

<p>Math 20C – Swanson – Fall 2020 Homework 9 Due Friday, 12/11/20 at 11:59pm</p>
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- The graded part of the homework is on WebAssign.
- The problems below are also assigned and you are responsible for doing them, but they will not be collected or graded.

1. Consider the rectangle $R = [1, 3] \times [4, 5]$ in the xy plane. A 3D object E lies above the rectangle R and below $z = y + 2$. The units for x, y, z are cm. Include units in your answers. The density at (x, y, z) is $\rho(x, y, z) = e^x \text{ g/cm}^3$.

- (a) Compute the volume of E using

$$\text{Volume} = \iint_R ((z \text{ at top}) - (z \text{ at bottom})) dA.$$

- (b) Compute the mass of E using

$$\text{Mass} = \iiint_E \rho(x, y, z) dV = \iint_D \int_{z \text{ at bottom}}^{z \text{ at top}} \rho(x, y, z) dz dA = \dots .$$

- (c) Compute the average density of E :

$$\text{Average of } \rho(x, y, z) \text{ over } E = \frac{\text{Mass of } E}{\text{Volume of } E}$$