Math 151 – Python Lab 1

Directions: Use Python to solve each problem. (Template link)

1. Calculate the following:

   (a) $\dfrac{79(e^{1.29} + 11.1^2)}{2026 - 5.1^3}$

   (b) $\cos\left(\dfrac{11\pi}{12}\right)\sec(75°) + \tan\left(\dfrac{7\pi}{12}\right)$ (Give exact and approximate answers.)

2. Consider the function

$$f(x) = \frac{\sqrt{x^2 - 4}}{x - 2}$$

   (a) Find the values of $f(-10)$, $f(-100)$, and $f(-1000000)$.

   (b) Find the values of $f(2.01)$, $f(2.0001)$, and $f(2.000001)$

   (c) Based on part (a), what happens to the y-values of f when x gets REALLY large in the negative direction?

   (d) Based on part (b), what happens to the y-values of f when x gets close to 2 from the right?

3. The height of an object at a certain distance from its starting point, x (in feet), is given by

$$y = \frac{-16}{v^2 \cdot \cos^2(\alpha)}x^2 + \tan(\alpha) \cdot x + h$$

   where v is the velocity (in ft/sec) with which the object is released, α is the angle (in degrees) at which the object is released, and h is the initial height (in feet) of the object.

   (a) The center field wall at Minute Maid Park is 409 feet from home plate and is 10 feet tall. José Altuve hits the ball at a 26° angle at a height of approximately 3 feet. If he hits the ball at a speed of 130 feet per second, will it clear the wall and be a home run?

   (b) Luka Dončić has used a radar gun to calculate his average free throw shooting velocity to be 24 ft/sec. The free throw line is 15 feet from the basket and the rim is 10 feet high. Luka releases the ball at a 54.2 degree angle and makes his free throw. At what height did he release the ball?