

Math 172 - Quiz 9

November 1, 2017

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (3 points) Integrate: $\int (x^2 + 8)e^{3x} dx$

Signs	u & DERIVS	dv/dx & ANTIS
+	$x^2 + 8$	e^{3x}
-	$2x$	$\frac{1}{3}e^{3x}$
+	2	$\frac{1}{9}e^{3x}$
-	0	$\frac{1}{27}e^{3x}$

$$\frac{1}{3}(x^2 + 8)e^{3x} - \frac{2}{9}xe^{3x} + \frac{2}{27}e^{3x} + C$$

2. (4 points) Evaluate the definite integral: $\int_1^2 x^3 \ln x dx$

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

$$dv = x^3 \quad v = \frac{1}{4} x^4$$

$$\frac{1}{4} x^4 \ln x \Big|_1^2 - \int_1^2 \frac{1}{4} x^3 dx$$

$$4 \ln 2 - \frac{1}{16} x^4 \Big|_1^2$$

$$= 4 \ln 2 - 1 + \frac{1}{16} = 4 \ln 2 - \frac{15}{16} \approx 1.835$$

3. (3 points) Integrate: $\int \sin^5 x \cos^3 x dx$

$$\int \sin^5 x \cos^2 x \cos x dx$$

$$\int \sin^5 x (1 - \sin^2 x) \cos x dx$$

$$u = \sin x$$

$$du = \cos x dx$$

$$\int (u^5 - u^7) du = \frac{1}{6} u^6 - \frac{1}{8} u^8 + C$$

$$= \frac{1}{6} \sin^6 x - \frac{1}{8} \sin^8 x + C$$