

$$\text{Let } I = \int_0^3 \frac{27}{(9+x^2)^2} dx.$$

(a) Using the substitution  $x = 3 \tan \theta$ , show that  $I = \int_0^{\frac{1}{4}\pi} \cos^2 \theta \, d\theta$ . [4]

[illegible]

**(b)** Hence find the exact value of  $I$ . [4]

[4]