Linear Functions

$y = mx + b$

output/ dependent variable

input/independent var

$f(x) = mx + b$

$f(x) = y$

$f(2) = 3 \Rightarrow (2, 3)$

↳ this is a point $x = 2$, $x = 3$

$f\left(\frac{3}{2}\right) = -1 \quad \left(\frac{3}{2}, -1\right)$

$f(5) = -4 \quad (5, -4)$

$f(2) = 7 \quad (2, 7)$

given $f(4)=1$ and $f(8)=7$, find $f(x)$

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

we need to find slope & y-int

start w/ slope

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

y-int: plug point & slope into $y=mx+b$

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

$$1=6+b$$

$$b=-5 \qquad m=\frac{3}{2}$$

write function

~~X~~ $=\frac{3}{2}x-5$

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

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

$(0,5)$ $\quad m=\frac{\text{rise}}{\text{run}}=\frac{-12}{4}=-3$

$5=0(-3)+b$

$b=5$

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

$m = \frac{1}{3}$ $f(6) = 0$ $f(x) = ?$

$(6, 0)$

$0 = \frac{1}{3} \cdot 6 + b$

$0 = 2 + b$

$b = -2$

$$f(x) = \frac{1}{3}x - 2$$

your turn!

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

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