MAT 222 - Calculus II : Assignment 6 **Due Date : 02/21/2025**

For full credit, you must clearly show all work, and upload the solutions as a PDF before 11:59 pm on the due date.

1. How much work is done when a hoist lifts a $200kg$ rock to a height of $3m$?

2. A force of $10lb$ is required to hold a spring strtched $4in$ beyond its natural length. How much work is done in strtching it from its natural length. How much work is done in stretching it from its natural length to $6in$ beyond its natural length.

3. A Spherical water tank, $24ft$ in diameter, sits atop of $60ft$ tower. The tank is filled by a hose attached to the bottom of the sphere. If a 1.5 horse power pump is used to deliver water upto the tank, how long will it take to fill the tank? (One horse power $= 550ft - lb$ of work per second)

4. Find the average vallue of the function on the given interval.

4.1. $f(x) = \sqrt{x}$. $[0, 4]$

4.2. $f(t) = e^{\sin t} \cos t,\ [0, 2\pi]$

5. Let $f(x) = (x-3)^2$ for $x \in [2, 5]$.

6. Find the average value of f on the given interval.

6.1. Find c such that $f_{avg} = f(c)$.

6.2. Sketch the graph of f and a rectangle whose area is the same area under the graph f.