Answer on Question #79531 - Math – Algebra

Question

$f(x)$

$(-1, -5)$, $(0, -1)$, $(1, 3)$

$g(x) = 4x + 3$

Part A: Write a sentence to compare the slope of the two functions and show the steps you used to determine the slope of $f(x)$ and $g(x)$. (6 points)

Part B: Which function has a greater y-intercept? Justify your answer. (4 points)

Solution

Part A.

Find the equation for a line that passes through the two points: $(-1, -5)$ and $(0, -1)$.

The equation of a line is:

$$y = mx + b.$$

Where: m is the slope, and b is the y-intercept.

For lines like these, the slope is always defined as "the change in y over the change in x" or, in equation form:

$$m = \frac{y_2 - y_1}{x_2 - x_1}.$$

Plug the numbers into the formula for m above:

$$m = \frac{-1-(-5)}{0-(-1)}$$

or

$$m = \frac{4}{1}$$

or

$$m = 4.$$

So, the equation of function is:

$$y = 4x + b.$$

Plug the numbers $x = -1$, $y = -5$ into the formula above for finding b:

$$-5 = 4 \cdot (-1) + b,$$

$$b = -1.$$

The equation of the line that passes through the points (–1, –5) and (0, –1) is:

$$y = 4x - 1.$$

Check the third point (1, 3). Plug the numbers $x = 1$, $y = 3$ into the formula of function:

$$3 = 4 \cdot 1 - 1.$$

This is the correct numerical equation. The point (1, 3) also belongs to the line $y = 4x - 1$.

f(x) = 4x – 1: the slope m = 4.

$g(x) = 4x + 3$: the slope m = 4.

Answer: the slope of the function $f(x)$ is the same as the slope of the function $g(x)$.

Part B.

f(x) = 4x – 1: the y-intercept is 4*0-1= –1.

$g(x) = 4x + 3$: the y-intercept is 4*0+3=3, which is greater than -1.

Thus, the function $g(x)$ has a greater y-intercept.

Answer: the function $g(x)$ has a greater y-intercept.