Linear Functions

$y = mx + b$

dependent var

independent var

$f(x) = mx + b$

$f(x) = y$

I'm told

$f(4)=1$ and $f(8)=7$

What is $f(x)$?

$f(4)=1$ is a point

$x=4$ $y=1$

$(4,1)$

$f(8)=7$ $(8,7)$

converting from functional notation to coordinates

$g(7)=1.5$ $(7,1.5)$

$f\left(\frac{3}{2}\right)=2$ $\left(\frac{3}{2},2\right)$

$f(5)=-3$ $(5,-3)$

$f(2)=-.8$ $(2,-.8)$

I'm told

$f(4)=1$ and $f(8)=7$

what is $f(x)$?

$(4,1)$ $(8,7)$

We need slope & y-int, find slope first

$$m=\frac{y_2-y_1}{x_2-x_1}=\frac{7-1}{8-4}=\frac{6}{4}=\frac{3}{2}$$

now find y-int by plugging a point & the slope into $y=mx+b$

$y=mx+b$

$1=\frac{3}{2}(4)+b$

$1=6+b$

-6

$-5=b$ $m=3/2$

$$\boxed{f(x)=\frac{3}{2}x-5}$$

$g(0)=5$ and an increase of 4 units in x causes a decrease of 12 units in $g(x)$. Find $g(x)$.

run: 4

rise: -12

point $(0,5)$

~~$g(4)=5-12$~~ ~~$g(4)=-7$~~ ~~$(4,-7)$~~

$$m=\frac{\text{rise}}{\text{run}}=\frac{-12}{4}=-3$$

$$5=-3\cdot 0+b$$

$$5=b$$

$$y=-3x+5$$

$$\boxed{g(x)=-3x+5}$$

$f(-2)=5 \quad f(2)=5$

$(-2,5) \quad (2,5)$

$m=\frac{5-5}{2--2}=\frac{0}{4}=0$

$5=0\cdot 2+b$

$b=5$

$\boxed{f(x)=5}$

this is a horizontal line

Vertical lines are not functions! They don't pass the vertical line test, and can't be written in functional notation.

Vertical: $x=4$

~~$f(x)=$~~

your turn!

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}}$

$f(x) = mx + b$

1.

$f(0) = 1$, $f(x)$ increases by 6 when x increases by 3.

2. $f(-2) = 3$ $f(2) = -3$