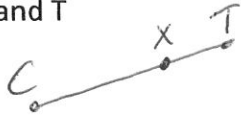


Geometry – Proofs Review Assignment

1. Given: X is between C and T

$$CX = 8$$

$$TX = 3$$



Prove: $CT = 11$

Statements

Reasons

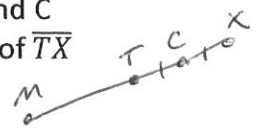
- | | |
|------------------------|------------------------|
| ① X is between C and T | ① Given |
| ② $CX = 8$ | ② Given |
| ③ $TX = 3$ | ③ Given |
| ④ $CT = CX + XT$ | ④ Seg. Add. Post. |
| ⑤ $CT = 8 + XT$ | ⑤ Substitution (2 → 4) |
| ⑥ $CT = 8 + 3$ | ⑥ Substitution (3 → 5) |
| ⑦ $CT = 11$ | ⑦ Simplify |

Name Key

2. Given: T is between M and C

C is the midpoint of \overline{TX}

$$CX = 9$$



Prove: $MC = MT + 9$

Statements

Reasons

- | | |
|--|------------------------|
| ① T is between M and C | ① Given |
| ② C is the midpoint of \overline{TX} | ② Given |
| ③ $CX = 9$ | ③ Given |
| ④ $MC = MT + TC$ | ④ Seg. Add. Post. |
| ⑤ $TC = CX$ | ⑤ Defn. of midpoint |
| ⑥ $TC = 9$ | ⑥ Substitution (3 → 5) |
| ⑦ $MC = MT + 9$ | ⑦ Substitution (6 → 4) |

3. Given: $RS - TV = 5$

$$XY - TV = 5$$

Prove: $RS = XY$

Statements

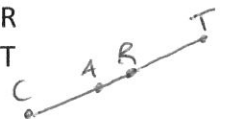
Reasons

- | | |
|---------------------------------|------------------------|
| ① $RS - TV = 5$ | ① Given |
| ② $XY - TV = 5$ | ② Given |
| ③ $RS - TV = XY - TV$ | ③ Substitution (2 → 1) |
| ④ $RS - TV + TV = XY - TV + TV$ | ④ Addition |
| ⑤ $RS + 0 = XY + 0$ | ⑤ Inv. of Addition |
| ⑥ $RS = XY$ | ⑥ Identity of Addition |

4. Given: A is between C and R

R is between A and T

$$CR = AT$$



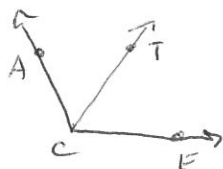
Prove: $CA = RT$

Statements

Reasons

- | | |
|---------------------------------|--------------------|
| ① A is between C and R | ① Given |
| ② R is between A and 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. of Add. |
| ⑩ $CA = RT$ | ⑩ Identity of Add. |

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



Prove: $m\angle TCE = 80^\circ$

Statements	Reasons
① \overrightarrow{CT} bisects $\angle ACE$	① Given
② $m\angle ACT = 80^\circ$	② Given
③ $m\angle ACT = m\angle TCE$	③ Defn. of bisects
④ $80^\circ = m\angle TCE$	④ Subst. (2 \rightarrow 3)
⑤ $m\angle TCE = 80^\circ$	⑤ Symmetric

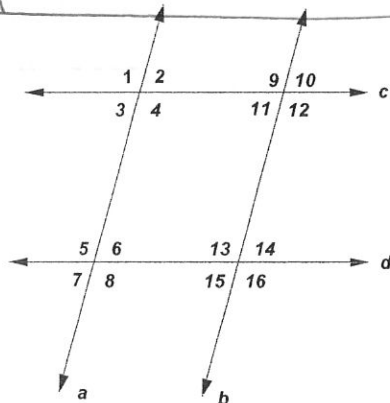
6. Given: $\angle C$ & $\angle D$ are complimentary angles
 $\angle R$ & $\angle S$ are complimentary angles
 $m\angle R = m\angle D$

Prove: $m\angle C = m\angle S$

Statements	Reasons
① $\angle C$ & $\angle D$ are comp. \angle 's	① Given
② $\angle R$ & $\angle S$ are comp. \angle 's	② Given
③ $m\angle R = m\angle D$	③ Given
④ $m\angle C + m\angle D = 90^\circ$	④ Defn. of comp. \angle 's
⑤ $m\angle R + m\angle S = 90^\circ$	⑤ Defn. of comp. \angle 's
⑥ $m\angle C + m\angle R = 90^\circ$	⑥ Subst. (3 \rightarrow 4)
⑦ $m\angle C + m\angle R = m\angle R + m\angle S$	⑦ Subst. (5 \rightarrow 6)
⑧ $m\angle C + m\angle R - m\angle R = m\angle R + m\angle S - m\angle R$	⑧ subtraction
⑨ $m\angle C + 0 = m\angle S + 0$	⑨ Inv. of add.
⑩ $m\angle C = m\angle S$	⑩ Identity of Add.

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

Prove: $m\angle 1 = m\angle 16$



Statements	Reasons
① $a \parallel b$	① Given
② $c \parallel d$	② Given
③ $\angle 1 \cong \angle 8$	③ Alt. Ext. \angle Thm ($c \parallel d$)
④ $\angle 8 \cong \angle 16$	④ Corr. \angle Post ($a \parallel b$)
⑤ $\angle 1 \cong \angle 16$	⑤ Subst. (3 \rightarrow 4)
⑥ $m\angle 1 = m\angle 16$	⑥ Defn. of congruence

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 31st.

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

Write the converse of the statement. *Switch the hypothesis + conclusion*

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

If the sum of their measures is 90°, then two angles 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.
you could have 500 pennies.

Geometry – Properties & Proofs – REVIEW

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 + T	① Given
② <u>GR = 7</u>	② Given
③ <u>RT = 4</u>	③ Given
④ <u>GT = GR + RT</u>	④ Seg. Add. Post.
⑤ <u>GT = 7 + RT</u>	⑤ Subst (2 → 4)
⑥ <u>GT = 7 + 4</u>	⑥ Subst (3 → 5)
⑦ <u>GT = 11</u>	⑦ Simplify

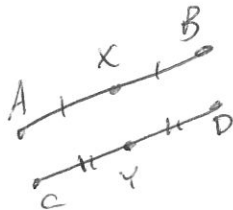
12. Given: $AB + CD = 15$
 $XY + CD = 15$

Prove: $AB = XY$

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

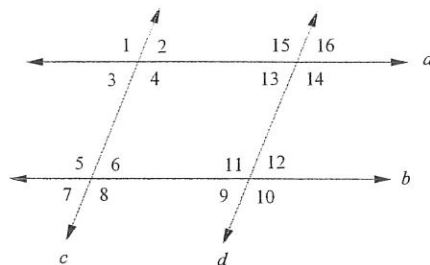
Write a proof for each of the following.

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 midpt of \overline{AB}	① Given
② Y is 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



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 Consec. Int. & Thm (c // d)
④ $\angle 9 \cong \angle 13$	④ Corr. & Post (a // b)
⑤ $m\angle 9 = m\angle 13$	⑤ Defn. of congruence
⑥ $m\angle 8 + m\angle 13 = 180^\circ$	⑥ Substitution (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. & Thm (a // b)
④ $\angle 3 \cong \angle 13$	④ Corr. & Post (c // d)
⑤ $\angle 6 \cong \angle 13$	⑤ Subst (4 → 3)
⑥ $m\angle 6 = m\angle 13$	⑥ Defn. of congruence