Integration. Area between curves

November 30, 2016

Problems

Problem 1. What can be said about the following limit:

$$\lim_{n \to \infty} \left(\frac{1}{n^{101}} + \frac{2^{99}}{n^{101}} + \dots + \frac{n^{99}}{n^{101}} \right)$$

(Hint: what does it have to do with integration?)

Problem 2. Below if the graph of a function f.



Let $g(x) = \int_0^x f(t)dt$. Find g(0), g'(0) and g'(2).

Problem 3. Let $f(x) = \int_{x^2}^{\cos x^3} (t^2 - t)^2 dt$. Find f'(x).

Problem 4. Find the area of the propeller-shaped region enclosed by the curves $x - y^{1/3} = 0$ and $x - y^{1/5} = 0$.