R$  and  $\angle S$  are complementary angles  
 $\angle R = \angle D$   
 Prove:  $\angle C = \angle S$

Statements

Reasons

① $a \parallel b$	① Given
② $c \parallel d$	② Given
③ $\angle 1 \cong \angle 9$	③ Corr. & Post ( $a \parallel b$ )
④ $\angle 9 \cong \angle 15$	④ Alt. Ext. Ang Thm ( $c \parallel d$ )
⑤ $\angle 1 \cong \angle 15$	⑤ Subst. (3 → 4)
⑥ $m\angle 1 = m\angle 15$	⑥ Defn. of congruency

Statements

Reasons

① $\angle C$ and $\angle D$ are comp. Ang's	① Given
② $\angle R$ and $\angle S$ are comp. Ang's	② Given
③ $\angle R = \angle D$	③ Given
④ $\angle C + \angle D = 90^\circ$	④ Defn. of comp. Ang's
⑤ $\angle R + \angle S = 90^\circ$	⑤ Defn. of comp. Ang's
⑥ $\angle C + \angle R = 90^\circ$	⑥ Subst. (3 → 4)
⑦ $\angle C + \angle R = \angle R + \angle S$	⑦ Subst. (5 → 6)
⑧ $\angle C + \angle R - \angle R = \angle R + \angle S - \angle R$	⑧ Subtraction
⑨ $\angle C + 0 = \angle S + 0$	⑨ Inv. Add.
⑩ $\angle C = \angle S$	⑩ Ident. Add.

# Geometry – Properties & Proofs – REVIEW

Key

Matching. Select the property that matches the example.

A 1. If  $x - 9 = 12$ , then  $x - 9 + 9 = 12 + 9$

B 2.  $(y + 4) + 3 = y + (4 + 3)$

F 3.  $GH + (-GH) = 0$

E 4.  $1 \cdot a = a$

I 5.  $RS = RS$

H 6. If  $2x = 14$ , then  $\frac{1}{2}(2x) = \frac{1}{2}(14)$

D 7.  $KT + 0 = KT$

C 8.  $5 + AB = AB + 5$

K 9. If  $10 = GT$ , then  $GT = 10$

G 10.  $\frac{1}{2}(2) = 1$

~~a.~~ Addition Property

~~b.~~ Associative

~~c.~~ Commutative

~~d.~~ Identity for Addition

~~e.~~ Identity for Multiplication

~~f.~~ Inverse for Addition

~~g.~~ Inverse for Multiplication

~~h.~~ Multiplication Property

~~i.~~ Reflexive Property

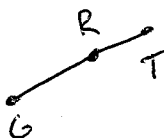
j. Subtraction Property

~~k.~~ Symmetric Property

l. Transitive Property

Write a proof for each of the following.

11. Given: R is between G and T  
GR = 7  
RT = 4



Prove:  $GT = 11$

Statements	Reasons
① R is between G and T	① Given
② $GR = 7$	② Given
③ $RT = 4$	③ Given
④ $GT = GR + RT$	④ Seg. Add. Post
⑤ $GT = 7 + RT$	⑤ Subst. (2 → 4)
⑥ $GT = 7 + 4$	⑥ Subst (3 → 5)
⑦ $GT = 11$	⑦ Simplify.

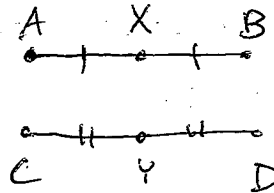
12. Given:  $AB + CD = 15$   
 $XY + CD = 15$

Prove:  $AB = XY$

Statements	Reasons
① $AB + CD = 15$	① Given
② $XY + CD = 15$	② Given
③ $AB + CD = XY + CD$	③ Subst. (2 → 1)
④ $AB + CD - CD = XY + CD - CD$	④ Subtraction
⑤ $AB + 0 = XY + 0$	⑤ Inverse of Add.
⑥ $AB = XY$	⑥ Identity of Add.

