DSC1520 ASSIGNMENT 3
POSSIBLE SOLUTIONS

Question 1
Find the derivative of the function: \( G(x) = x(x^2 - 4\sqrt{x} + 4) \)

Replace \( \sqrt{x} \) with \( \frac{1}{2}x^{\frac{1}{2}} \), expand the brackets and simplify before differentiating

\[
G(x) = x(x^2 - 4x^{\frac{1}{2}} + 4)
\]

\[
G(x) = x^3 - 4x^{\frac{3}{2}} + 4x
\]

Apply the “Power Rule” of differentiation.

If \( G(x) = x^n \) then \( G'(x) = nx^{n-1} \)

Also, if \( G(x) = ax^n \) then \( G'(x) = anx^{n-1} \)

Note: The derivative of \( ax \) is \( a \) and the derivative of a constant term \( c \) is 0.

\[
G'(x) = 3x^{3-1} - 4\left(\frac{3}{2}\right)x^{\frac{3}{2}-1} + 4
\]

\[
G'(x) = 3x^2 - 6x^{\frac{1}{2}} + 4
\]

Replace \( x^{\frac{1}{2}} \) with \( \sqrt{x} \)

\[
G'(x) = 3x^2 - 6\sqrt{x} + 4
\]