Parallel and Perpendicular Lines

Name: _____	Date: _____	Score: _____ / 24

Quick Review

Lines can have special relationships with each other. **Parallel lines** are always the same distance apart and never cross, no matter how far they go — think of the two long rails of a train track. **Perpendicular lines** cross each other and make a *right angle* ($90°$) where they meet, like the corner of a window. Lines that cross but do *not* make a right angle are called **intersecting lines**. A quick way to remember: parallel lines stay apart forever, while perpendicular lines meet to form a perfect square corner.

◇ **Example:** Two lines cross each other, and the angle where they meet measures exactly $90°$. What is the relationship between the two lines?

⇒ First notice that the lines do cross, so they are at least intersecting. The special clue is the angle at the crossing point: it is exactly $90°$, a right angle. Lines that cross and form a right angle have a special name — they are perpendicular. So these two lines are perpendicular.

Answer: perpendicular

PRACTICE

Name the relationship between the lines or describe the figure in each problem.

1. Two lines that never cross and stay the same distance apart _____
2. Two lines that cross and form a $90°$ angle _____
3. The two long rails of a train track _____
4. The corner where two walls of a room meet _____
5. Two lines that cross but do not make a $90°$ angle _____
6. The top and bottom edges of a chalkboard _____
7. The two lines that form a plus sign $+$ _____
8. The lines of the letter X _____
9. The opposite sides of a rectangle _____
10. Two sides of a rectangle that share a corner _____
11. The two long edges of a ruler _____
12. Lines that meet to form a perfect square corner _____
13. Two roads that cross at a slanted, non-square corner _____
14. The shelves of a tall bookcase _____
15. The lines of the letter T _____
16. Two lines that will never meet no matter how far they go _____
17. The hands of a clock at $3{:}00$ _____
18. Two pencils laid down so they cross like a slanted X _____
19. The two sides of a road that a car drives between _____
20. The lines that form the corner of a picture frame _____

Word Problems

21. Liam is drawing a map. He draws Maple Street and Oak Street so they cross each other and form a perfect $90°$ corner. What is the relationship between the two streets? _____
22. On the soccer field, the two long sidelines run straight down the field and never get closer together or cross. What kind of lines are the two sidelines? _____
23. Sofia notices that the floor and one wall of her classroom meet to form a square corner. What is the relationship between the floor and that wall? _____
24. Noah draws two lines that cross in the middle of his page, but the angles they make are not square corners. What is the best name for these two lines? _____

Answer Keys

1. parallel
2. perpendicular
3. parallel
4. perpendicular
5. intersecting
6. parallel
7. perpendicular
8. intersecting
9. parallel
10. perpendicular
11. parallel
12. perpendicular
13. intersecting
14. parallel
15. perpendicular
16. parallel
17. perpendicular
18. intersecting
19. parallel
20. perpendicular
21. perpendicular
22. parallel lines
23. perpendicular
24. intersecting lines

Step-by-Step Explanations

1. Lines that never meet and stay equally apart are parallel.
2. Crossing at a right angle of 90° makes the lines perpendicular.
3. Train rails stay the same distance apart forever, so they are parallel.
4. Walls meet at a square corner of 90°, so they are perpendicular.
5. They cross but the angle is not a right angle, so they are simply intersecting.
6. The top and bottom edges stay the same distance apart, so they are parallel.
7. A plus sign is made of two lines crossing at 90°, so they are perpendicular.
8. The two strokes of an X cross, but not at a right angle, so they are intersecting.
9. Opposite sides of a rectangle never meet and stay equally apart — parallel.
10. Sides that meet at a rectangle's corner form a 90° angle, so they are perpendicular.
11. A ruler's long edges stay the same distance apart, so they are parallel.
12. A perfect square corner is a right angle, so the lines are perpendicular.
13. They cross but the corner is not square, so the roads are just intersecting.
14. Each shelf stays the same distance from the next, so the shelves are parallel.
15. The line across the top of a T meets the stem at 90°, so they are perpendicular.
16. Lines that never meet, staying equally apart, are parallel.
17. At $3{:}00$ the clock hands form a 90° angle, so they are perpendicular.
18. The pencils cross but not at a right angle, so they are intersecting.
19. The two sides of a road stay the same distance apart, so they are parallel.
20. A picture-frame corner is a 90° angle, so those lines are perpendicular.
21. Lines that cross and make a right angle of 90° are perpendicular, so the two streets are perpendicular.
22. The sidelines stay the same distance apart and never meet, which means they are parallel lines.
23. A square corner is a 90° right angle, so the floor and the wall are perpendicular.
24. The lines cross but do not make a 90° angle, so they are simply intersecting lines.

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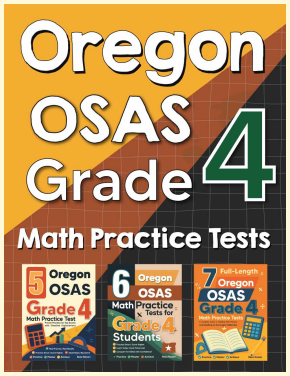

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