**Integration 1**

**1.** Evaluate .

Let

Put , then

,

**2. (a)** Consider the integrals:

By evaluating and , find the values of .

**(b)** Evaluate , where .

**(c)** Evaluate , where .

**(a)**

Solving the above simultaneous equations, we get:

**(b)** Let

Then

Solving the above simultaneous equations, we get:

**(c)**  Let

Then

Solving the above simultaneous equations, we get:

**3.** **(a)** By using the substitution , evaluate the integral

, where .

Evaluate this integral where .

**(b)** By using the substitution , evaluate the integral

, where .

**(a)** and

(i) When

(ii) When

Combining (i) and (ii), we take and to be the new lower and upper limits.

, where .

When ,

**(b)** When we use the substitution ,

, from **(a)**  and note that .

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