You have **10 minutes** for the quiz. Please show your work and write neatly.
NO CALCULATOR please!

1. Evaluate

$$\int \frac{x^3 + 1}{x^4 + 4x + 7} \, dx.$$

Make sure your work is **complete** and **correct**.

Proceed by ~~a~~ u-substitution : $u = x^4 + 4x + 7$

$du = 4x^3 + 4 \, dx$

$= 4(x^3 + 1) \, dx$

$\Rightarrow \int \frac{x^3 + 1}{x^4 + 4x + 7} \, dx = \frac{1}{4} \int \frac{1}{u} \, du$

$\Rightarrow \frac{1}{4} du = x^3 + 1 \, dx$

$= \frac{1}{4} \ln |u| + C$

$= \frac{1}{4} \ln |x^4 + 4x + 7| + C$

2. Estimate the area under the graph of

$$f(x) = x^2 + 3x + 1$$

on the interval $[0, 10]$ by splitting it into 5 subintervals.

We can approximate the area as the sum of the 5 areas of 5 rectangles defined on the subintervals (as we did in class).

Area $\approx \underbrace{2}_{\text{width of each rectangle}} (\overbrace{f(2)}^{\text{height of first rectangle}} + f(4) + f(6) + f(8) + f(10))$

$= 2 \left[(2^2 + 3(2) + 1) + (4^2 + 3(4) + 1) + (6^2 + 3(6) + 1) \right.$

$\left. + (8^2 + 3(8) + 1) + (10^2 + 3(10) + 1) \right]$