

Instructions. Show all work, with clear logical steps. No work or hard-to-follow work will lose points.

Problem 1. (4 points) Given that the area of D is equal to 2018 and the volume under the surface $z = f(x, y)$ and above the region D is 16020, calculate the average value of the function $f(x, y)$ over the region D .

Problem 2. (3 points) What are the three elementary row operations?

Problem 3. (2 points) Put the following matrix into row-echelon form.

$$\begin{bmatrix} 1 & 98129 & 2334 \\ 0 & 1 & 19 \\ 0 & 0 & 3 \end{bmatrix}$$

Problem 4. (1 point) Are you a fan of the fact that it is 3 weeks into spring but it still feels like winter?