Math 241: Problem of the day

- Regrade requests due in discussion section by Thursday.
- Final exam scheduled: December 12, 8:00am–11:00am.
Cylindrical coordinates: \((r, \theta, z) \leftrightarrow (x, y, z), \ r \geq 0.\)

\[ x = r \cos(\theta), \quad y = r \sin(\theta), \quad z = z \]

\[ \iiint_R f(x, y, z) \, dV = \iiint_R f(r \cos(\theta), r \sin(\theta), z) \, r \, dr \, d\theta \, dz \]
Spherical coordinates: \((\rho, \theta, \phi) \leftrightarrow (x, y, z), \ \rho \geq 0, \ 0 \leq \phi \leq \pi.\)

\[ x = \rho \sin(\phi) \cos(\theta), \quad y = \rho \sin(\phi) \sin(\theta), \quad z = \rho \cos(\phi) \]

(beware: different conventions out there...)

\[
\int\int\int_{R} f(x, y, z) \, dV = \\
\int\int\int_{R} f(\rho \sin(\phi) \cos(\theta), \rho \sin(\phi) \sin(\theta), \rho \cos(\phi)) \rho^2 \sin(\phi) \, d\rho \, d\theta \, d\phi
\]

www.math.uiuc.edu/~clein/classes/2014/fall/241.html