Surface Area of Parametric Surfaces- HW Problems

1. Find the surface area of the upper unit hemisphere parametrized by $x = \cos(\theta)\sin(\phi)$, $y = \sin(\theta)\sin(\phi)$, $z = \cos(\phi)$ where $0 \leq \theta \leq 2\pi$, $0 \leq \phi \leq \frac{\pi}{2}$.

2. Find the surface area of the portion of the cone $x^2 + y^2 = z^2$ which lies between the planes $z = 1$ and $z = 4$.

3. Find the surface area of the surface given by $z = xy$, where $x^2 + y^2 \leq 4$.

4. find the surface area of the portion of the upper hemisphere $z = \sqrt{4 - x^2 - y^2}$ cut out by the cone $x^2 + y^2 = z^2$, where $z \geq 0$ and $z^2 \geq x^2 + y^2$.

5. Find the surface area of the portion of the plane $3x - 2y + z = 4$ where $x^2 + y^2 \leq 9$.

6. Find the surface area of the torus given by

$\vec{\Phi}(u, v) =< (2 + \cos(v))\cos(u)$, $(2 + \cos(v))\sin(u)$, $\sin(v))$

for $0 \leq u \leq 2\pi$, $0 \leq v \leq 2\pi$.