MATH 205 ANALYTIC GEOMETRY   Quiz 5   28.11.2005

Name   Student No.   Sign

You will not get any points if your answer is wrong, that is no points to your explanations if your answer is wrong. And of course no points to a correct answer if your explanation or proof is not correct or clear.

YOU must write GOOD Mathematics

1. Find the parametric form of the function $y^2 + 2y - x + 2 = 0$ for $x \geqslant 0$.
   Solution:

   There are several parametrization.

   Since $(y+1)^2 = x - 1$ set $y+1 = t$. Then $x = t^2 + 1$

   Hence $x = t^2 + 1$ and $x \geqslant 0$ means $-\infty < t < \infty$.
   $y = t - 1$.   OR

   Simply take $y = t$. Then $x = t^2 + 2t + 2$ and open
   $-\infty < t < \infty$.

2. Find the arc length of the function $f(x) = \cos x$ on $[0, \pi/2]$.
   Solution:

   From $x = t$, $y = \cos t$ we have

   $$L = \int_0^{\pi/2} \sqrt{(x'(t))^2 + (y'(t))^2} \, dt = \int_0^{\pi/2} \sqrt{1 + \left(\sin^2 t\right)} \, dt$$

   or just use the formula;

   $$L = \int_a^b \sqrt{1 + (f'(x))^2} \, dx.$$

   The above integral is not an elementary integral and so called elliptic integrals. "I appreciate your effort" to find it!