

### Quiz 2

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. (2 marks) pg.255 #40 Find the indefinite integral.

$$\int \sec y (\tan y - \sec y) dy = \int \sec y \tan y - \sec^2 y dy$$

$$= \sec y - \tan y + C$$

Question 2. (4 marks) pg.304 #65 Find the indefinite integral.

$$\int x^2 \sqrt{x+1} dx \stackrel{(1)}{=} \int x^2 \sqrt{u} dx$$

$$u = x+1 \quad (2)$$

$$du = dx \quad (3)$$

$$\rightarrow u-1 = x \quad (4)$$

$$\stackrel{(5)}{=} \int (u-1)^2 \sqrt{u} du$$

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

$$= \int u^{5/2} - 2u^{3/2} + u^{1/2} du$$

$$= \frac{2u^{7/2}}{7} - \frac{4u^{5/2}}{5} + \frac{2u^{3/2}}{3} + C$$

$$\stackrel{(6)}{=} \frac{2(x+1)^{7/2}}{7} - \frac{4(x+1)^{5/2}}{5} + \frac{2(x+1)^{3/2}}{3} + C$$

Question 3. (4 marks) pg.305 #53 Find the indefinite integral.

$$\int \frac{\csc^2 x}{\cot^3 x} dx \stackrel{(1)}{=} \int \frac{\csc^2 x}{u^3} dx$$

$$u = \cot x \quad (2)$$

$$du = -\csc^2 x dx \quad (3)$$

$$\frac{du}{-\csc^2 x} = dx \quad (4)$$

$$\stackrel{(5)}{=} \int \frac{\csc^2 x}{u^3} \left( \frac{du}{-\csc^2 x} \right)$$

$$= - \int \frac{1}{u^3} du$$

$$= - \frac{u^{-2}}{-2} + C$$

$$\stackrel{(6)}{=} \frac{1}{2 \cot^2 x} + C$$