

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. §5.5 #49 (5 marks) Evaluate the definite integral:

$$\int_e^{e^4} \frac{1}{x\sqrt{\ln x}} dx = \int_1^4 \frac{1}{\sqrt{u}} du = \int_1^4 u^{-\frac{1}{2}} du$$

$$u = \ln x$$

$$du = \frac{1}{x} dx$$

$$u(e) = \ln e = 1$$

$$u(e^4) = \ln e^4 = 4$$

$$= [2\sqrt{u}]_1^4$$

$$= 2\sqrt{4} - 2\sqrt{1}$$

$$= 2(2) - 2$$

$$= 2$$

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

$$\int_0^1 \frac{y}{e^{2y}} dy = \int_0^1 y e^{-2y} dy = [uv]_0^1 - \int_0^1 v du$$

$$u = y \quad du = dy$$

$$v = \frac{-e^{-2y}}{2} \quad dv = e^{-2y} dy$$

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

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

$$= \frac{-e^{-2}}{2} + \frac{1}{2} \left[\frac{e^{-2}}{-2} - \frac{e^0}{-2} \right]$$

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