Integration – A2 Mathematics P1

1. June/2022/Paper_7357/01/No.14(b)

(b) Show that the exact area is given by

$$32\ln 2 - \frac{33}{2}$$

Fully justify your answer.

[6 marks]

2. June/2022/Paper_7357/01/No.15(b)

(b) (i) Use the substitution

$$x = 2\,\text{cosec}\,u$$

to show that

$$\int \frac{1}{x^2\sqrt{x^2-4}}\,\mathrm{d}x \qquad \text{for } x > 2$$

can be written as

$$k\int \sin u\ \mathrm{d}u$$

where k is a constant to be found.

[6 marks]

(b) (ii) Hence, show

$$\int \frac{1}{x^2\sqrt{x^2-4}}\,\mathrm{d}x = \frac{\sqrt{x^2-4}}{4x} + c \qquad \text{for } x > 2$$

where c is a constant.

[3 marks]