

Parallel and Perpendicular Lines

Parallel lines run alongside each other and never meet. Perpendicular lines cross at a perfect right angle (90°). Most pairs of lines fit one of those two patterns.

| Type | Definition |
|---------------|---|
| Parallel | Two lines that never cross and stay the same distance apart |
| Perpendicular | Two lines that cross at a 90° (right) angle |
| Intersecting | Two lines that cross (at any angle) |

Key Concepts

- Parallel lines** stay the same distance apart and never touch.
- Perpendicular lines** cross at a perfect right angle (90°). They form a “+”-shape or a square corner.
- Two lines that simply **cross** are *intersecting*. Perpendicular lines are a special case where the crossing happens at 90° .
- Examples: railroad tracks (parallel), the corner of a book (perpendicular), the letter X (intersecting but not perpendicular).

Worked Examples

① Two lines never touch and stay the same distance apart. Are they parallel or perpendicular?

 Never touch + same distance = parallel.

 **Answer:** *Parallel*

② Two lines cross and form a 90° angle. What are they?

 Crossing at 90° = perpendicular.

 **Answer:** *Perpendicular*

③ Name a pair of parallel lines you see in a classroom.

 Anything that runs side-by-side without crossing: the two long edges of a desk, opposite walls, the top and bottom edges of a whiteboard.

 **Answer:** *The top and bottom edges of a whiteboard*

Practice Problems

Identify parallel, perpendicular, or other.

- Never cross, same distance apart \Rightarrow ? _____
- Cross at a 90° angle \Rightarrow ? _____
- Cross, but not at 90° \Rightarrow ? _____
- Railroad tracks are _____.
- A plus sign (+) has _____ lines. _____
- The letter H has _____ lines. _____

7. Opposite sides of a rectangle are _____.

8. Adjacent sides of a rectangle are _____.

9. Do parallel lines form an angle? (Y/N)

10. Can two perpendicular lines be parallel? (Y/N)

11. The letter T has a pair of _____ lines.

12. Floor and wall meet at a _____ angle.

Study Tips

-  Look for the small square symbol at a corner — it means 90° (perpendicular).
-  Parallel lines always go in the same direction and never get closer or farther apart.
-  In a rectangle, opposite sides are parallel and adjacent sides are perpendicular.

Word Problems

1. Maya looks at the lines on a basketball court. The two sidelines run side by side and never cross. Are they parallel or perpendicular?

Answer: _____

2. The horizontal and vertical bars on a window frame meet at right angles. What type of lines are they?

Answer: _____

Answer Key — with Friendly Explanations**Practice Problems**

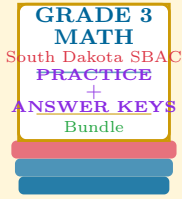
1. Parallel.
 **Answer:** *Parallel*
2. Perpendicular.
 **Answer:** *Perpendicular*
3. Intersecting (but not perpendicular).
 **Answer:** *Intersecting*
4. Parallel.
 **Answer:** *Parallel*
5. Perpendicular.
 **Answer:** *Perpendicular*
6. Parallel (the two upright sides).
 **Answer:** *Parallel*
7. Parallel.
 **Answer:** *Parallel*
8. Perpendicular.
 **Answer:** *Perpendicular*
9. No — they don't meet.
 **Answer:** *No*
10. No — perpendicular lines must cross, so they aren't parallel.
 **Answer:** *No*
11. Perpendicular.
 **Answer:** *Perpendicular*
12. Right angle (90°).
 **Answer:** *Right (90°)*

Word Problems

1. Side by side, never cross = parallel.
 **Answer:** *Parallel*
2. Cross at 90° = perpendicular.
 **Answer:** *Perpendicular*

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