

Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page.

Name and section: \_\_\_\_\_  
Instructors name: \_\_\_\_\_

1. Evaluate these expressions

(a)

$$\int 0 da$$

[1]

(b)

$$\int 3x^2 + 2x^3 dx$$

[2]

(c)

$$\int e^{-x} dx$$

[1]

(d)

$$\int \sin(x) + 3 dx$$

[1]

(e)

$$\int \frac{3a}{2x^2} dx$$

[1]

(f)

$$\int ax^{-1} dx$$

[1]

2. Evaluate these definite integral expressions

(a)

$$\int_0^2 e^{-x} dx$$

[2]

(b)

$$\int_{-1}^1 \sin(x) dx$$

[2]

(c)

$$\int_a^x 3x^{-2} dx$$

[2]

(d)

$$\int_0^{\infty} 3e^{-\frac{x}{2}} e^{-\frac{x}{2}} dx$$

[2]

(e)

$$\int_{-\pi}^{\pi} \sin(3x) dx$$

[2]

3. Evaluate these integrals using substitution

(a)

$$\int \ln(2-x) dx$$

[2]

(b)

$$\int_2^3 2x^3 dx$$

[3]

(c)

$$\int e^{-4x} dx$$

[2]

(d)

$$\int_a^{\frac{y}{3}} \cos(3y) dy$$

[3]

4. Evaluate these integrals with integration by parts, I recommend using the Internet to solve some of these as you may need to look them up in an integral table

(a)

$$\int \sin(3x^3) dx$$

[3]

(b)

$$\int \sin(x) e^{-2x} dx$$

[3]

(c)

$$\int 2x^3 \ln(x) dx$$

[3]

(d)

$$\int r e^{-ar} dx$$

[3]

(e)

$$\int \sqrt{x^2} dx$$

[4]

5. Evaluate these expressions

(a)

$$\int_0^{\infty} e^{-\frac{r}{2}} r^2 e^{-\frac{r}{2}} dr$$

[5]

(b)

$$\int x (\ln(x))^2 dx$$

[4]

(c)

$$\int \frac{1}{(2-x)(4-x)} dx$$

[5]

(d)

$$\int_a^x (1-x)\ln(x+1) dx$$

[5]

(e)

$$\int \frac{3x+1}{x^2+x} dx$$

[5]

6. Bonus Question

$$\int_0^2 (\sin(x) x^3 e^{-x} + \ln(x) x^2) \delta(x-1) dx$$

[3]