LESSON MAKER PRO

Which Line Wins?

Compare how linear functions start and change.

GRADE 8 · 8.AT.C.7

8.AT.C.7 "Compare the properties (i.e., rate of change, intercepts) of two linear functions each represented in a different way (algebraically, graphically, numerically in tables, or by narrative descriptions)."

NAME _____ DATE _____

COMPARE TWO FEATURES

The rate of change tells how much y changes when x increases by 1. The y-intercept is the value of y when x is 0. Find both features for each function before you compare them.

WORKED EXAMPLE

Compare Function A in the table with Function B, y = 9x + 19. Which has the smaller rate of change and the smaller y-intercept?

FUNCTION A

x	y
0	17
3	38
6	59

1. A's rate is (38 - 17)/(3 - 0) = 7.
2. A's y-intercept is 17 because y = 17 when x = 0.
3. B's rate is 9, and its y-intercept is 19.

Answer: Function A has both the smaller rate of change and the smaller y-intercept.

PRACTICE 4 problems

1 Function A is y = 3x + 8. Function B starts at 13 and rises 5 for each increase of 1 in x. Which has the greater rate? Which has the greater y-intercept?

ANSWER _____

2 Function A is y = -2x + 18. Function B starts at 10 and falls 4 for each increase of 1 in x. Which has the greater rate? Which has the greater y-intercept?

ANSWER _____

3 Function A is y = -3x + 12. Function B starts at 20 and falls 1 for each increase of 1 in x. Which falls faster? Which has the greater y-intercept?

ANSWER _____

4 Function A is y = 8x - 7. Function B starts at -7 and rises 10 for each increase of 1 in x. Which has the greater rate? Compare their y-intercepts.

ANSWER _____

APPLY IT Show your work

1 Two clubs sell custom stickers. Club A's total cost is in the table. Club B's total cost is $y = 2x + 16$ dollars, where x is the number of stickers. Which club has the lower start-up fee? Which charges less per sticker?

CLUB A COST

Stickers	Cost ($)
0	12
1	15
2	18

ANSWER _____

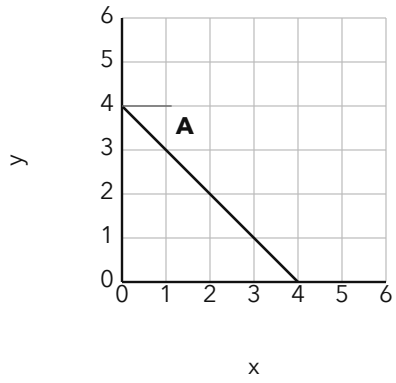
2 Ride A costs $y = 3x + 6$ dollars for x miles. Ride B charges $10 to start, then $2 per mile. Which ride has the lower starting cost? Which has the lower cost per mile?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Function A is graphed. Function B is y = -2x + 6. At what point do they have the same x and y values? Which has the greater y-intercept, and which falls faster?



WORK SPACE AND ANSWER

ANSWER KEY

Which Line Wins?

GRADE 8 · 8.AT.C.7

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Function A is y = 3x + 8. Function B starts at 13 and rises 5 for each increase of 1 in x. Which has the greater rate? Which has the greater y-intercept?	**Function B has the greater rate, 5, and the greater y-intercept, 13.**
2	Function A is y = -2x + 18. Function B starts at 10 and falls 4 for each increase of 1 in x. Which has the greater rate? Which has the greater y-intercept?	**Function A has the greater rate, -2, and the greater y-intercept, 18.**
3	Function A is y = -3x + 12. Function B starts at 20 and falls 1 for each increase of 1 in x. Which falls faster? Which has the greater y-intercept?	**Function A falls faster. Function B has the greater y-intercept, 20.**
4	Function A is y = 8x - 7. Function B starts at -7 and rises 10 for each increase of 1 in x. Which has the greater rate? Compare their y-intercepts.	**Function B has the greater rate, 10. Both y-intercepts are -7.**

PART 2 · APPLY IT

1. **Club A has the lower start-up fee, $12. Club B charges less per sticker, $2.** Club A starts at $12 and increases by $3 per sticker. Club B starts at $16 and increases by $2 per sticker.
2. **Ride A has the lower starting cost, $6. Ride B has the lower cost per mile, $2.** The starting costs are $6 and $10. The costs per mile are $3 and $2.

CHALLENGE

They meet at (2, 2). Function B has the greater y-intercept, 6, and falls faster.

For a function that falls, a more negative rate means a faster decrease. Accept equivalent wording that identifies both functions correctly.