

Learning Goal 01: Functions

- 1) Find the difference quotient for $f(x) = \frac{1}{x+2}$.

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

- 2) For $f(x) = \frac{2x^2 - 3x + 4}{x+1}$

a) Evaluate $f(0)$

$$4$$

b) Evaluate $f(-3)$

$$-\frac{31}{2}$$

c) Compute $\frac{f(2+h) - f(2)}{h}$

$$\frac{3+2h}{3+h}$$

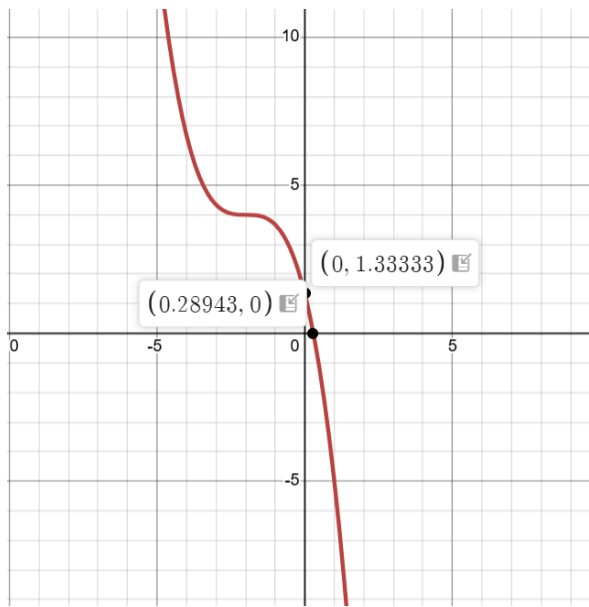
- 3) For $h(x) = \sqrt{3x - 1}$, find two functions f and g such that $h(x) = f(g(x))$

$$f(x) = \sqrt{x}, g(x) = 3x - 1$$

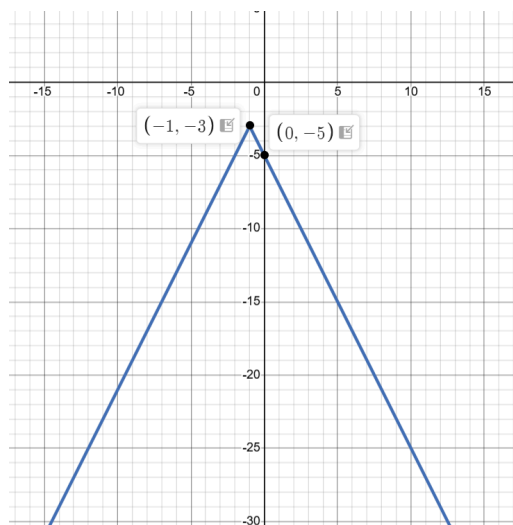
Learning Goal 02: Transformations

For each of the following functions, (a) state the parent function, (b) list the transformations in the order, and (c) sketch a graph of the transformed function.

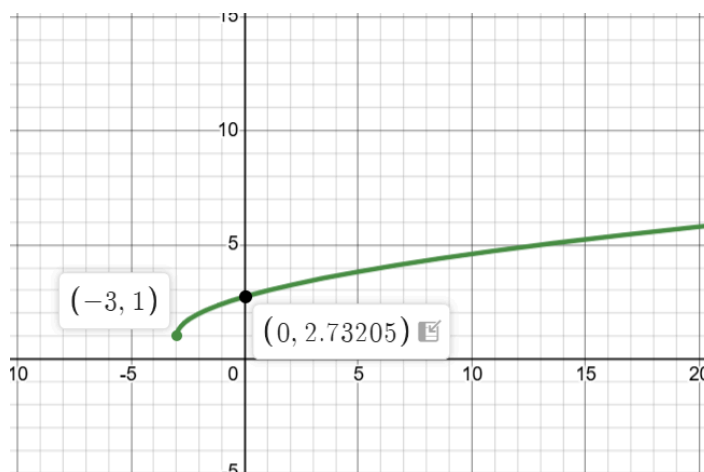
1) $f(x) = -\frac{1}{3}(x+2)^3 + 4$



2) $h(x) = -2|x + 1| - 3$



3) $p(x) = \sqrt{x + 3} + 1$



Learning Goal 03: Sequences

1) Find the limit for each of the following sequences by inspection.

a) $a_n = \frac{2^n}{n!}$

0

b) $b_n = \frac{1}{n^2} + \frac{1}{n}$.

0

2) Find a formula for the general term a_n of each sequence, assuming the pattern continues. Then, state the domain of the sequence.

a) $\{2, \frac{5}{4}, \frac{8}{7}, \frac{11}{10}, \frac{14}{13}, \dots\}$

$a_n = \frac{3n-1}{3n-2}$

b) $\{1, 4, 9, 16, 25, \dots\}$

$a_n = n^2$

3) Indicate which of the listed properties for each sequence:

Alternating/Strictly increasing/ Strictly decreasing

Bounded above / Bounded below

Convergent / Divergent

a) $f_n = (-1)^n * n^2$

Alternating, Divergent

b) $g_n = 3 + \frac{1}{n}$

Bounded above by 4, Bounded below by 3, Convergent to 3

4) Use the Limit Laws to find the limit of the sequence

a) $\lim_{n \rightarrow \infty} \frac{5n^4 + 3n^2 - 2}{n^4 - 6n^2 + 2}$

5

b) $\lim_{n \rightarrow \infty} \frac{10n^5 + 2}{2n^2 + n - 4}$

Infinity

c) $\lim_{n \rightarrow \infty} \frac{3n^2 - 4n + 1}{6n^7 + 4n^3 + 30}$

0