

# Problems of the Month

Summer 2019

## General Problem:

In the U.S. a standard sheet of paper is 8.5 inches wide and 11 inches tall. In Europe they use A4 paper which is 210 millimeters wide and 297 millimeters tall. Which paper has a larger area, and by how much?



## Calculus Problem:

Calculate the improper integral below, or state that it diverges.

$$\int_7^{\infty} \frac{3}{x^5} dx$$

## Challenge Problem:

Suppose  $f$  is a differentiable and invertible function on the interval  $[0,1]$  such that  $f(x) \geq x$  with equality holding at the endpoints. Given that the region bounded by  $y = 0$ ,  $x = 1$ , and  $y = f(x)$  has area  $A$ , what is the area of the region bounded by  $y = f(x)$  and  $y = f^{-1}(x)$ ?