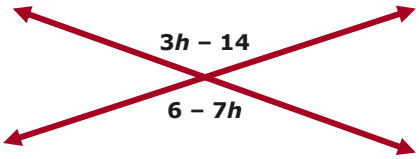
19: Plane Geometry

Key Terms

- **Acute angle:** a positive angle with a measure less than 90°.
- **Adjacent angles:** two angles that share a common side and a common vertex, but do not overlap.
- **Alternate exterior angles:** pairs of angles located outside the parallel lines on opposite sides of the transversal; they are congruent.
- **Alternate interior angles:** pairs of angles located between the parallel lines on opposite sides of the transversal; they are congruent.
- **Chord:** a line segment with both endpoints on the circle.
- **Complementary angles:** two angles whose sum is 90°.
- **Corresponding angles:** pairs of angles that are positioned the same at the intersection of two parallel lines and a transversal; they are congruent.
- **Diameter:** a chord that passes through the center of a circle.
- **Equilateral triangle:** a triangle with all sides congruent; also called equiangular.
- **Isosceles trapezoid:** a trapezoid with congruent legs.
- **Isosceles triangle:** a triangle with at least two sides congruent.
- **Kite:** a quadrilateral with no parallel sides and two pairs of adjacent sides that are congruent.
- **Obtuse angle:** an angle with a measure between 90° and 180°.
- **Parallel lines:** two or more lines in the same plane that do not intersect.
- **Parallelogram:** a quadrilateral with two pairs of parallel sides.
- **Plane:** a flat surface that extends indefinitely in all directions; represented by a parallelogram.
- **Plane geometry:** the science of measurement; the geometry dealing with figures in a plane.
- **Polygon:** a closed plane figure with three or more sides; each side is a line segment.
- **Radius:** any segment that connects a point on a circle to the center of the circle.
- **Reflection:** a transformation that flips a figure over a line.
- **Right angle:** an angle with a measure of exactly 90°.
- **Rotation:** a transformation that turns a figure around a fixed point.
- **Scalene triangle:** a triangle with no two congruent sides; all interior angles have different measures.
- **Straight angle:** an angle with a measure of exactly 180°.
- **Supplementary angles:** two angles whose sum is 180°.
- **Tessellate:** to cover a plane with identical shapes with no overlapping or gaps.
- **Transformation:** a change in position, shape, or size of a figure.
- **Translation:** a transformation that slides a figure to another location without change in size or orientation.
- **Trapezoid:** a quadrilateral with one pair of parallel sides.
- **Vertical angles:** two angles that are across from each other at the intersection of two lines; they are always congruent.

Example: Vertical Angles

Using the diagram to find *h*.



Solution: The expressions represent vertical angles so they are equivalent. Set them equal to each other and solve for *h*.

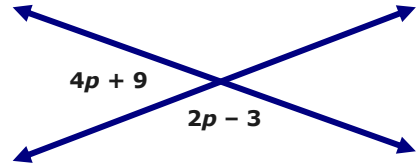
$$3h - 14 = 6 - 7h$$

$$10h = 20$$

$$h = 2$$

Example: Supplementary Angles

Use the diagram to find *p*.



Solution: The expressions represent the measures of supplementary angles. Set the sum of the expressions equal to 180° and solve for *p*.

$$4p + 9 + 2p - 3 = 180$$

$$6p + 6 = 180$$

$$6p = 174$$

$$p = 29$$

Example: Duplicating Segments

Duplicate $\overline{AB}$.

To construct a segment equal to $\overline{AB}$, draw an arbitrary $\overline{MN}$ using a straightedge. Take the length of this segment longer than the length of $\overline{AB}$.

Open a compass and place its pointer at *A* and its pencil at *B*.

Keeping the compass with same openness, place its pointer at *M* and draw an arc. This arc intersects $\overline{MN}$ at *K*. Then $\overline{MK}$ is congruent to $\overline{AB}$.

How to Use This Cheat Sheet: These are the keys related this topic. Try to read through it carefully twice then rewrite it out on a blank sheet of paper. Review it again before the exams.

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