

GLS UNIVERSITY
Faculty Of Computer Applications & Information Technology
Integrated IMScIT Programme
221601104 Mathematics for Computer Science -I
Assignment-V
Unit-5 Differentiation and Integration

1. Differentiate the following with respect to x .

(i) $3x^4 - 2x^3 + x + 8$

(ii) $\frac{5}{x^4} - \frac{2}{x^3} + \frac{5}{x}$

(iii) $\sqrt{x} + \frac{1}{\sqrt[3]{x}} + e^x$

(iv) $\frac{3 + 2x - x^2}{x}$

(v) $x^3 e^x$

(vi) $(x^2 - 3x + 2)(x + 1)$

(vii) $x^4 - 3 \sin x + \cos x$

(viii) $\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^2$

2. Differentiate the following with respect to x .

(i) $\frac{e^x}{1+x}$

(ii) $\frac{x^2 + x + 1}{x^2 - x + 1}$

(iii) $\frac{e^x}{1 + e^x}$

3. Differentiate the following with respect to x .

(i) $x \sin x$

(ii) $e^x \sin x$

(iii) $e^x(x + \log x)$

(iv) $\sin x \cos x$

(v) $x^3 e^x$

4. Differentiate the following with respect to x .

(i) $\sin^2 x$

(ii) $\cos^2 x$

(iii) $\cos^3 x$

(iv) $\sqrt{1+x^2}$

(v) $(ax^2 + bx + c)^n$

(vi) $\sin(x^2)$

(vii) $\frac{1}{\sqrt{1+x^2}}$

5. Integrate the following with respect to x .

1. $\sqrt{3x+5}$

2. $\left(9x^2 - \frac{4}{x^2}\right)^2$

3. $(3+x)(2-5x)$

4. $\sqrt{x}(x^3 - 2x + 3)$

6. Evaluate :

1. $\int \left(\sqrt{2x} - \frac{1}{\sqrt{2x}} \right)^2 dx$

2. $\int 3^{2x+3} dx$

3. $\int \frac{e^x + 7}{e^x} dx$

4. $\int \left(e^x + \frac{1}{e^x} \right)^2 dx$

5. $\int (e^x + 1)^2 e^x dx$

6. $\int (2 \sin x - 5 \cos x) dx$

7. Find the following integrals:

1. $\int (5x^2 - 8x + 5) dx$

2. $\int (-6x^3 + 9x^2 + 4x - 3) dx$

3. $\int (x^{\frac{3}{2}} + 2x + 3) dx$

4. $\int \left(\frac{8}{x} - \frac{5}{x^2} + \frac{6}{x^3} \right) dx$

5. $\int \left(\sqrt{x} + \frac{1}{3\sqrt{x}} \right) dx$

6. $\int (12x^{\frac{3}{4}} - 9x^{\frac{5}{3}}) dx$

7. $\int \frac{x^2 + 4}{x^2} dx$

8. $\int \frac{1}{x\sqrt{x}} dx$

9. $\int (1 + 3t) t^2 dt$

10. $\int (2t^2 - 1)^2 dt$