Sri Lanka Institute of Information Technology
B. Sc Degree in IT/IS/CSN, Diploma in Information Technology
Year 01 – Semester I – 2017
Mathematics for Computing (IT1030)
Tutorial 05

1. Verify the statement by showing that the derivative of the right side is equal to the integrand of the left side.

   a) $\int (-9/x^4)\, dx = 3/x^3 + c$
   b) $\int (4x^3 - 1/x^2)\, dx = x^4 + 1/x + c$
   c) $\int (x - 2)(x + 2)\, dx = x^3/3 - 4x + c$

2. Find the indefinite integral at your result by differentiation.

   a) $\int 6\, dx$
   b) $\int 5x^{-3}\, dx$
   c) $\int du$
   d) $\int u^{-1/2}\, du$
   e) $\int (x^3 + 2)\, dx$
   f) $\int 1/x^3\, dx$
   g) $\int x^{2/3}\, dx$
   h) $\int 1/(4x^2)\, dx$
   i) $\int (t^2 + 2)/t^2\, dt$
   j) $\int x(3x^2 + 1)\, dx$
   k) $\int (x-1)(6x-5)\, dx$
   l) $\int x^2\sqrt{x}\, dx$
   m) $\int (2x^2 - 1)^2\, dx$
   n) $\int (1+3t)t^2\, dt$

3. Find the following definite integrals.

a) $\int_0^2 3\,dx$

b) $\int_0^3 2x\,dx$

c) $\int_0^5 (x+1)dx$

d) $\int_0^1 (x-x^2)dx$

e) $\int_1^2 \left(\frac{1}{x^4}\right)dx$

f) $\int_{-1}^1 |4x|dx$

g) $\int_0^4 (2-|x-2|)dx$

h) $\int_0^1 \sqrt{x}\,(1-x)dx$

i) $\int_1^4 \sqrt{\frac{2}{x}}dx$

j) $\int_0^3 |2x-3|dx$

Further Exercises

1. Evaluate the indefinite integrals given below.
   a) $\int -7\,dx$
   b) $\int (x^7+2)\,dx$
   c) $\int (x+1)^2 dx$
   d) $\int \left(x^{\frac{1}{2}}+3x\right)dx$
   e) $\int 3t(t^2+4t)dt$
   f) $\int (x+1)(x^2+2x)dx$
   g) $\int \left(\frac{1}{x^2}+\frac{1}{x}\right)\,dx$

2. Evaluate the definite integrals given below.
   a) $\int_1^2 x^3 dx$
   b) $\int_{-2}^4 (x^2+5x^3)\,dx$
   c) $\int_{-1}^1 x^{-\frac{1}{3}}\,dx$
   d) $\int_{-2}^2 |x-1|\,dx$