

Math 250B X02
Test Three

Time: 50 minutes
Total: 20 marks

Name: _____

1. [4 marks] Use a triple integral in cylindrical coordinates to set up the volume of the solid region in the first octant inside $z = \sqrt{16 - x^2 - y^2}$ and outside $x^2 + y^2 = 4x$. Do not evaluate the integral.

2. [5 marks] Find the work done by the force field $\mathbf{F} = [3y^2, 2xy]$ in moving a particle over the line segment from $(-1, 0)$ to $(5, 7)$.

3. [5 marks] Use a change of variables to evaluate $I = \iint_R \frac{(2x+y)^2}{6+3x-y} dA$
where R is bounded by $2x + y = 2$, $2x + y = 4$, $3x - y = 0$ and $3x - y = 1$.

4. [6 marks] Find the surface area of the following parametric surface:
 $\mathbf{r} = [2 \sin a \cos b, 2 \sin a \sin b, 2 \cos a]$ where $0 \leq a \leq \pi$, $0 \leq b \leq 2\pi$.