

Simplify your answers as much as possible.

1. Let $f(x) = 5x + 3$.

(a) Find $f(4)$.

$$f(4) = 5(4) + 3 = 23$$

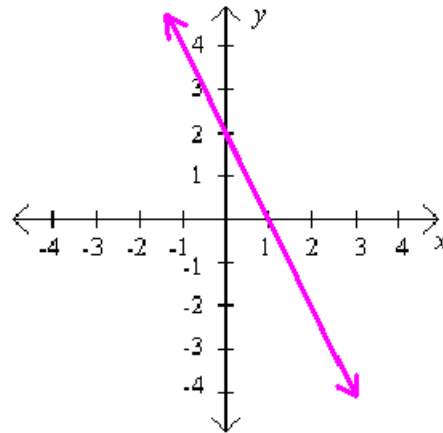
(b) Find $\frac{f(x+h) - f(x)}{h}$.

$$\begin{aligned} \frac{f(x+h) - f(x)}{h} &= \frac{[5(x+h) + 3] - [5x + 3]}{h} \\ &= \frac{5x + 5h + 3 - 5x - 3}{h} \\ &= \frac{5h}{h} \\ &= 5 \end{aligned}$$

2. Write the equation and sketch the graph of the line that passes through the point $(-1, 4)$ and has slope -2 .

$$\begin{aligned} y &= -2x + b \\ 4 &= -2(-1) + b \\ 4 &= 2 + b \\ b &= 2 \end{aligned}$$

$$y = -2x + 2$$



3. Suppose that a company makes calculators. It costs \$7000 each month for the company to stay in operation. Additionally, it costs \$15 to produce each calculator. The company sells its calculators for \$65.

(a) Find the Cost function, $C(x)$, for this company if it produces x calculators this month.

$$C(x) = 7000 + 15x$$

(b) Find the Revenue function, $R(x)$, for this company if it sells x calculators this month.

$$R(x) = 65x$$

(c) How many calculators must the company make and sell this month in order for it to break even?

$$7000 + 15x = 65x$$

$$7000 = 50x$$

$$x = 140$$

The company must make and sell 140 calculators in order to break even.

Extra Credit 1: If a jacket originally cost \$80 and it is marked down by 25% of the original price, what is the sale price?

$$25\% \text{ of } \$80 \text{ is } 0.25 \cdot 80 = \$20.$$

Since the jacket is marked down by \$20, the sale price is \$60.

Extra Credit 2: Suppose a person's salary is \$30,000. If one year she is given a raise of 10% and then the next year, she is given a pay cut of 10%, what is her final salary?

$$\text{After the raise, her salary is } 30,000 + 0.10 \cdot 30,000 = 30,000 + 3000 = \$33,000.$$

$$\text{After the pay cut, her salary is } 33,000 - 0.10 \cdot 33,000 = 33,000 - 3300 = \$29,700.$$