

Quiz 1

This quiz is graded out of 10 marks. No books, calculators or notes 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. §4.1#36 (3 marks)

Integrate the following indefinite integral:

$$\begin{aligned}\int (x^2 - \sin x) dx &= \int x^2 dx - \int \sin x dx \\ &= \frac{x^3}{3} + \cos x + C\end{aligned}$$

Question 2. §4.5#68 (7 marks)

Integrate the following indefinite integral:

$$\int \frac{2x+1}{\sqrt{x+4}} dx$$

Solve by substitution.

Let ① $u = x+4$, $du = u'(x)dx$
② $du = dx$

$$= \int \frac{2x+1}{\sqrt{u}} dx \quad \text{by ①}$$

$$= \int \frac{2x+1}{\sqrt{u}} du \quad \text{by ②}$$

$$= \int \frac{2(u-4)+1}{\sqrt{u}} du \quad \text{notice from ① } x = u-4$$

$$= \int \frac{2u-7}{\sqrt{u}} du$$

$$= 2 \int \frac{u}{\sqrt{u}} du - 7 \int \frac{1}{\sqrt{u}} du$$

$$= 2 \int u^{1/2} du - 7 \int u^{-1/2} du$$

$$\begin{aligned}&= \frac{2(u)^{3/2}}{3/2} - \frac{7(u)^{1/2}}{1/2} + C \\ &= \frac{2(x+4)^{3/2}}{3/2} - \frac{7\sqrt{x+4}}{1/2} + C \\ &= \frac{4(x+4)^{3/2}}{3} - 14\sqrt{x+4} + C\end{aligned}$$