Transversals and Angles Formed

A. Fill in the Blanks

1. If two parallel lines are cut by a transversal, then alternate interior angles are _____.

0. Angles that are in the same position at each intersection where a straight line crosses two others are called _____ angles.

3. If two parallel lines are cut by a transversal, then consecutive interior angles are _____.

4. Angles that are on opposite sides of the transversal and outside the parallel lines are called _____ angles.

5. Vertically opposite angles are always _____.

## B. Match the angle pair name in Column A with the correct pair of angles from the diagram in Column B.

Column A	Column B
1. Alternate Interior Angles	A. $\angle 1$ and $\angle 8$
2. Corresponding Angles	B. $\angle 4$ and $\angle 5$
3. Consecutive Interior Angles	C. $\angle 2$ and $\angle 7$
4. Alternate Exterior Angles	D. $\angle 3$ and $\angle 6$
5. Vertically Opposite Angles	E. $\angle 4$ and $\angle 6$

C. Practice Problems

1. $m\angle 3 = 75°$ and $m\angle 5 = 75°$. Are lines l and m parallel?

2. $m\angle 2 = 110°$ and $m\angle 7 = 110°$. Are lines l and m parallel?

3. $m\angle 4 = 100°$ and $m\angle 6 = 80°$. Are lines l and m parallel?

4. $m\angle 1 = 125°$ and $m\angle 5 = 125°$. Are lines l and m parallel?

5. $m\angle 2 = 65°$ and $m\angle 8 = 115°$. Are lines l and m parallel?

D. Warm-up Questions

1. What is the name of the line 't' that intersects lines 'l' and 'm'?

2. If $m\angle 1 = 130°$, what is the measure of $m\angle 4$? Why?

3. If $m\angle 2 = 50°$, what is the measure of $m\angle 6$? Why?

4. Name one pair of alternate interior angles.
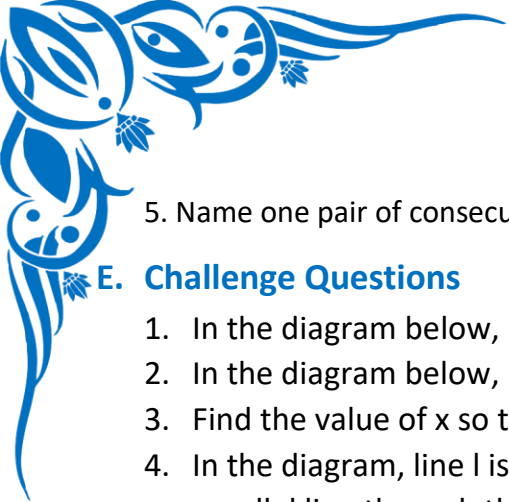
5. Name one pair of consecutive interior angles (same-side interior angles).

E. Challenge Questions

1. In the diagram below, lines a and b are parallel. Find the value of x.
2. In the diagram below, lines l and m are parallel. Find the values of x and y.
3. Find the value of x so that lines l and m are parallel.
4. In the diagram, line l is parallel to line m. Find the measure of angle z. (Hint: Draw a third parallel line through the vertex of angle z).
5. A carpenter is building a bookshelf. The top and bottom shelves are parallel. A diagonal brace is installed as shown. If m∠1 = (5x + 15)° and m∠2 = (7x - 5)°, find the measure of each angle.

F. Word Problems & Application

1. A city planner is designing a new neighborhood. Maple Street and Oak Street are parallel to each other. A new road, Pine Avenue, will be built as a transversal. The angle Pine Avenue makes with Maple Street is 65°. What is the measure of the corresponding angle it makes with Oak Street?

2. Two parallel train tracks are crossed by a road. The angle the road makes with the first track is 110°. What is the measure of the alternate interior angle formed at the second track?

3. A ladder is leaning against a wall. The rungs of the ladder are parallel to the ground. If the side of the ladder makes a 70° angle with the ground, what angle does the side of the ladder make with the top rung? (Assume the top rung is parallel to the ground).

4. In a parking lot, the parking space lines are parallel. A car is parked diagonally across one line, forming an angle of 85° with the line. What is the measure of the consecutive interior angle formed with the next parking line?

5. A gate is made of parallel horizontal bars and a diagonal support beam. The support beam makes a 40° angle with the bottom bar. What angle does the support beam make with the top bar? Explain your reasoning.

G. True or False

1. When a transversal intersects two lines, corresponding angles are always equal. _____

2. Alternate exterior angles are supplementary. _____

3. If two lines are parallel, any pair of angles formed by a transversal are either congruent or supplementary. _____

4. A transversal can only intersect two lines. _____

5. If consecutive interior angles add up to 180°, the lines must be parallel. _____