Question (1)

(a) Find the root of the equation $x^3 + 3x - 10 = 0$ by using Newton method.

(b) Construct the difference table to the following data.

Hence find interpolation polynomial interpolate the function

$y = f(x)$ at these points (0, 1), (0.1, 1.32), (0.2, 1.68), (0.3, 2.08), (0.4, 2.52).

Question (2)

(a) Approximate the integrals $\int_0^1 \sqrt{1+x} \, dx$ using Sampson's rule.

Estimate the error by computing the exact value.

(b) Solve the differential equation $y' = x + y$, $0 < x < 1$, $y(0) = 1$ using Euler method considering $h = 0.2$. Estimate the error at $x = 0.4$ by comparing your result with the exact solution of the problem.