

Function Feature Faceoff

Compare rates of change and starting values.

HIGH SCHOOL • MA.912.F.1.5

MA.912.F.1.5 "Compare key features of linear functions each represented algebraically, graphically, in tables or written descriptions."

NAME _____

DATE _____

COMPARE THE FEATURES

In $y = mx + b$, m is the rate of change and b is the y-intercept, or starting value. Find these two features in each representation, then compare them.

WORKED EXAMPLE

Compare $F(x) = 8x - 6$ and $G(x) = 5x + 9$.

1. F has rate 8 and y-intercept -6.
2. G has rate 5 and y-intercept 9.
3. Compare 8 to 5, then compare -6 to 9.

Answer: F has the greater rate of change. G has the greater y-intercept.

PRACTICE 5 problems

- 1** Compare A: $y = 2x + 7$ and B: $y = 3x + 1$. Which function has the greater rate? Which has the greater y-intercept?

ANSWER _____

- 2** Function H has points (0, -4), (2, 0), and (4, 4). Function K is $y = 2x + 3$. Compare their rates and y-intercepts.

ANSWER _____

- 3** Plan A charges \$4 to join and \$7 each month. Plan B charges \$10 to join and \$3 each month. Compare the monthly rates and starting costs.

ANSWER _____

- 4** Line P passes through (0, -1) and (3, 2). Line Q passes through (0, 4) and (3, -2). Which line has the greater rate? Which has the greater y-intercept?

ANSWER _____

- 5** Compare E: $y = -3x + 12$ and F: $y = -3x - 2$. How are their rates and y-intercepts alike or different?

ANSWER _____

APPLY IT Show your work

- 1** A music app costs \$14 to start and \$3 per month. Another app costs \$10 to start and \$7 per month. Compare their monthly rates and starting costs. After how many months will the total costs be equal?

WORK SPACE

ANSWER _____

- 2** Creator A earns a \$20 bonus plus \$3 for each sticker sold. Creator B earns a \$4 bonus plus \$7 for each sticker sold. Compare their rates and starting amounts. How many stickers must they sell to earn the same amount?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Function A is $y = -2x + 12$. Function B has points (0, 7), (2, 3), and (4, -1). Function C starts at 4 and decreases by 3 for each increase of 1 in x . Name the parallel pair, order the rates from greatest to least, and identify the greatest y -intercept.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Compare A: $y = 2x + 7$ and B: $y = 3x + 1$. Which function has the greater rate? Which has the greater y-intercept?	B has the greater rate, 3. A has the greater y-intercept, 7.
2	Function H has points (0, -4), (2, 0), and (4, 4). Function K is $y = 2x + 3$. Compare their rates and y-intercepts.	Both have rate 2. K has y-intercept 3, which is greater than H's y-intercept of -4.
3	Plan A charges \$4 to join and \$7 each month. Plan B charges \$10 to join and \$3 each month. Compare the monthly rates and starting costs.	Plan A has the greater monthly rate, \$7. Plan B has the greater starting cost, \$10.
4	Line P passes through (0, -1) and (3, 2). Line Q passes through (0, 4) and (3, -2). Which line has the greater rate? Which has the greater y-intercept?	P has the greater rate, 1. Q has the greater y-intercept, 4.
5	Compare E: $y = -3x + 12$ and F: $y = -3x - 2$. How are their rates and y-intercepts alike or different?	They have the same rate, -3. E has y-intercept 12, and F has y-intercept -2.

PART 2 • APPLY IT

- The second app has the greater monthly rate, \$7, and the first app has the greater starting cost, \$14. The costs are equal after 1 month, when both cost \$17.** Set $14 + 3m$ equal to $10 + 7m$. Solving gives $m = 1$, and each total is \$17.
- Creator B has the greater rate, \$7 per sticker. Creator A has the greater starting amount, \$20. They earn the same amount after 4 stickers, when each earns \$32.** Set $20 + 3s$ equal to $4 + 7s$. Solving gives $s = 4$, and each earnings total is \$32.

CHALLENGE

A and B are parallel. The rates are $A = B = -2$, then $C = -3$. A has the greatest y-intercept, 12.

Accept equivalent statements of rate, slope, y-intercept, initial value, and starting cost. For equal rates, accept that the functions are parallel when both are linear.