

1. Find the area between the curves

$$y^2 = x + 1, \quad y^2 = 7 - x.$$

2. Evaluate the following definite integrals

$$(a) \int_{\pi/4}^{3\pi/4} \cot \theta d\theta$$

$$(b) \int_1^e \frac{(\ln x)^3}{x} dx$$

$$(c) \int_0^{7/2} 3t(2t + 1)^{1/3} dt$$

$$(d) \int_{1/2}^{\sqrt{3}/2} \frac{dy}{\sqrt{1 - y^2}}$$

$$(e) \int_0^{\ln 2} \frac{e^z dz}{e^{2z} + 2e^z + 1}$$