Lecture 24: Worksheet

Applications of integration

1   Find the cumulative distribution function

$$F(x) = \int_{-\infty}^{x} f(t) \, dt \ .$$

of the exponential distribution in the case $f(x) = 2 \exp(-2x)$.

2   Find the moment of inertia of a rod which has density $f(x) = x$ and length 10.

$$\int_{0}^{L} x^2 f(x) \, dx \ .$$

3 How much heat energy is in a sphere of radius 1 if the heat at height z is z? Remember that if $A(z)$ is the radius of the sphere at height z then $\int_{-1}^{1} A(z)\, dz$ was the volume. You have to compute

$$\int_{-1}^{1} z A(z)\, dz / V \ .$$