

Definite Integrals and using the Substitute given

1) Use the substitution $x = (u - 1)^2$ to obtain $\int \frac{1}{(1 + \sqrt{x})^3} dx$. 5

2) Use the substitution $u = 1 + x^2$ to obtain $\int_0^1 \frac{x^3}{(1 + x^2)^4} dx$. 5

3) Use the substitution $x = 2 \sin \theta$ to obtain the exact value of $\int_0^{\sqrt{2}} \frac{x^2}{\sqrt{4 - x^2}} dx$. Marks
6
(Note that $\cos 2A = 1 - 2 \sin^2 A$.)

4) Use the substitution $t = x^4$ to obtain $\int \frac{x^3}{1 + x^8} dx$. 3

5) Use the substitution $x = 4 \sin \theta$ to evaluate $\int_0^2 \sqrt{16 - x^2} dx$. 6

6) Use the substitution $x = \tan \theta$ to determine the exact value of

$$\int_0^1 \frac{dx}{(1 + x^2)^{\frac{3}{2}}}$$
6