**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 .

**Yue Kwok Choy**

**2/12/2016**