

Line Detective Lab

Spot line relationships in shapes and everyday places.

GRADE 4 • 4.MG.4.d

4.MG.4.d "Identify parallel, perpendicular, and intersecting lines and line segments in plane and solid figures, including those in context."

NAME _____

DATE _____

LINE CLUES

Line segments that stay the same distance apart and never meet are parallel. Segments that meet to make a square corner are perpendicular. Segments that cross are intersecting, even if they do not make a square corner.

WORKED EXAMPLE

A rectangle has vertices J, K, L, and M in order. What is the relationship between segments JK and KL?

1. Segments JK and KL meet at point K.
2. A rectangle has square corners.
3. JK and KL make a square corner.

Answer: JK and KL are perpendicular.

PRACTICE 6 problems

- 1** At 3:00, the hands of a clock make a square corner. How are the two hands related?

ANSWER _____

- 2** Two straight bike paths never meet and stay the same distance apart. How are the paths related?

ANSWER _____

- 3** Two line segments cross to make angles that are not square corners. How are the segments related?

ANSWER _____

- 4** A rectangle has vertices P, Q, R, and S in order. How are segments PQ and RS related?

ANSWER _____

- 5** A cube has top vertices A, B, C, and D and bottom vertices E, F, G, and H. Point A is directly above E, and point B is directly above F. How are edges AB and EF related?

ANSWER _____

- 6** Segments RS and TU lie on different horizontal lines. They stay the same distance apart and never meet. How are the segments related?

ANSWER _____

APPLY IT Show your work

- 1** A soccer field has two long sidelines that never meet. A painted cross-field line goes from one sideline to the other and meets each sideline at a square corner. How are the two sidelines related? How is the cross-field line related to each sideline?

WORK SPACE

ANSWER _____

- 2** A game designer draws two straight laser paths on a map. The paths cross, but the angles where they cross are not square corners. How are the laser paths related?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A rectangular prism has top vertices A, B, C, and D and bottom vertices E, F, G, and H. Point A is directly above E, B is directly above F, C is directly above G, and D is directly above H. Classify each pair: AB and CD, AB and BF, and AB and CG.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	At 3:00, the hands of a clock make a square corner. How are the two hands related?	perpendicular
2	Two straight bike paths never meet and stay the same distance apart. How are the paths related?	parallel
3	Two line segments cross to make angles that are not square corners. How are the segments related?	intersecting
4	A rectangle has vertices P, Q, R, and S in order. How are segments PQ and RS related?	parallel
5	A cube has top vertices A, B, C, and D and bottom vertices E, F, G, and H. Point A is directly above E, and point B is directly above F. How are edges AB and EF related?	parallel
6	Segments RS and TU lie on different horizontal lines. They stay the same distance apart and never meet. How are the segments related?	parallel

PART 2 • APPLY IT

1. **The sidelines are parallel. The cross-field line is perpendicular to each sideline.** The sidelines stay the same distance apart, so they are parallel. The cross-field line makes square corners with the sidelines, so it is perpendicular to them.
2. **intersecting** The paths cross, so they are intersecting. They are not perpendicular because they do not make a square corner.

CHALLENGE

AB and CD are parallel. AB and BF are perpendicular. AB and CG are neither parallel, perpendicular, nor intersecting.

Accept “make a right angle” or “make a square corner” for perpendicular. For the challenge, AB and CG are edges in different directions that do not meet, so they are neither parallel nor perpendicular.