

Lecture 23: Worksheet

28 3 2014 (week 12)

23 is the smallest odd prime that is not a prime twin.

365 $\log(2)$ is the number of pairs of 23 items

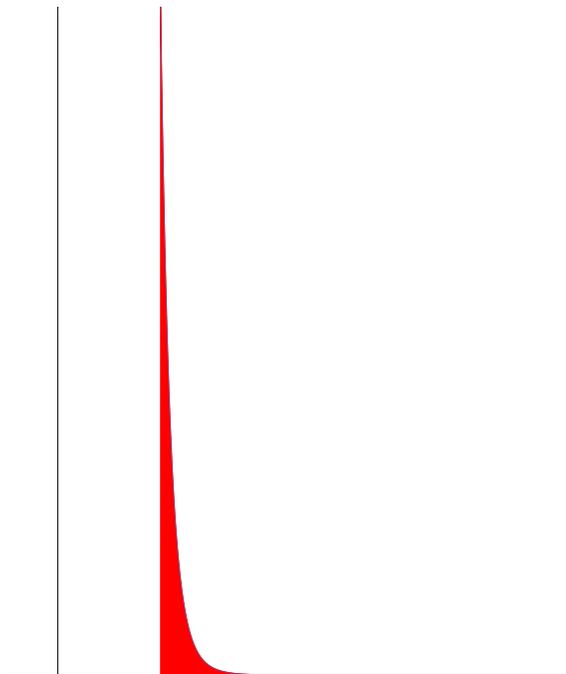
Humans have 23 chromosomes

Michael Jordans Tshirt had the number 23.

Improper integrals

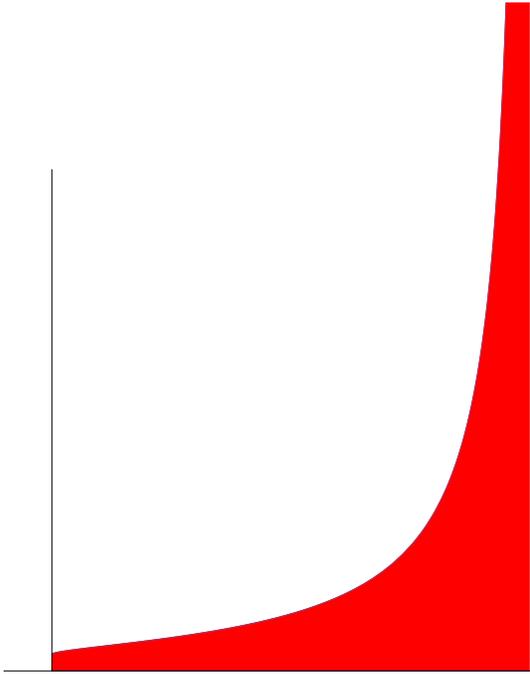
1 Find the value of the improper integral

$$\int_1^{\infty} \frac{1}{x^{17}} dx$$



2 Find the following improper integral

$$\int_0^1 \frac{1}{\sqrt{1-x}} dx$$



3 We have met the **Maria Agnesi** function

$$f(x) = \frac{1}{1+x^2}$$

early in the course already. Evaluate the integral

$$I = \int_{-\infty}^{\infty} \frac{1}{1+x^2} dx .$$

The function $g(x) = \frac{1}{I} \frac{1}{1+x^2}$ is a probability distribution called **Cauchy distribution**. It is a nonzero function which has the property that $\int_{-\infty}^{\infty} g(x) dx = 1$.

