MTH 254 **HW #3** Fall 2016

1. Let W be the solid cone bounded by $z = \sqrt{x^2 + y^2}$ and $z = 2$. For each integral below, decide *without calculating its value* whether the integral is positive, negative, or zero. *Briefly justify your answers.*

   (a) $\displaystyle\int_W (z - \sqrt{x^2 + y^2})\, dV$

   (b) $\displaystyle\int_W y\, dV$

2. Write down a triple integral representing the volume of a slice of the cylindrical cake of height $2''$ and radius $5''$ between the planes $\phi = \pi/6$ and $\phi = \pi/3$. Evaluate this integral.

3. Suppose W is the region *outside* the cylinder $x^2+y^2 = 1$ and *inside* the sphere $x^2+y^2+z^2 = 2$. Calculate

$$\int_W \left(x^2 + y^2\right)\, dV$$