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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. §5.4#87 (5 marks)
Integrate the following indefinite integral:

$$\int \frac{e^{\sqrt{x}}}{\sqrt{x}}\,dx$$

Let $u = \sqrt{x}$ ①
$\Rightarrow du = u'(x)dx$
$du = \frac{1}{2\sqrt{x}}dx$
$2du = \frac{1}{\sqrt{x}}dx$ ②

$\overset{①}{=} \int \frac{e^u}{\sqrt{x}}dx$

$\overset{②}{=} \int e^u \cdot 2 \cdot du$

$= 2\int e^u du$

$= 2e^u + C$

$\overset{①}{=} 2e^{\sqrt{x}} + C$

Question 2. §5.7#13 (5 marks)
Integrate the following indefinite integral:

$$\int \frac{e^{2x}}{4+e^{4x}}\,dx$$

$= \int \frac{e^{2x}}{4+(e^{2x})^2}dx$

Let $u = e^{2x}$ ①
$\Rightarrow du = u'(x)dx$
$du = 2e^{2x}dx$
$\frac{du}{2} = e^{2x}dx$ ②

$\overset{①}{=} \int \frac{e^{2x}}{2^2+u^2}dx$

$\overset{②}{=} \int \frac{1}{2^2+u^2}\cdot\frac{du}{2}$

$= \frac{1}{2}\int \frac{1}{2^2+u^2}du$

$= \frac{1}{2}\left[\frac{1}{2}\arctan\frac{u}{2}\right] + C$

$\overset{①}{=} \frac{1}{4}\arctan\frac{e^{2x}}{2} + C$