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 04

1. Use the differentiation rules to find the derivative of the function.

a) $y = 3$

b) $f(x) = 3x - 1$

c) $g(t) = t^2 + 2t - 3$

d) $g(x) = 4\sqrt[3]{x} + 2$

e) $y = 4x^{-2} + 2x^2$

2. Find the marginal cost for producing x units.

a) $C = 4500 + 1.47x$

b) $C = 104{,}000 + 7200x$

c) $C = 55{,}000 + 470x - 0.25\,x^2$

d) $C = 100\,(9 + 3\sqrt{x})$

3. Find the marginal revenue for producing x units.

a) $R = 50x - 0.5x^2$

b) $R = 30x - x^2$

c) $R = -6\,x^3 + 8x^2 + 200x$

d) $R = 50(20x - x^{3/2})$

4. Find the marginal profit for producing x units.

a) $P = -2x^2 + 72x - 145$

b) $P = -0.25\,x^2 + 2000x - 1{,}250{,}000$

c) $P = -0.00025\,x^2 + 12.2x - 25{,}000$

d) $P = -0.5\,x^3 + 30\,x^2 - 164.25x - 1000$

5. Find the value of the derivative of the functions given below.

a) $f(x) = x^2(3x^3 - 1)$

b) $f(x) = (x^2 + 1)(2x + 5)$

c) $f(x) = \frac{x}{x - 5}$

d) $h(x) = \frac{x + 1}{x - 1}$

6. Differentiate the functions given below.

a) $f(x) = (x^3 - 3x)(2x^2 + 3x + 5)$

b) $f(x) = (x - 1)(x^2 - 3x + 2)$

c) $g(x) = \left(\frac{x-3}{x+4}\right)(x^2 + 2x + 1)$

d) $f(x) = (x^2 - x)(x^2 + 1)(x^2 + x + 1)$

7. Find the derivative of the functions given below.

a) $y = (2x - 7)^3$

b) $y = 2(x^2 - 1)^3$

c) $y = \sqrt[3]{9x^2 + 4}$

d) $y = (4 - 3x)^{-5/2}$

e) $f(t) = (9t + 2)^{2/3}$

Further Exercises

1. Find the derivative of the following.

a) $f(x) = x^2 - 5x + 3$

b) $f(x) = \left(\frac{2-5x}{\sqrt{x+2}}\right)^{2/5} + (x+6)(x^3+2x)$

c) $f(t) = (t^2 + 6t)\left(t^{1/5} - 4\right)$

d) $f(x) = (x^8 + 5x^3 - 6)\left(3x + \sqrt[3]{4x}\right)$

e) $f(x) = \frac{x-4}{x^3+5x}$

f) $f(t) = (t^4 + 3t - 7)^{12}$

g) $f(x) = \sqrt{x^2 + 3x + 8}$

h) $g(x) = \frac{\left(x^4+\sqrt{x}-5\right)}{\left(x+4x^2\right)}$

i) $f(x) = \sqrt[5]{x^{-2} - x^5}$

j) $f(s) = \left(\frac{6s+5s^2}{s^3+5}\right)^8$