Worksheet – Section 3-1 Parallel Lines and Transversals

Objectives:
- Understand Parallel Lines, skew lines, and Parallel planes
- Identify parallel lines, skew lines, and Parallel Planes in a drawing
- Identify lines cut by a transversal and the angles formed
- Name and identify the special angles pairs formed by two lines cut by a transversal

Relationships Between Lines and Planes

When two lines lie in the same plane and do not intersect, they are parallel.

Lines that do not intersect and are not coplanar are skew lines.

In the figure, ℓ is parallel to m, or ℓ || m (symbol)

You can also write PQ || RS.

Similarly, if two planes do not intersect, they are parallel planes.

Example:
Refer to the figure at the right to identify each of the following.

a. all planes parallel to plane ABD

b. all segments parallel to FG

c. all segments skew to EH
Practice:
Refer to the figure at the right to identify each of the following.

a. all planes that intersect plane $OPT$

b. all segments parallel to $NU$

c. all segments that intersect $MP$

Refer to the figure at the right to identify each of the following.

a. all segments parallel to $QX$

b. all planes that intersect plane $MHE$

c. all segments parallel to $QR$

d. all segments skew to $AG$
**Angle Relationships**

A line that intersects two or more other lines at two different points in a plane is called a **transversal**.

In the figure, **line $t$ is a transversal**.

Two lines and a transversal form eight angles.

Some pairs of the angles have special names.

The following chart lists the pairs of angles and their names.

<table>
<thead>
<tr>
<th>Name</th>
<th>Angle Pair</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interior Angles:</strong></td>
<td></td>
</tr>
<tr>
<td>alternate interior angles:</td>
<td></td>
</tr>
<tr>
<td>consecutive interior angles:</td>
<td></td>
</tr>
<tr>
<td>exterior angles:</td>
<td></td>
</tr>
<tr>
<td>alternate exterior angles:</td>
<td></td>
</tr>
<tr>
<td>corresponding angles:</td>
<td></td>
</tr>
</tbody>
</table>
Example:

Classify the relationship between each pair of angles as alternate interior, alternate exterior, corresponding, or consecutive interior angles.

a. $\angle 10$ and $\angle 16$  
b. $\angle 4$ and $\angle 12$

c. $\angle 12$ and $\angle 13$  
d. $\angle 3$ and $\angle 9$

Practice

Use the figure in the Example for Practice a - l.

Identify the transversal connecting each pair of angles.

a. $\angle 9$ and $\angle 13$  
b. $\angle 5$ and $\angle 14$  
c. $\angle 4$ and $\angle 6$

d. $\angle 1$ and $\angle 5$  
e. $\angle 6$ and $\angle 14$  
f. $\angle 2$ and $\angle 8$

g. $\angle 3$ and $\angle 11$  
h. $\angle 12$ and $\angle 3$  
i. $\angle 4$ and $\angle 6$

Classify the relationship between each pair of angles as alternate interior, alternate exterior, corresponding, or consecutive interior angles.

d. $\angle 1$ and $\angle 5$  
e. $\angle 6$ and $\angle 14$  
f. $\angle 2$ and $\angle 8$

g. $\angle 3$ and $\angle 11$  
h. $\angle 12$ and $\angle 3$  
i. $\angle 4$ and $\angle 6$

j. $\angle 6$ and $\angle 16$  
k. $\angle 11$ and $\angle 14$  
l. $\angle 10$ and $\angle 16$
Homework:

Refer to the figure at the right to identify each of the following.

1. all planes that intersect plane $STX$

2. all segments that intersect $QU$

3. all segments that are parallel to $XY$

4. all segments that are skew to $VV$

Classify the relationship between each pair of angles as alternate interior, alternate exterior, corresponding, or consecutive interior angles.

5. $\angle 2$ and $\angle 10$

6. $\angle 7$ and $\angle 13$

7. $\angle 9$ and $\angle 13$

8. $\angle 6$ and $\angle 16$

9. $\angle 3$ and $\angle 10$

10. $\angle 8$ and $\angle 14$
Name the transversal that forms each pair of angles. Then identify the special name for the angle pair.

11. \( \angle 2 \) and \( \angle 12 \)  
12. \( \angle 6 \) and \( \angle 18 \)

13. \( \angle 13 \) and \( \angle 19 \)  
14. \( \angle 11 \) and \( \angle 7 \)

For Questions 15-16, refer to the drawing of the end table.

15. Give an example of parallel planes.

16. Give an example of parallel lines.