

# 3 5 skills practice answers

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How to Prove and Recognize Parallel Lines\*\*

### Determining Parallel Lines:

- **Definition:** Parallel lines are lines that never intersect no matter how far they are extended.
- **Key Rule:** The distance between parallel lines remains constant at all points.

### 7 Ways to Prove Lines are Parallel:

1. **Same Slope:** If two lines have the same slope, they are parallel.
2. **Zero Slope:** If one line has a slope of 0 and the other line has any other non-zero slope, they are parallel.
3. **Slope Product Property:** If the product of the slopes of two lines is -1, they are parallel.
4. **Angle Congruence:** If alternate interior angles or corresponding angles formed by two transversals are congruent, the lines are parallel.
5. **Perpendicular Transversals:** If a transversal intersects parallel lines and forms perpendicular angles with one line, it also forms perpendicular angles with the other line.
6. **Midpoint Theorem:** If the midpoints of two line segments are the same point, then the segments are parallel.
7. **Alternate Exterior Angle Congruence:** If alternate exterior angles formed by two transversals are congruent, then the lines are parallel.

### 5 Examples of Parallel Lines:

- Sides of a rectangle
- Opposite sides of a parallelogram
- Tracks of a railroad
- Wires in an electrical circuit
- Lines of latitude on a globe

### Answer to Parallel Lines:

The answer to parallel lines is that they never intersect.

### Formula to Prove Lines are Parallel:

The slope product property formula can be used to prove parallelism:

$$m_1 * m_2 = -1$$

Where  $m_1$  and  $m_2$  are the slopes of the two lines.

### Recognizing Parallel or Perpendicular Lines:

- **Parallel:** Parallel lines have the same slope or a product of slopes equal to -1.
- **Perpendicular:** Perpendicular lines have slopes that are negative reciprocals.

### Do Perpendicular Lines Always Intersect?

Yes, perpendicular lines always intersect at a right angle.

### Practice Questions:

- How do you prove that the following lines are parallel:  $y = 2x + 1$  and  $y = 2x - 5$ ?
- Are the lines  $x = 3$  and  $y = -2 + 5x$  parallel?
- Demonstrate the use of the slope product property formula to determine if lines with slopes 2 and  $-1/2$  are parallel.

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