MACM 316   COMPUTING ASSIGNMENT #2

Submit on Crowdmark by Tuesday, June 9, 2020, 11pm

Upload one .pdf file with 2 pages: Page 1 is your typed report (your discussions, data and figures on a single page); Page 2 is a listing of your code(s). The assignment is due at 11:00pm. You will receive a Crowdmark link for the upload.

C1. Exercise 2.13 from the course text.

Remarks:

You will have to write two Matlab functions:

1. One function to perform the Newton iteration. Once you have written that function, test it to find the solution of the equation $f(x) = x^2 - 4 = 0$ with a start value of $x_0 = 1$. Print out the x_n and the errors $e_n = 2 - x_n$. Always a good idea to test your programs on an example where you know the answer.

2. One function that computes $g(x)$, and $g'(x)$ for the function g of Exercise 2.13.

Hint. The formula for the length of the belt is

$$L = g(x) = 2x \cos \phi(x) + (R + r)\pi + 2(R - r)\phi(x)$$
$$\text{where} \quad \phi(x) = \arcsin\left(\frac{R - r}{x}\right)$$

Finding this formula is half the fun, so my apologies for spoiling this for you.
In your report you still have to explain and derive the formula; you also get to apply your calculus skills to compute the derivative.