1. Parametrize and give bounds for the portion of the paraboloid $z = x^2 + y^2$ lying above the rectangle with vertices (0,0), (2,0), (2,3), and (0,3).

   $x(u, v) = u$
   $y(u, v) = v$
   $z(u, v) = u^2 + v^2$

   for $0 \leq u \leq 2, 0 \leq v \leq 3$

2. Parametrize and give bounds for the portion of the cylinder with radius 4 centered around the z-axis between $z = 2$ and $z = 10$.

   $x(u, v) = 4 \cos u$
   $y(u, v) = 4 \sin u$
   $z(u, v) = v$

   for $0 \leq u \leq 2\pi, 2 \leq v \leq 10$

3. Parametrize and give bounds for the portion of the plane $z = 12$ that lies within the cylinder with equation $x^2 + y^2 = 16$.

   $x(u, v) = u \cos v$
   $y(u, v) = u \sin v$
   $z(u, v) = 12$

   for for $0 \leq u \leq 4, 0 \leq v \leq 2\pi$

1. Parametrize and give bounds for the rectangle with vertices (3,0,0), (3,2,0), (3,2,5), and (3,0,5).

   $x(u, v) = 3$
   $y(u, v) = u$
   $z(u, v) = v$

   for $0 \leq u \leq 2, 0 \leq v \leq 5$

2. Parametrize and give bounds for the right half (i.e. the portion with positive y coordinates) of the cylinder with radius a and centered on the x-axis between $x = 0$ and $x = 5$.

   $x(u, v) = u$
   $y(u, v) = a \cos v$
   $z(u, v) = a \sin v$

   for $0 \leq u \leq 5, -\pi/2 \leq v \leq \pi/2$

3. Parametrize and give bounds for the portion of the plane $x = 12$ that lies within the cylinder with equation $y^2 + z^2 = r^2$.

   $x(u, v) = 12$
   $y(u, v) = u \cos v$
   $z(u, v) = u \sin v$

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