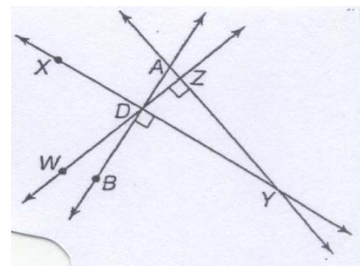# AG. 1 GEOMETRY

BLACK: Quiz 2
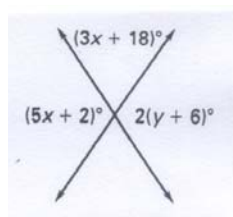
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Date: _____

Goal 2: Analyze and solve problems involving geometric relationships

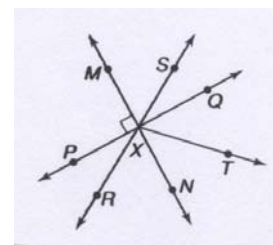_Section 1:_ **Special Angle Pairs and the Angle Addition Postulate**

1. In the figure, $\overrightarrow{AB} \perp \overrightarrow{XY}$ and $\overleftrightarrow{WZ} \perp \overrightarrow{AY}$.
    Name two angles that are complementary to $m\angle ADZ$.

2. Solve for y.

    $(3x + 18)°$

    $(5x + 2)°$ $2(y + 6)°$

3. If $\overrightarrow{XT}$ bisects $m\angle QXN$ and $m\angle SXQ = 30$, find the measure of each of
    the obtuse angles that have $\overrightarrow{XM}$ as one of their sides.

4. Given that $\angle 1$ is not a right angle, $\angle 1$ and $\angle 2$ form a linear pair, $\angle 3$ and $\angle 4$ form
    a linear pair, and $\angle 1$ and $\angle 3$ are vertical angles. Which statement below is _not_
   true?

    A. $m\angle 1 + m\angle 2 = 180^0$
    B. $m\angle 3 + m\angle 4 = 180^0$
    C. $\angle 2 \cong \angle 4$
    D. $m\angle 2 + m\angle 4 = 180^0$
    E. $\angle 1 \cong \angle 3$

5. Suppose $\angle AXB$, $\angle BXC$, and $\angle CXA$ are congruent angles in the same plane with no
    common interior points. If the sum of their measures is 360 and $\overrightarrow{XY}$ is the bisector
    of $\angle AXB$, which of the following is true? _Show or explain._

    A. $\angle AXY \cong \angle BXC$
    B. $\angle BXC \cong \angle BXY$
    C. $\overrightarrow{XC}$ And $\overrightarrow{XY}$ are opposite rays
    D. $\angle AXC$ and $\angle YXB$ are vertical angles

## *Section 2:* Parallel Lines and Transversals

6. Horatio is building a shed. The framing diagram for the shed is shown below.
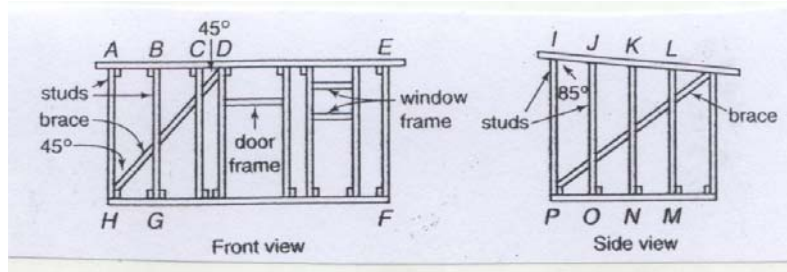
A. Looking at the side view, is the roof line parallel to the floor? Explain how you know.

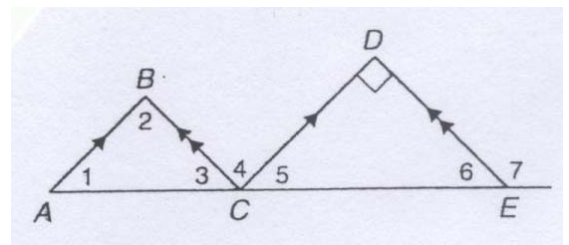B. What is the measure of $\angle KJO$? Explain how you know?

