

# Triple Integrals

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April 4, 2018

# Triple Integral Problems

- 1 Evaluate  $\iiint_{\mathcal{B}} \frac{x}{(y+z)^2} dV$  for the box  $\mathcal{B} = [0, 2] \times [2, 4] \times [-1, 1]$ .
- 2 Set up the triple integral  $\iiint_{\mathcal{W}} f(x, y, z) dV$  where  $\mathcal{W}$  is the region in the first octant above  $z = y^2$  and below  $z = 8 - 2x^2 - y^2$ .
- 3 Try evaluating  $\int_0^2 \int_0^4 \int_z^2 yze^{x^3} dx dy dz$ . Why is this hard? Try again, but reorder the integrals to make evaluating easier.

## Challenge Problems

- 1 Prove that  $\int_0^x \int_0^t F(u) du dt = \int_0^x (x-u)F(u) du$ .
- 2 Find the volume of the region contained in the intersection of the cylinders  $x^2 + y^2 \leq a^2$  and  $x^2 + z^2 \leq a^2$ .