Are there any questions from the review?

p. 61 # 10, 11a, 12, 13, 16, 17 +a

b

Error:
#17a) the function should be:

$$f(x)=\begin{cases}30, \text{if } 0\le x\le 200\\ 24+0.03x, \text{if } x>200\end{cases}$$

Practice Test p. 62 # 1-10

9a b

Errors:
#7a) should be (-2, 17)
#9a) should be: \$11500
b)

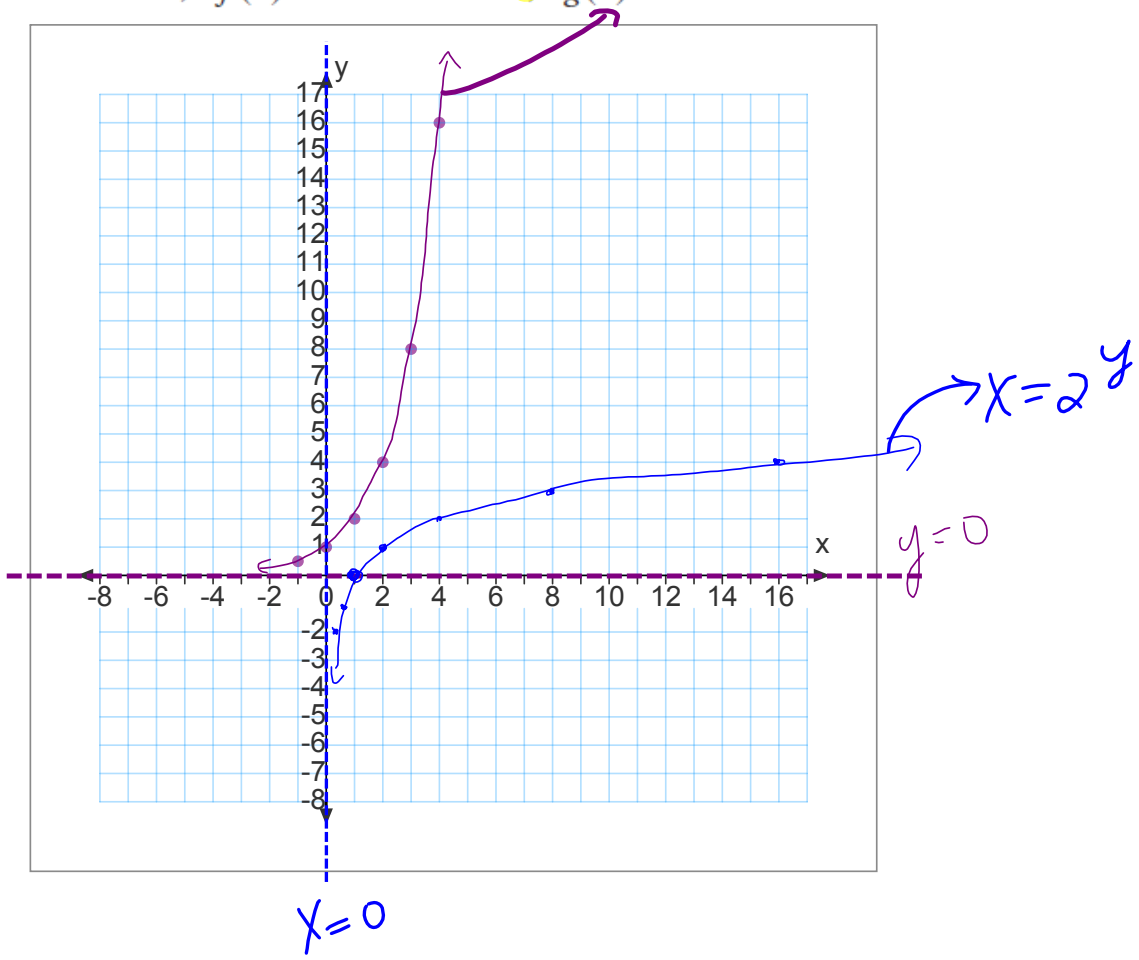
$$T(x)=\begin{cases}0.05x & \text{if } 0\le x\le 50000\\ 0.12x-3500 & \text{if } x>50000\end{cases}$$

#10c) There should be a square bracket beside one of the zeros
#10d) The range should be:

$$\{y\in\Re \mid 1<y<2, y\ge 3\}$$

p. 61 **12.** Graph each function and its inverse relation on the same set of axes. Determine whether the inverse relation is a function.

a) $f(x) = x^2 - 4$ b) $g(x) = 2^x$



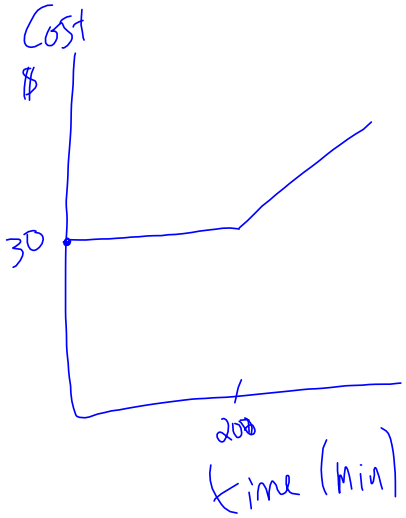
p. 61 **17.** A telephone company charges $30 a month and gives the customer 200 free call minutes. After the 200 min, the company charges $0.03 a minute.

a) Write the function using function notation.

b) Find the cost for talking 350 min in a month.

c) Find the cost for talking 180 min in a month.

a) $f(x) = \begin{cases} 30 & [0, 200] \\ 0.03x + 24 & (200, \infty) \end{cases}$



after 200 min,

$f(x) = 30 + 0.03(x - 200)$

$= 30 + 0.03x - 6$

$= 0.03x + 24$

p. 62 **9.** A certain tax policy states that the first \$50 000 of income is taxed at 5% and any income above \$50 000 is taxed at 12%.

a) Calculate the tax on \$125 000. $= 50\,000 + 75\,000$

b) Write a function that models the tax policy.

