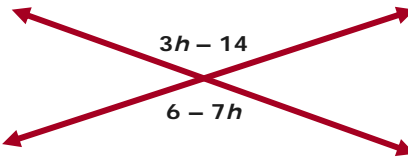


14: Plane Geometry and Spatial Thinking

Key Terms
<ul style="list-style-type: none"> • 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 .

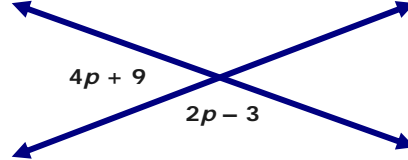
$$3h - 14 = 6 - 7h$$

$$10h = 20$$

$$h = 2$$

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 .

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

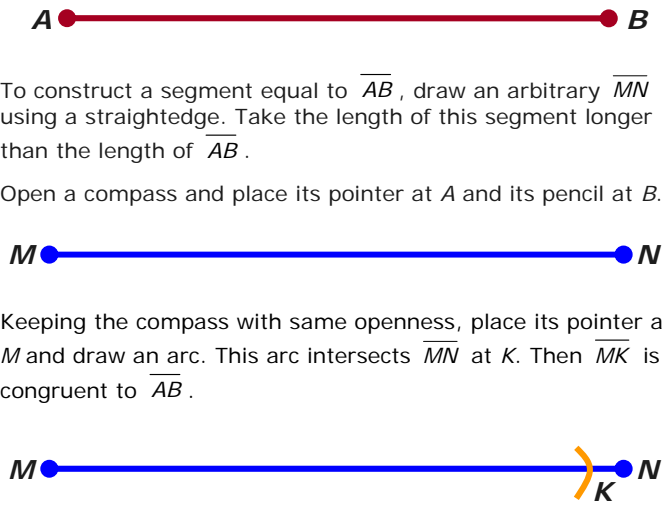
$$6p + 6 = 180$$

$$6p = 174$$

$$p = 29$$

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 recite it out on a blank sheet of paper. Review it again before the exams.