Summer Term I | MA124 Calculus II
Kostadinov | Boston University

Quiz No.20

student:

Problem 1: Evaluate the integral

$$\int_0^1 xe^{3x^2}\,dx$$

Problem 2: The arc length of a curve described by parametric equations $x = f(t)$, $y = g(t)$, $a \leq t \leq b$ is given by the integral

$$\int_a^b \sqrt{x'^2 + y'^2}\,dt.$$

Find the length of the arc of a circle $x = \cos(t)$, $y = \sin(t)$, $0 \leq t \leq \frac{\pi}{3}$.

Problem 3: Solve the differential equation:
$y' = xy$

Problem 4: Find a solution of the differential equation that satisfies the given initial condition:
$y' = xy + 2y \quad y(0) = 2$

Problem 5: Formulate a problem that is modeled/described by some differential equation. Write the equation.

Problem 6: Specify the general term of a sequence which has limit 2 and has among its terms the number 5.

Problem 7: Find the limit of the sequence with general term $a_n = \frac{\ln(n)}{n}$.

Problem 8: Determine whether the series $\sum_{n=0}^{\infty} \frac{n^2}{2^n}$ is convergent.

Problem 9: Find the expansion of the function $x^2 + x + 1$ around 2 using Taylor's formula for the coefficients of a power series.

Problem 10: Find the radius of convergence and the interval of convergence of the series $\sum_{n=0}^{\infty} \frac{(x+2)^n}{n!}$