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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)* §5.5 #62
If f is continous and $\int_0^4 f(x)\,dx = 10$, find $\int_0^2 f(2x)\,dx$.

$$\int_0^2 f(2x)\,dx = \int_0^4 f(u)\,\frac{du}{2}$$

$u = 2x$
$du = 2dx$
$\frac{du}{2} = dx$
$u(0) = 0$
$u(2) = 4$

$$= \frac{1}{2}\int_0^4 f(u)\,du$$

$$= \frac{1}{2}\cdot 10$$

$$= 5$$

Question 2. *(5 marks)* §6.1 #17
Evaluate the integral.

$$\int_1^2 \frac{\ln x}{x^2}\,dx$$

$u = \ln x$ $\quad du = \frac{1}{x}\,dx$

$v = \frac{-1}{x}$ $\quad dv = \frac{1}{x^2}\,dx$

$$= [uv]_1^2 - \int_1^2 v\,du$$

$$= \left[\frac{-\ln x}{x}\right]_1^2 - \int_1^2 \frac{-1}{x}\,\frac{1}{x}\,dx$$

$$= \frac{-\ln 2}{2} + \frac{\ln 1}{1} + \int_1^2 \frac{1}{x^2}\,dx$$

$$= \frac{-\ln 2}{2} - \left[\frac{1}{x}\right]_1^2$$

$$= \frac{-\ln 2}{2} - \frac{1}{2} + 1$$

$$= \frac{-\ln 2}{2} + \frac{1}{2}$$