GEOMETRY

The Complete Course

Lesson Six

Parallel Lines, Skew Lines, Parallel Planes

KA8466

Worksheet

ANSWERS

	(a) Name	(b) Relationship	(c) Measure
1. ∠2 & ∠10	Corresponding Angles	Equal	60° Ea.
2. ∠6 & ∠9	Alternate Interior Angles	Equal	120° Ea.
3. ∠7 & ∠11	Same-Side Interior Angles	Supplementary	60° & 120°
4. ∠3 & ∠16	Alternate Exterior Angles	Equal	120° Ea.
5. ∠12 & ∠15	Vertical Angles	Equal	60° Ea.
6. ∠1 & ∠13	Same-Side Exterior Angles	Supplementary	120° & 60°

7. An infinite number
8. An infinite number
9. An infinite number
10. One
11. An infinite number
12. One
13. One

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I. VIDEOTAPE FOLLOW-UP QUESTIONS

I. Introduction

II. Definitions.
   A. Parallel lines
   B. Skew lines
   C. Parallel planes
   D. Transversal
      1. 0blique
      2. Perpendicular

III. Angles formed by parallel lines and transversals.
   A. Interior angles
   B. Exterior angles
   C. Alternate interior angles
   D. Alternate exterior angles
   E. Same-side interior angles
   F. Same-side exterior angles
   G. Corresponding angles
   H. Vertical angles

IV. Postulate and theorems to prove relationships of angles.
   A. If parallel lines have a transversal, then corresponding angles are congruent. (P6-1)
   B. If parallel lines have a transversal, then alternate interior angles are congruent. (T6-1)
   C. If parallel lines have a transversal, then interior angles on the same side of the transversal are supplementary. (T6-2)
   D. If a transversal intersecting two parallel lines is perpendicular to one of the lines, it is also perpendicular to the other line. (T6-3)

V. Postulate and theorems to prove two lines parallel.
   A. If two lines have a transversal and a pair of congruent corresponding angles, then the lines are parallel. (P6-2)
   B. If two lines have a transversal and a pair of congruent alternate interior angles, then the lines are parallel. (T6-4)
   C. If two lines have interior angles on the same side of the transversal that are supplementary, then the lines are parallel. (T6-5)
   D. If two coplanar lines are perpendicular to the same line, then they are parallel. (T6-6)
   E. If two lines are parallel to third line, then they are parallel to each other. (T6-7)

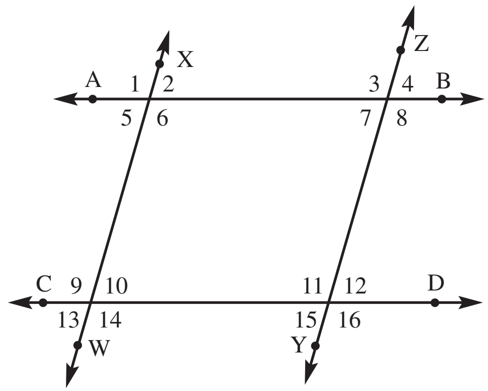
VI. Other postulates and theorems regarding parallels and perpendiculars.
   A. Through a point not on a line, there is exactly one line parallel to the given line. (P6-3)
   B. If there is a point not on a line, then there is exactly one line perpendicular to the given line through the given point. (T6-8)
   C. If there is given any point on a line in a plane, then there is exactly one line in that plane perpendicular to the given line at the given point. (T6-9)
   D. If there is given any segment in a plane, then in that plane is exactly one line that is a perpendicular bisector of the segment. (T6-10)
   E. If two parallel planes are intersected by a third plane, then the lines of intersection are parallel. (T6-11)

VII. Proof using theorems.
   A. Creating new theorems
      1. If parallel lines have a transversal, then alternate exterior angles are congruent. (T6-12)
      2. If two lines have a transversal and a pair of congruent alternate exterior angles, then the lines are parallel. (T6-13)
   B. Proving a new theorem.

II. SUPPLEMENTARY EXERCISES

Refer to the following figure for questions 1-6

$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$ and $\overleftrightarrow{WX} \parallel \overleftrightarrow{YZ}$, $m\angle 1 = 120°$



a) Name the following pairs of angles.
b) State their relationship.
c) Give the measure of the angles.

1. $\angle 2$ and $\angle 10$
2. $\angle 6$ and $\angle 9$
3. $\angle 7$ and $\angle 11$
4. $\angle 3$ and $\angle 16$
5. $\angle 12$ and $\angle 15$
6. $\angle 1$ and $\angle 13$

7-13 Given a line segment $\overline{AB}$ in plane S and a point P not on $\overline{AB}$ but in plane S.

7. How many lines in S can be perpendicular to $\overline{AB}$?

8. How many lines in S can be parallel to $\overline{AB}$?

9. How many lines in S can bisect $\overline{AB}$?

10. How many lines in S can be a perpendicular bisector of $\overline{AB}$?

11. How many lines in S can pass through point P?

12. How many lines in S can be parallel to $\overline{AB}$ and pass through point P?

13. How many lines in S can be perpendicular to $\overline{AB}$ and pass through point P?