$T(x) = 0.05(50000) + 0.12(75000)$

$=$

$$f(x) = \begin{cases} 0.05x & [0, 50000] \\ 0.12x - 3500 & (50\,000, \infty) \end{cases}$$

if $x = 50000$

$f(50000) = 0.05(50000)$

$= 2500$

if $x > 50\,000$

$f(x) = 2500 + 0.12(x - 50000)$

$= 2500 + 0.12x - 6000$

$= 0.12x - 3500$

2.1 Determining Average Rate of Change

Math Learning Target:
"I can calculate the average rate of change, and I can interpret the result."

Let the independent variable be x and let the dependent variable be y.

The **average rate of change**, in any relation, is the change in quantity of the dependent variable divided by the corresponding change in amount of the independent variable.
If the relation is the function $y = f(x)$, over an interval $x_1 \le x \le x_2$, the average rate of change is:

$$\frac{\Delta y}{\Delta x} = \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

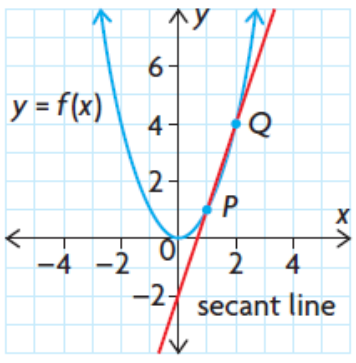
$$= \frac{y_2 - y_1}{x_2 - x_1}$$

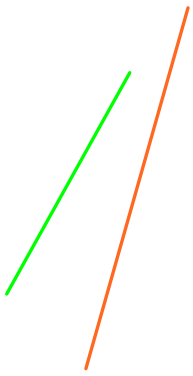
$$m_{secant} = A_{ROC} = \frac{\Delta y}{\Delta x}$$

Complete after Ex.1

A **secant line** is...

- a line connecting two (or more) unique points on the graph of a function. The average rate of change (AROC) is the slope of the secant line.





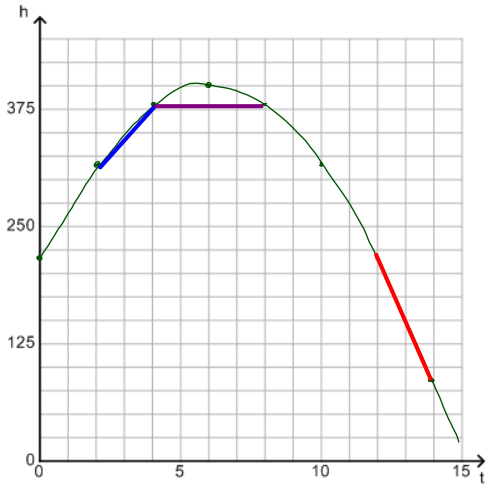
Read and understand p. 75 "**Need to Know**".
Complete: pp. 76-78 #2, 6, 7, 10, 12, 13

Ex. 1:
A rocket is shot vertically off a cliff. The height of the rocket, in *m*, is given by $h(t) = -5t^2 + 60t + 220$, where *t* is in seconds.

a) Graph this relation using the grid.
You may use the table below to assist.

* We could:
- complete the square to find the vertex
- factor (or use QRF) to find the zeros

$x = \frac{-b}{2a}$ finds the AofS.



t	0	2	4	6	8	10	12	14
h	220	320	380	400	380	320	220	80

rate: a comparison of two quantities measured in *different* units

b) Find the average rate of change over $2 \le t \le 4$.

$$A_{ROC} = \frac{\Delta h}{\Delta t} = \frac{h(t_2)-h(t_1)}{t_2-t_1} = \frac{h(4)-h(2)}{4-2} = \frac{380-320}{2} = \frac{60}{2}\ \frac{m}{s} = 30\ m/s$$

Interpretation:
On average, between 2 and 4 seconds,
the rocket's height increased at a rate of 30 m per 1 second.

c) Find the average rate of change over $12 \le t \le 14$ and $t \in [4,8]$.

$$A_{ROC} = \frac{\Delta h}{\Delta t} = \frac{h(14)-h(12)}{14-12} = \frac{80-220}{2} = \frac{-140}{2} = -70$$

On average, between 12 and 14 seconds,
the rocket is moving down
(it's height decreased) at 70 m per 1 second.

$$A_{ROC} = \frac{\Delta h}{\Delta t} = \frac{h(8)-h(4)}{8-4} = \frac{380-380}{4} = 0\ m/s$$

On average,
the rocket has not changed height values
in the 4 seconds from 4 to 8 seconds.