LESSON MAKER PRO

Function Face-Off

Compare starting values, rates, and outputs.

HIGH SCHOOL · MT.CORE.ALG.FUN.3.b

MT.CORE.ALG.FUN.3.b "Represent functions using tables, graphs with appropriate scales and labels, equations, and verbal situations, while using technology strategically by: Comparing properties of two functions..."

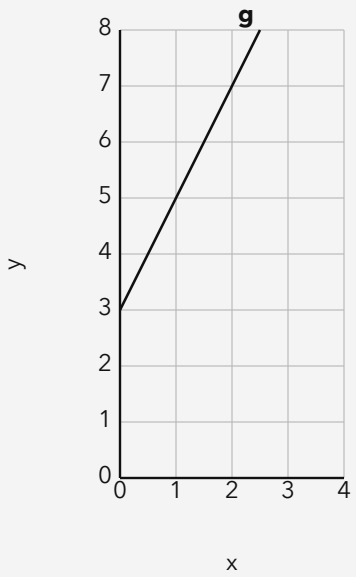
NAME _____ DATE _____

COMPARE THE CHANGES

For a linear function, the value at x = 0 is its starting value. Its rate is the change in output for each increase of 1 in x. Use those two properties to compare functions shown in different ways.

WORKED EXAMPLE

The graph shows g. The equation h(x) = 4x + 1 shows h. Which starts higher? Which increases faster?



1. On the graph, g starts at 3 and rises from 3 to 7 as x goes from 0 to 2.
2. The rate of g is (7 - 3)/2 = 2.
3. From its equation, h starts at 1 and has a rate of 4.

Answer: g starts higher. h increases faster.

PRACTICE 4 problems

1 f(x) = 6x + 8. Function g starts at 10 and rises by 7 per unit of x. Which increases faster?

ANSWER _____

2 f(x) = 9x + 12. Function g starts at 15 and rises by 8 per unit of x. Which starts higher?

ANSWER _____

3 f(x) = 7x + 11. Function g starts at 14 and rises by 10 per unit of x. Which has the greater value at x = 2?

ANSWER _____

4 f(x) = 8x + 20. Function g starts at 24 and rises by 6 per unit of x. At what x-value are they equal?

ANSWER _____

APPLY IT Show your work

1 Plan A's total cost is shown in the graph and rises at a constant rate. Plan B costs $10 plus $3 each week. Which costs less after 6 weeks, and by how much?



ANSWER _____

2 Sam's game credits are shown in the graph and grow at a constant rate. Lee starts with 8 credits and earns 7 each week. Who has more after 5 weeks, and by how many?



ANSWER _____

CHALLENGE One step up

Team A's fundraising total changes at a constant rate, as shown in the table. Team B's total is y = 6x + 30. Which team leads at x = 0, when are they tied, and which team leads after that? Explain.

TEAM A FUNDRAISING

Weeks, x	Total, $
0	18
2	34
4	50

WORK SPACE AND ANSWER

ANSWER KEY # Function Face-Off

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	f(x) = 6x + 8. Function g starts at 10 and rises by 7 per unit of x. Which increases faster?	**g**
2	f(x) = 9x + 12. Function g starts at 15 and rises by 8 per unit of x. Which starts higher?	**g**
3	f(x) = 7x + 11. Function g starts at 14 and rises by 10 per unit of x. Which has the greater value at x = 2?	**g, with 34; f(2) = 25**
4	f(x) = 8x + 20. Function g starts at 24 and rises by 6 per unit of x. At what x-value are they equal?	**x = 2**

PART 2 · APPLY IT

1. **Plan B costs $2 less.** Plan A rises by ($14 - $6)/2 = $4 per week, so it costs $30 after 6 weeks. Plan B costs $10 + 6($3) = $28.
2. **Lee has 1 more credit.** Sam earns (24 - 12)/2 = 6 credits per week, giving Sam 42 after 5 weeks. Lee has 8 + 5(7) = 43.

CHALLENGE

Team B leads at x = 0, $30 to $18. Team A raises $8 per week, so 8x + 18 = 6x + 30 when x = 6; both have $66. Team A leads after 6 weeks because its weekly rate is higher.

Accept a function name alone for practice items 1 and 2. For the challenge, accept any explanation that compares the starting totals and weekly rates.