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CS 135 Homework 4

I pledge my honor that I have abided by the Stevens Honor System

Section 2.3

1.
    a. The function is undefined at x = 0. The function approaches the y-axis but never touches it.
    b. The function's bounds are [0, ∞). The function is undefined for anything x value less than zero.
    c. The function does not pass the vertical line test.

12.
    a. Yes
    b. No
    c. Yes
    d. No

13.
    a. Yes
    b. No
    c. Yes
    d. Yes

Section 2.4

4.
    a. $a_0 = 1, a_1 = -2, a_2 = 4, a_3 = -8$
    b. $a_0 = 3, a_1 = 3, a_2 = 3, a_3 = 3$
    c. $a_0 = 8, a_1 = 11, a_2 = 23, a_3 = 71$
    d. $a_0 = 2, a_1 = 0, a_2 = 8, a_3 = 0$

9.
    a. $a_0 = 2, a_1 = 12, a_2 = 72, a_3 = 432, a_4 = 2592, a_5 = 15552, a_6 = 93312$
    b. $a_1 = 2, a_2 = 4, a_3 = 16, a_4 = 256, a_5 = 65536, a_6 = 4294967296$
    c. $a_0 = 1, a_1 = 2, a_2 = 5, a_3 = 11, a_4 = 26, a_5 = 59$

Section 5.4

8. The algorithm for summing the first n positive integers states that $S_n = n + S_{(n-1)}$ with a base condition of $S_0=0$.

```
#lang eopl


(define (recursive_sum n)
  (cond
    [(eq? n 0) 0]
    [(eq? n 1) 1]
    [else (+ (recursive_sum (- n 1)) n)]
    )
  )


(define (build-seq start step end)
  (cond
    [(< step 0) '()]
    [(< end start) '()]
    [else (append (list start) (build-seq (+ start step) step end))]
     )
  )
```