Properties of Angles with Parallel Lines

A. Fill in the Blanks

1. When a transversal intersects two parallel lines, the alternate interior angles are _____.
2. Angles on the same side of the transversal and inside the parallel lines are called _____ interior angles.
3. If two corresponding angles are equal, then the lines intersected by the transversal must be _____.
4. Consecutive interior angles are _____, meaning they add up to 180°.
5. A line that intersects two or more other lines is called a _____.

B. Match the angle pair from the diagram with its correct name. Lines a and b are parallel.

Column A (Angle Pair)	Column B (Name)
1. ∠1 and ∠5	A. Alternate Interior Angles
2. ∠4 and ∠5	B. Consecutive Interior Angles
3. ∠3 and ∠6	C. Corresponding Angles
4. ∠1 and ∠4	D. Vertically Opposite Angles
5. ∠5 and ∠7	E. Linear Pair (Angles on a straight line)

D. Warm-up Questions

1. Name a pair of corresponding angles.
2. Name a pair of alternate interior angles.
3. If the measure of ∠1 is 115°, what is the measure of ∠5?
4. If the measure of ∠4 is 65°, what is the measure of ∠5?
5. If the measure of ∠3 is 120°, what is the measure of ∠5?

F. Word Problems & Application

1. Two parallel city streets, Elm St. and Oak St., are crossed by a diagonal road, Maple Ave. The angle Maple Ave. makes with Elm St. is 55°. What is the measure of the corresponding angle it makes with Oak St.?
2. A carpenter is building a gate with a diagonal brace as shown. The top and bottom bars of the gate are parallel. If the angle the brace makes with the bottom bar (∠1) is 40°, what is the measure of ∠2 to ensure the brace is straight?
3. The rungs of a ladder are parallel. If the ladder's side makes a 75° angle with the ground, what angle does the side make with the top rung (angle x)?

4. On a map, a railroad track crosses two parallel highways. The obtuse angle formed at the first intersection is 130°. What is the measure of the acute angle formed at the second intersection?

5. A skier is skiing down a hill. The path of the skier can be seen as a transversal cutting across two parallel lines representing the start and finish lines. If the angle of her path with the start line is 110°, what is the measure of the alternate interior angle at the finish line?

G. True or False

31. Vertically opposite angles are always supplementary. _____

32. If two lines are parallel, then alternate interior angles are supplementary. _____

33. All acute angles in a diagram with two parallel lines and a transversal are equal. _____

34. Angles that form a linear pair add up to 360°. _____

35. If a transversal is perpendicular to one of two parallel lines, it is not necessarily perpendicular to the other. _____