

Quiz 11

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. (3 marks) §28.1 #13 Integrate.

$$\int \frac{5 \arctan 5x}{1+25x^2} dx = \int \frac{5u du}{5} = \frac{u^2}{2} + C$$

$$u = \arctan 5x$$

$$du = \frac{1}{1+(5x)^2} \cdot 5 dx = \frac{(\arctan 5x)^2}{2} + C$$

$$\frac{du}{5} = \frac{1}{1+25x^2} dx$$

Question 2. (4 marks) §28.2 #19 Evaluate the given definite integral.

$$\int_1^3 \frac{1+x}{4x+2x^2} dx = \int_6^{30} \frac{1}{u} \frac{du}{4} = \frac{1}{4} \int_6^{30} \frac{1}{u} du$$

$$u = 4x + 2x^2$$

$$du = x + 4x dx$$

$$\frac{du}{4} = 1 + x dx$$

$$u(3) = 4(3) + 2(3)^2 = 12 + 18 = 30$$

$$u(1) = 4(1) + 2(1)^2 = 6$$

$$= \frac{1}{4} \left[\ln|u| \right]_6^{30}$$

$$= \frac{1}{4} \left[\ln|30| - \ln|6| \right]$$

$$= \frac{1}{4} \ln\left(\frac{30}{6}\right) = \frac{1}{4} \ln 5 = \ln \sqrt[4]{5}$$

Question 3. (3 marks) §28.3 #23 Integrate.

$$\int \frac{e^{\cos 3x}}{\csc 3x} dx = \int e^{\cos 3x} \sin 3x dx = \int e^u \frac{du}{-3}$$

$$u = \cos 3x$$

$$du = -\sin 3x (3) dx$$

$$\frac{du}{-3} = \sin 3x dx$$

$$= -\frac{1}{3} e^u + C$$

$$= -\frac{1}{3} e^{\cos 3x} + C$$