Today's Plan:

Learning Target (standard): I will evaluate functions and use correct function notation.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

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* When evaluating functions, be sure to label
the first step, show the work & label the last step. Function notation is
always on the left side of the equation. *

Evaluate.

$$f(x) = -\frac{1}{3}x^3 - x + 3 \qquad\qquad f(-3) = ?$$

$$f(-3) = -\frac{1}{3}(-3)^3 - (-3) + 3$$

$$= 9 + 3 + 3$$

$$f(-3) = 15$$

Evaluate.

$$f(x) = 2x^2 - 3x + 5 \qquad \text{Find } f(-2) =$$

$$f(-2) = 2(-2)^2 - 3(-2) + 5$$
$$= 8 + 6 + 5$$
$$f(-2) = 19$$

Evaluate each.

$$\boxed{f(x) = -3x^2 + 2}$$

$$f(a) = -3a^2 + 2$$

$$f(a+h) = -3(a+h)^2 + 2$$
$$= -3(a+h)(a+h) + 2$$
$$= -3(a^2 + 2ah + h^2) + 2$$
$$f(a+h) = -3a^2 - 6ah - 3h^2 + 2$$

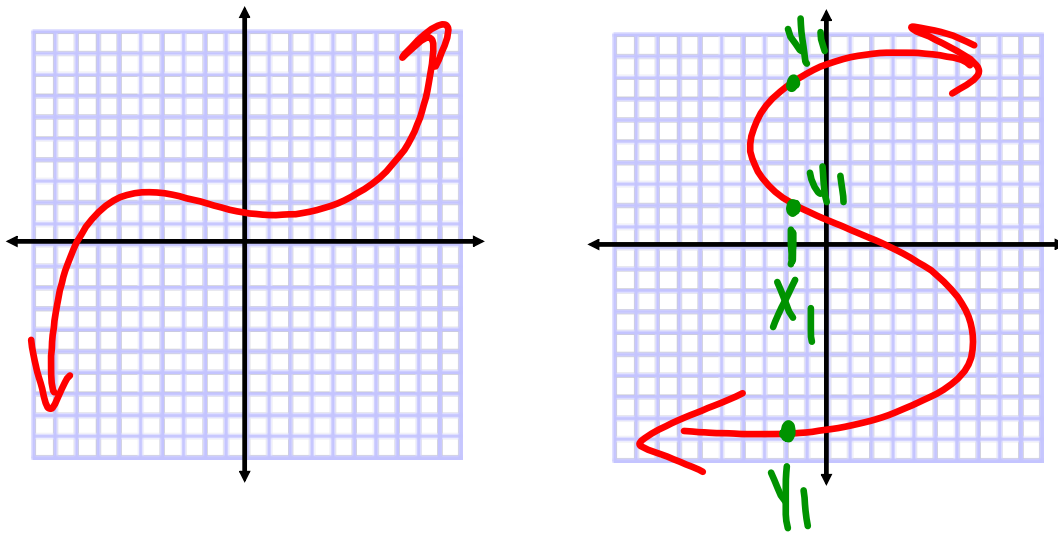$$\frac{f(a+h) - f(a)}{h} = \frac{-3a^2 - 6ah - 3h^2 + 2 - (-3a^2 + 2)}{h}$$
$$= \frac{-3a^2 - 6ah - 3h^2 + 2 + 3a^2 - 2}{h}$$
$$= \frac{-6ah - 3h^2}{h}$$
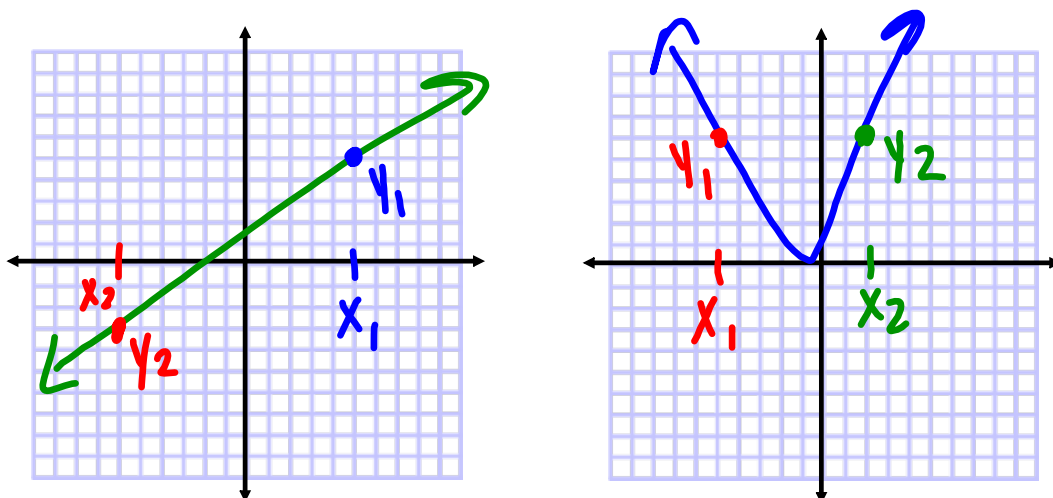
$$\frac{f(a+h) - f(a)}{h} = -6a - 3h$$

What is a relation?

A relation is *any* set of ordered pairs.

What is a function?

A function is a set of ordered pairs such that any x-value has only one y-value. In other words, for any one x, there is only one y.

Functions and Their Properties:

The basic concept of a function is a set of ordered pairs, and these can also be represented by an equation.

- The domain of a function is the set of x-values that can be substituted into the function producing real values

- The domain of a function will have exclusions in two different places:
    - those numbers for which the denominator of the function is zero
    - those numbers for which the value of the function is not a real number - square roots of negative numbers

- If there are no exclusions from the domain of a function, the domain will be the set of real numbers

Functions and Their Properties:

- The range of a function is the set of y-values that can be produced by substituting the values of the domain into the function

    - We find the range of a function by substituting numbers into the function and by graphing the function

Find the domain of the given function:

$$f(x) = 2x^2 + x - 3$$

exclusions: none

D: ℝ

Find the domain of the given function:

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

$$x + 2 = 0$$
$$x = -2$$

exclusions: $x = -2$

D: $\{x \mid x \neq -2\}$

$$f(x) = \sqrt{3-x}$$

↓ negative

$$3 - x < 0$$
$$-x < -3$$

exclusions: $\{x \mid x > 3\}$ $x > 3$

D: $\{x \mid x \le 3\}$

Assignment:

p.116 #14,16,18,21-32

* When completing assignments out of the textbook, write the problem and/or draw the provided graph & show work as modeled in class examples *