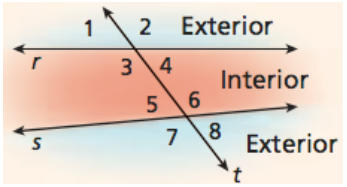
Geometry
Big Ideas Chapter 3 Study Guide - Parallel and Perpendicular Lines



Definitions

Parallel lines (||): lines are coplanar and do not intersect.
Perpendicular lines (⊥): lines that intersect at 90˚ angles.
Skew lines: lines that are not coplanar. They are not parallel and they do not intersect.
Parallel planes: planes that do not intersect.
Transversal: a line that intersects two coplanar lines at two different points.
Corresponding angles: like $\angle 1$ and $\angle 5$
Alternate interior angles: like $\angle 4$ and $\angle 5$
Alternate exterior angles: like $\angle 1$ and $\angle 8$
Consecutive (Same-side) interior angles: like $\angle 3$ and $\angle 5$
Perpendicular bisector: a line perpendicular to a segment at the segment's midpoint.

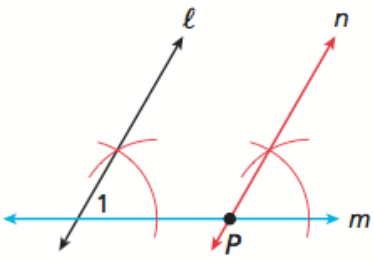
Theorems and Postulates

Parallel Postulate: If there is a line and a point not on the line, then there is exactly one line through the point parallel to the given line.
Perpendicular Postulate: If there is a line and a point not on the line, then there is exactly one line through the point perpendicular to the given line.
Corresponding Angles Theorem: If two parallel lines are cut by a transversal, then the pairs of corresponding angles are congruent. The converse is also true.
Alternate Interior Angles Theorem: If two parallel lines are cut by a transversal, then the pairs of alternate interior angles are congruent. The converse is also true.
Alternate Exterior Angles Theorem: If two parallel lines are cut by a transversal, then the two pairs of alternate exterior angles are congruent. The converse is also true.
Same-side (Consecutive) Interior Angles Theorem: If two parallel lines are cut by a transversal, then the two pairs of same-side interior angles are supplementary. The converse is also true.
Linear Pair Perpendicular Theorem: If two lines intersect to form a linear pair of congruent angles, then the lines are perpendicular.
Perpendicular Transversal Theorem: In a plane, if a transversal is perpendicular to one of two parallel lines, then it is perpendicular to the other line.
Lines Perpendicular to a Transversal Theorem: In a plane, if two lines are perpendicular to the same line, then they are parallel to each other.
Slopes of Parallel Lines Theorem: In a coordinate plane, two distinct non-vertical lines are parallel if and only if they have the same slope.
Slopes of Perpendicular Lines Theorem: In a coordinate plane, two non-vertical lines are perpendicular if and only if the product of their slopes is −1.

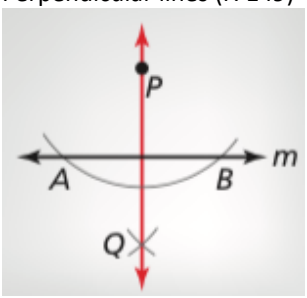
Distance from a point to a line: the length of the perpendicular segment from the point to the line (A to B).

Constructions

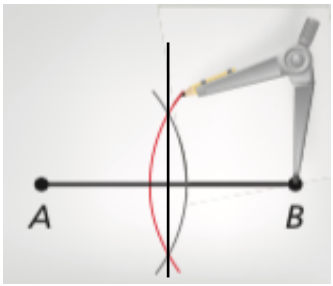
Parallel lines (P. 139)



Perpendicular lines (P. 149)



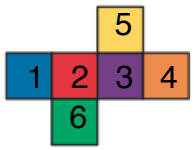
Perpendicular bisector (P. 149)



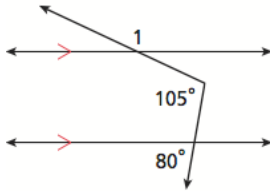
Geometry
Big Ideas Chapter 3 Practice Problems
Show all work!!!

Name _____
Date _____ Period _____

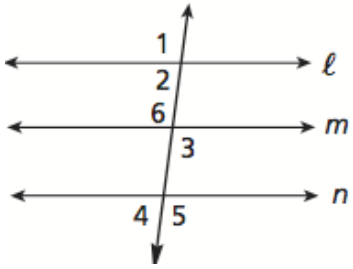
1) If the figure shown is folded to form a cube, which faces of the cube will be parallel?



2) Find $m\angle 1$.

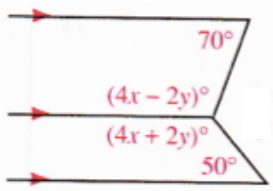


3) Given: $m\angle 2 + m\angle 3 = 180^\circ$. Prove: $\ell \parallel m$.



Statements _____ Reasons

4) In the figure, find x and y.



5) $\overleftrightarrow{ST} \parallel \overleftrightarrow{VW}$ for S(-3, 5), T(1, -1), V(x, -3), and W(1, y). Find values for x and y.

6) A right triangle is formed by the x-axis, the y-axis, and the line $y = -\frac{3}{4}x + 15$. Find the length of the hypotenuse.

7) Are the points (-2, -4), (5, -2), and (2, -3) collinear? Explain the method you used to determine the answer.

8) Find the point-slope form of the perpendicular bisector of the segment with endpoints (-6, 3) and (4, -5).

9) Construct a perpendicular to segment $\overline{AB}$ through point X.

X

A ——————————— B