7. Refer to the figure. State the transversal that forms each pair of angles. Then, identify the special angle pair name.
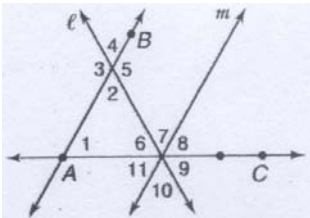
A. $\angle 5$ and $\angle 7$ __ _____

B. $\angle 1$ and $\angle 8$ __ _____
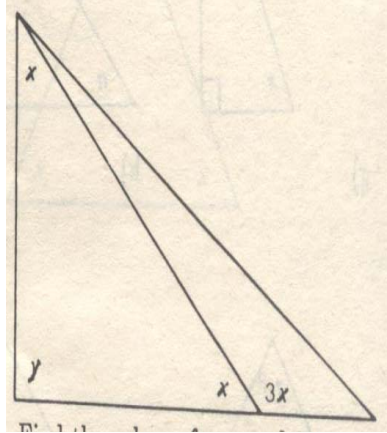
C. $\angle 4$ and $\angle 10$ __ _____

8. In the figure, $\overline{AB} \parallel \overline{CD}$, $\overline{BC} \parallel \overline{DE}$ and $m\angle 1 = 55$. Find the measure of each angle:

A. $\angle 5$
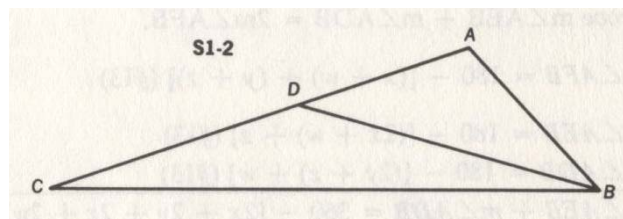
B. $\angle 6$

C. $\angle 4$

D. $\angle 7$

Section 3: Triangles

9. Find the measure of x and y. Then, record the sizes of all three angles of the shaded triangle.


10. In $\triangle ABC$, a point, D is on $\overline{AC}$ so that AB = AD (fig. S1-2).
    Also, $m\angle ABC - m\angle ACB = 30$.

Find $m\angle CBD$. Show or explain your work/thinking clearly and completely.

11. The following problem and solution appeared on the AG1 website. Demonstrate your understanding of the solution by explaining a justification for each step of the solution.

Problem: The interior bisector of $\angle B$, and the exterior bisector of $\angle C$ of $\triangle ABC$ meet at D (fig. S1-3). Through D, a line parallel to $\overline{CB}$ meets $\overline{AC}$ at L and $\overline{AB}$ at M. If the measures of legs $\overline{LC}$ and $\overline{MB}$ of trapezoid CLMB are 5 and 7, respectively, find the measure of base $\overline{LM}$. Prove your result.
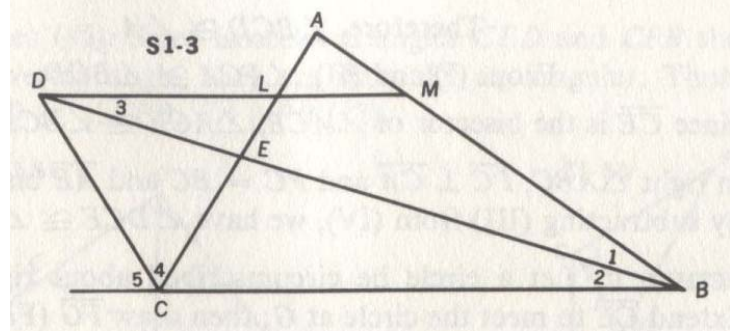
Solution Steps	Justification
$m\angle 1 = m\angle 2$ and $m\angle 2 = m\angle 3$	
Therefore, $m\angle 1 = m\angle 3$	
In isosceles $\triangle DMB$, DM = MB	
Similarly, $m\angle 4 = m\angle 5$ and $m\angle 5 = m\angle LDC$	
Therefore, $m\angle 4 = m\angle LDC$	
Thus, in isosceles $\triangle DLC$, DL = CL	
Since DM = DL + LM MB = LC + LM, or LM = MB − LC.	
Since LC = 5 and MB = 7, LM = 2.	

<u>*Section 4:*</u> **Problem Solving**

12. The measure of an angle is greater than the measure of its complement and is less than twice the measure of its supplement. What can you determine about the measure of the angle?

<u>*Section 5:*</u>   **Constructions**

13. On a piece of printer paper,

   A. Use your protractor to draw an angle of $148°$.
   B. Construact an angle congruent to it.
   C. Bisect the angle.
   D. Name the bisected angle and its bisector.
   E. Measure each of the smaller angles with your protractor.
   F. Write a mathematical statement that describes a relationship seen in your construction.

Don't forget to staple your printer paper to your assessment !!!

14. Given the three points on the circle below. Find the center of the circle by using a compass and straight edge.