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Quiz 5

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 marks)* §6.1 #61
If f is continous and $\int_0^9 f(x)\,dx = 4$, find $\int_0^3 xf(x^2)\,dx$.

$$\int_0^3 x f(x^2)\,dx = \int_0^9 f(u)\,\frac{du}{2}$$

$u = x^2$
$du = 2x\,dx$
$\frac{du}{2} = x\,dx$
$u(0) = 0$
$u(3) = 9$

$$= \frac{1}{2}\int_0^9 f(u)\,du$$

$$= \frac{1}{2}\cdot 4$$

$$= 2$$

Question 2. *(5 marks)* §6.1 #19
Evaluate the integral.

$$\int_0^1 \frac{y}{e^{2y}}\,dy$$

$u = y \qquad du = dy$
$v = \frac{e^{-2y}}{-2} \qquad dv = e^{-2y}\,dy$

$$= \int_0^1 y e^{-2y}\,dy$$

$$= [uv]_0^1 - \int_0^1 v\,du$$

$$= \left[\frac{y e^{-2y}}{-2}\right]_0^1 - \int_0^1 \frac{e^{-2y}}{-2}\,dy$$

$$= -\frac{e^{-2}}{2} + \frac{1}{2}\left[\frac{e^{-2y}}{-2}\right]_0^1$$

$$= -\frac{e^{-2}}{2} - \frac{1}{4}e^{-2} + \frac{1}{4}$$

$$= -\frac{3}{4}e^{-2} + \frac{1}{4}$$