LESSON MAKER PRO

Same Slope, Different Start

Compare lines that change at the same rate.

GRADE 8 · 8.AF.B.9.d

8.AF.B.9.d "Given that the slopes for two different sets of points are equal, demonstrate that the linear equations that include those two sets of points may have different y-intercepts."

NAME _____ DATE _____

THE BIG IDEA

In y = mx + b, m is the slope and b is the y-intercept. Two lines can have the same slope but different y-intercepts because they start at different values when x = 0.

WORKED EXAMPLE

Write an equation for each set of points.

TWO SETS OF POINTS

Set	Point 1	Point 2
A	(10, 47)	(12, 55)
B	(10, 61)	(12, 69)

1. A: m = (55 - 47)/(12 - 10) = 4.
2. B: m = (69 - 61)/(12 - 10) = 4.
3. A: 47 = 4(10) + b, so b = 7.
4. B: 61 = 4(10) + b, so b = 21.

Answer: A: y = 4x + 7. B: y = 4x + 21.

PRACTICE 4 problems

1 A: (0, 6), (2, 8). B: (0, -2), (2, 0). Write both equations.

ANSWER _____

2 A: (1, 8), (3, 12). B: (1, -1), (3, 3). Write both equations.

ANSWER _____

3 A: (0, 5), (2, 1). B: (0, -1), (2, -5). Write both equations.

ANSWER _____

4 A: (2, 3), (6, 5). B: (2, -2), (6, 0). Write both equations.

ANSWER _____

APPLY IT Show your work

1 Two game lounges charge by the hour. The table shows total costs. Write a cost equation for each lounge.

COST BY HOURS PLAYED

Hours	Lounge A	Lounge B
1	$9	$14
3	$15	$20

ANSWER _____

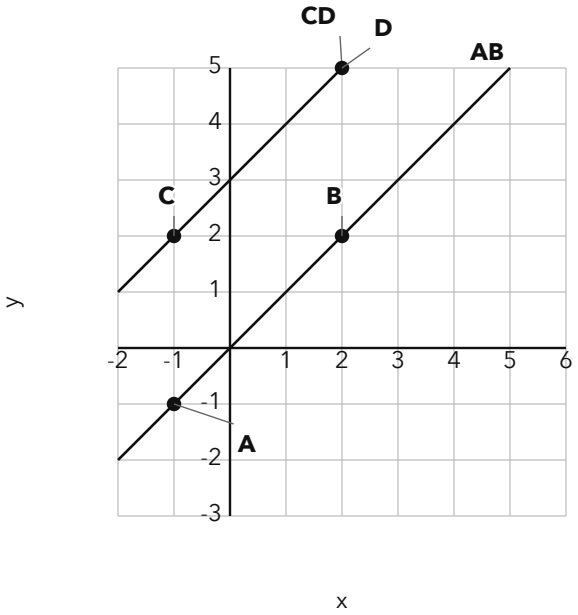
2 Kai and Ren coach gamers for x hours. For 2 hours, Kai charges $18 and Ren charges $25. For 5 hours, Kai charges $36 and Ren charges $43. Write both cost equations. What do the y-intercepts mean?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Line AB and line CD pass through the plotted points. Write both equations. Explain why the lines have equal slopes but different y-intercepts.



WORK SPACE AND ANSWER

ANSWER KEY # Same Slope, Different Start

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A: (0, 6), (2, 8). B: (0, -2), (2, 0). Write both equations.	**A: y = x + 6. B: y = x - 2.**
2	A: (1, 8), (3, 12). B: (1, -1), (3, 3). Write both equations.	**A: y = 2x + 6. B: y = 2x - 3.**
3	A: (0, 5), (2, 1). B: (0, -1), (2, -5). Write both equations.	**A: y = -2x + 5. B: y = -2x - 1.**
4	A: (2, 3), (6, 5). B: (2, -2), (6, 0). Write both equations.	**A: y = (1/2)x + 2. B: y = (1/2)x - 3.**

PART 2 · APPLY IT

1. **A: y = 3x + 6. B: y = 3x + 11.** Each cost rises $6 over 2 hours, so the hourly rate is $3. Subtract $3 from each 1-hour cost to find the starting fees.
2. **Kai: y = 6x + 6. Ren: y = 6x + 13. The y-intercepts are their starting fees: $6 and $13.** Both costs rise $18 over 3 hours, giving a rate of $6 per hour. Use either time and cost for each coach to find the starting fee.

CHALLENGE

AB: y = x. CD: y = x + 3. Both lines rise 1 unit for each 1 unit to the right, but AB crosses the y-axis at 0 and CD crosses it at 3.

Accept equivalent equation forms. In the challenge, accept any explanation that identifies the shared slope of 1 and the distinct y-intercepts of 0 and 3.