Lesson 2.8.1: Writing Proofs

Proof: a form of logical reasoning in which each statement is organized and backed up by the reasons
Postulate: a statement that is accepted without proof
Theorem: a statement that is accepted after it is proved deductively
Ways of Writing Proofs

1. Flow-Chart Proof
2. Two-Column Proof
3. Paragraph Form Proof

Practice Exercises 2.8.1

A. Provide the reason for each statement.

1. If $\angle 1$ is a right angle, then $m\angle 1 = 90^\circ$.
2. If $\angle M$ and $\angle N$ are supplementary, then $m\angle M + m\angle N = 180^\circ$.
3. If Y is the midpoint of $\overline{CE}$ then $CY = EY$.
4. If $\overline{LO} \cong \overline{VE}$, then $LO = VE$.
5. If $2x = 10$ then $\frac{2x}{2} = \frac{10}{2}$.
6. If $\angle X$ and $\angle Y$ are vertical angles, then $\angle X \cong \angle Y$.
7. If $\angle M$ and $\angle N$ form a linear pair, then $\angle M$ and $\angle N$ are supplementary.
8. If $m\angle J + m\angle K = 90^\circ$ and $m\angle K + m\angle L = 90^\circ$, then $\angle J \cong \angle L$.
9. If Y lies on $\overline{XZ}$, then $XZ = XY + YZ$.
10. If $m\angle D + m\angle E = 180^\circ$ and $m\angle E + m\angle F = 180^\circ$, then $\angle D \cong \angle F$.

B. Provide a conclusion for each given hypothesis and give the reason.

1. If $\angle 1$ is a right angle, then ____.
   Reason: ____
2. If $\angle A$ and $\angle B$ are supplementary, then ____.
   Reason: ____
3. If X is the midpoint of $\overline{AC}$ then ____.
   Reason: ____
4. If $LO = VE$, then ____.
   Reason: ____
5. If $2x = 10$ then ____.
   Reason: ____
6. If $\angle M$ and $\angle N$ form a linear pair, then ____.
   Reason: ____
7. If $\overrightarrow{LM}$ bisects $\overline{PG}$ at L, then ____.
   Reason: ____
8. If $x + y = 12$ and $y = 9$, then ____.
   Reason: ____
9. If $AB + BC = AC$ and $AC = 2AB$, then ____.
   Reason: ____
10. If X and Y are vertical angles, then ____.
    Reason: ____

Activity 2.8.1

A. Provide the reason for each statement.

1. If $\angle 1$ is an acute angle, then $m\angle 1 < 90^\circ$.
2. If $\angle T$ and $\angle R$ are complementary, then $m\angle T + m\angle R = 90^\circ$.
3. If H is the midpoint of $\overline{EF}$ then $EH = HF$.
4. If $\overline{RU} \cong \overline{BY}$, then $RU = BY$.
5. If $3x = 9$ then $\frac{3x}{3} = \frac{9}{3}$.
6. If $x + 2 = 5$, then $x + 2 - 2 = 5 - 2$.
7. If $\overrightarrow{LM}$ bisects $\overline{PG}$ at L, then $\overline{LP} \cong \overline{GL}$.
8. If $x + y = 12$ and $y = 9$, then $x + 9 = 12$.
9. If $AB + BC = 2AB$ and $2AB = AC$, then $AB + BC = AC$.
10. If $\angle X \cong \angle Y$, then $m\angle X = m\angle Y$.

B. Provide a conclusion for each given hypothesis and give the reason.

1. If $\angle 1$ and $\angle 2$ form two opposite rays, then ____.
   Reason: ____
2. If $\angle C$ and $\angle D$ are complementary, then ____.
   Reason: ____
3. If $\overline{XY} \perp \overline{WX}$, then ____.
   Reason: ____
4. If $\overline{MN} \cong \overline{OP}$, then ____.
   Reason: ____
5. If $3x = 12$, then ____.
   Reason: ____
6. If $\angle M \cong \angle N$, then ____.
   Reason: ____
7. If $x - 3 = 5$, then ____.
   Reason: ____
8. If $x + y = 5$ and $y = 2$, then ____.
   Reason: ____
9. If Y lies between $\overline{XZ}$, then ____.
   Reason: ____
10. If X and Y are supplementary angles, then ____.
    Reason: ____

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