

Last Name: SOLUTIONS

First Name: \_\_\_\_\_

Student ID: \_\_\_\_\_

## Quiz 2 (A)

Question 1. Find the following:

(a) (4 marks)  $\int \csc^2 x (\cot x - 1)^3 dx$

$$= \int \csc^2 x u^3 \frac{du}{-\csc^2 x} = - \int u^3 du = -\frac{u^4}{4} + C$$

$$= -\frac{(\cot x - 1)^4}{4} + C$$

$$\begin{aligned} \text{LET } u &= \cot x - 1 \\ du &= -\csc^2 x dx \\ \frac{du}{-\csc^2 x} &= dx \end{aligned}$$

(b) (6 marks)  $\int \frac{x+2}{\sqrt{x+1}} dx$

$$= \int \frac{x+2}{\sqrt{u}} du = \int \frac{(u-1)+2}{\sqrt{u}} du = \int \frac{u+1}{\sqrt{u}} du$$

$$= \int (u^{1/2} + u^{-1/2}) du$$

$$= \frac{u^{3/2}}{3/2} + \frac{u^{1/2}}{1/2} + C = \frac{2}{3} (x+1)^{3/2} + 2(x+1)^{1/2} + C$$

$$\begin{aligned} \text{LET } u &= x+1 \\ du &= dx \\ \Rightarrow u-1 &= x \end{aligned}$$