Section 3 – 1: Parallel Lines and Transversals

Notes

**Parallel Lines:** coplanar lines that do not ________________

- Symbol:
- Ex:

**Parallel Planes:** ________________ that do not ________________

- Ex:

**Skew Lines:** lines that do not ________________ and that are not ________________

**Example #1:** Refer to the figure on the right.

a.) Name all planes that are parallel to plane $AEF$.

b.) Name all segments that intersect $AF$.

c.) Name all segments that are parallel to $DC$.

d.) Name all segments that are skew to $AD$. 
**Transversal**: a line that intersects \______ or more lines in a plane at different ____________

**Example #2**: Identify the pairs of lines to which each given line is a transversal.

a.) \( p \)  

b.) \( r \)

c.) \( q \)  

d.) \( t \)

**Key Concept (Transversals and Angles)**:

Transversal \( p \) intersects lines \( q \) and \( r \).

a.) Exterior Angles

b.) Interior Angles

c.) Consecutive Interior Angles

d.) Alternate Exterior Angles

e.) Alternate Interior Angles

f.) Corresponding Angles
Section 3 - 2: Angles and Parallel Lines

Notes

IF TWO PARALLEL LINES ARE CUT BY A TRANSVERSAL, THEN:

- By the **Corresponding Angles Postulate** each pair of corresponding angles is ________________.
- By the **Alternate Interior Angles Theorem** each pair of alternate interior angles is ________________.
- By the **Alternate Exterior Angles Theorem** each pair of alternate exterior angles is ________________.
- By the **Consecutive Interior Angles Theorem** each pair of consecutive interior angles is ________________.

Example #1: In the figure, \( m \angle 3 = 110 \) and \( m \angle 12 = 55 \). Find the measure of each angle.

a.) \( \angle 1 \)  

b.) \( \angle 6 \)

c.) \( \angle 2 \)  

d.) \( \angle 10 \)

e.) \( \angle 13 \)  

f.) \( \angle 15 \)
Example #2: Find $x$ and $y$ in the following figure.

Example #3: Find $x$ and $y$ in the following figure.

Example #4: Find $\angle 1$. 
Section 3 – 3: Slopes of Lines

Slope – the ratio of a line’s _______________ _______ to its _______________ _______

slope =

Example #1: Find the slope.

a.)

b.)

c.)

d.)

Example #2: For one manufacturer of camping equipment, between 1990 and 2000 annual sales increased by $7.4 million per year. In 2000, the total sales were $85.9 million. If sales increase at the same rate, what will be the total sales in 2010.
Section 3 – 4: Equations of Lines

**Notes**

Slope-Intercept Form –

**Example #1:** Write an equation in slope-intercept form of the line with slope of –4 and \( y \)-intercept of 1.

**Example #2:** Write an equation in slope-intercept form of the line with slope 5 and a point at (0, -8).

**Example #3:** Write an equation in slope-intercept form of the line with slope –2 and a point at (-3, 6).
Point-Slope Form –

**Example #4:** Write an equation in point-slope form of the line whose slope is \(-\frac{3}{5}\) that contains (-10, 8).

**Example #5:** Write an equation in slope intercept form for a line containing (4, 9) and (-2, 0).

**Example #6:** Write an equation in slope-intercept form for a line containing (1, 7) that is perpendicular to the line \(y = -\frac{1}{2}x + 1\).
Section 3 – 5: Proving Lines Parallel

Notes

**IF TWO LINES IN A PLANE ARE CUT BY A TRANSVERSAL SO THAT:**

- Corresponding angles are _____________, then the lines are ______________.

- A pair of alternate exterior angles is ________________, then the two lines are ________________.

- A pair of alternate interior angles is ________________, then the lines are ________________.

- A pair of consecutive interior angles is ________________, then the lines are ________________.

*Ask yourself, “What if they were parallel...”*

**Example #1:** Determine which lines, if any, are parallel.

![Diagram of lines and angles]

**Diagram:**
- Line $a$ with a point $P$ and angle $103^\circ$.
- Line $b$ with a point $Q$ and angle $77^\circ$.
- Line $c$ with a point $R$ and angle $100^\circ$.
Example #2: Given the following information, determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.

a.) \( \angle 2 \cong \angle 8 \)

b.) \( \angle 9 \cong \angle 16 \)

c.) \( \angle 2 \cong \angle 10 \)

d.) \( \angle 6 \cong \angle 15 \)

Example #3: Find \( x \) so that \( a \parallel b \).

Example #4: Find \( y \) so that \( l \parallel m \).