Write a proof for each of the following.

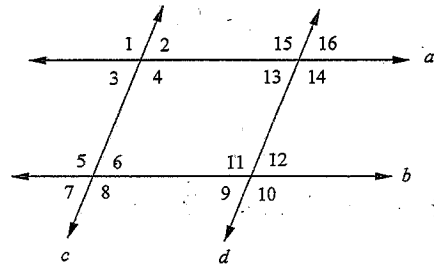
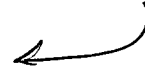
13. Given: X is the midpoint of  $\overline{AB}$   
 Y is the midpoint of  $\overline{CD}$   
 $AX = 10$   
 $XB = CY$



Prove:  $YD = 10$

Statements	Reasons
① X is the midpt of $\overline{AB}$	① Given
② Y is the midpt of $\overline{CD}$	② Given
③ $AX = 10$	③ Given
④ $XB = CY$	④ Given
⑤ $AX = XB$	⑤ Defn. of midpt
⑥ $CY = YD$	⑥ Defn. of midpt.
⑦ $10 = XB$	⑦ Subst. (3 → 5)
⑧ $XB = YD$	⑧ Subst. (4 → 6)
⑨ $10 = YD$	⑨ Subst. (7 → 8)
⑩ $YD = 10$	⑩ Symmetric

★ Substitution steps may be Different



14. Given:  $a \parallel b$   
 $c \parallel d$

Prove:  $m\angle 8 + m\angle 13 = 180^\circ$

Statements	Reasons
① $a \parallel b$	① Given
② $c \parallel d$	② Given
③ $m\angle 8 + m\angle 9 = 180^\circ$	③ Cons. Int. & Thrm (c    d)
④ $\angle 9 \cong \angle 13$	④ Corr. & Post. (a    b)
⑤ $m\angle 9 = m\angle 13$	⑤ Defn. of congruency
⑥ $m\angle 8 + m\angle 13 = 180^\circ$	⑥ Subst. (5 → 3)

15. Given:  $a \parallel b$   
 $c \parallel d$

Prove:  $m\angle 6 = m\angle 13$

Statements	Reasons
① $a \parallel b$	① Given
② $c \parallel d$	② Given
③ $\angle 6 \cong \angle 3$	③ Alt. Int. & Thrm (a    b)
④ $\angle 3 \cong \angle 13$	④ Corr. & Post. (c    d)
⑤ $\angle 6 \cong \angle 13$	⑤ Subst. (3 → 4)
⑥ $m\angle 6 = m\angle 13$	⑥ Defn. of congruency.

★ Statements + Reasons may be different. Both should include subst. + defn. of congruency.

Review – Chapter 2 Test

Name Key hr     

Identify the hypothesis and conclusion below by boxing in the hypothesis and underlining the conclusion.

1. If it is November then last month was October.

2. I will get good grades if I study.

Rewrite the conditional statement in if-then form.

3. You can retake a test within 5 school days if you have all of your homework turned in.

If you have all of your homework turned in, then you can retake a test within 5 school days.

4. Today is New Year's Day if yesterday was December 31<sup>st</sup>.

If yesterday was December 31<sup>st</sup>, then today is New Year's Day.

Write the converse of the statement.

5. If two angles are complementary, then the sum of their measures is 90 degrees.

If the sum of two angles measures is 90°, then they are complementary.

6. If the moon has purple spots, then it is June.

If it is June, then the moon has purple spots.

Decide whether the statement is *true* or *false*. If false, provide a counterexample.

7. If  $a$  is positive, then  $10a$  is greater than  $a$ . True

8. If today is Wednesday, then yesterday was Friday. False, yesterday would be Tuesday.

9. If I roll two six-sided dice and the sum of the numbers is 11, then one die must be a five. True

10. If you have five dollars, then you have five one-dollar bills. False, you could have a \$5 bill.