LESSON MAKER PRO

Crossing Paths

Find where two linear relationships meet.

GRADE 8 · 8.EE.C.8c

CCSS.Math.Content.8.EE.C.8c "Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points..."

NAME _____ DATE _____

THE BIG IDEA

Write each equation in a form that makes x or y easy to compare. The ordered pair that makes both equations true is the solution. If the lines are parallel, there is no solution. If the equations describe the same line, there are infinitely many solutions.

WORKED EXAMPLE

Solve the system: y = 13x - 71 and y = -9x + 83.

1. Set the expressions for y equal: 13x - 71 = -9x + 83.
2. Add 9x and 71: 22x = 154.
3. Solve for x: x = 7. Substitute to get y = 20.

Answer: (7, 20)

PRACTICE 6 problems

1 Solve the system: y = 2x + 4 and y = -x + 10.

ANSWER _____

2 Solve the system: 3x + y = 17 and x - y = 3.

ANSWER _____

3 Solve the system: x + 2y = 14 and 3x - 2y = 10.

ANSWER _____

4 Solve the system: y = -2x + 11 and 4x + 2y = 14.

ANSWER _____

5 Solve the system: 2x + 3y = 15 and 4x + 6y = 30.

ANSWER _____

6 Line A passes through (0, 1) and (4, 5). Line B passes through (2, 8) and (5, 2). Do the lines intersect? If so, give the intersection point.

ANSWER _____

APPLY IT Show your work

1 A student compares two phone data plans. Plan A costs $y = 3x + 6$ dollars for x gigabytes of data. Plan B costs $y = x + 16$ dollars. How many gigabytes make the plans cost the same, and what is that cost?

WORK SPACE

ANSWER _____

2 A school dance sells 16 tickets. Advance tickets cost $4 each, and door tickets cost $6 each. The dance collects $84. How many advance tickets and door tickets are sold?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Line A passes through (1, 2) and (5, 10). Line B passes through (3, 8) and (6, 14). Do the lines intersect? Explain your reasoning using equations or slopes.

WORK SPACE AND ANSWER

ANSWER KEY # Crossing Paths

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve the system: y = 2x + 4 and y = -x + 10.	**(2, 8)**
2	Solve the system: 3x + y = 17 and x - y = 3.	**(5, 2)**
3	Solve the system: x + 2y = 14 and 3x - 2y = 10.	**(6, 4)**
4	Solve the system: y = -2x + 11 and 4x + 2y = 14.	**No solution**
5	Solve the system: 2x + 3y = 15 and 4x + 6y = 30.	**Infinitely many solutions**
6	Line A passes through (0, 1) and (4, 5). Line B passes through (2, 8) and (5, 2). Do the lines intersect? If so, give the intersection point.	**Yes, (11/3, 14/3)**

PART 2 · APPLY IT

1. **5 gigabytes and $21** Set 3x + 6 equal to x + 16, which gives x = 5. Substitute 5 into either equation to get y = 21.
2. **6 advance tickets and 10 door tickets** Let x be door tickets and y be advance tickets. Solve x + y = 16 and 6x + 4y = 84 to get x = 10 and y = 6.

CHALLENGE

No. Line A is y = 2x, and Line B is y = 2x + 2. The lines have the same slope but different y-intercepts, so they are parallel.

Accept equivalent ordered-pair forms, including decimal equivalents for 11/3 and 14/3. For the challenge, accept any correct explanation that identifies equal slopes and different intercepts.