MATH 1115, Mathematics for Commerce
WINTER 2011
Toby Kenney
Homework Sheet 8
Due: Wednesday 30th March: 2:30 PM

Each multiple choice question is worth one mark, other questions are worth two marks. Show your working for the other questions, but for multiple choice questions, just the letter is sufficient.

1. The derivative of $3x^3 + 4x^2 - 6x + 2$ is:

    (A) $3x^2 + 4x - 6$

    (B) $6x^2 + 4x - 6$

    (C) $9x^2 + 8x - 6$

    (D) $9x^3 + 8x^2 - 6x + 2$

    (E) undefined

2. The derivative of $\frac{3x^2 + 2x - 1}{x^2 - 5}$ is:

    (A) $\frac{6x + 2}{x^2 - 5}$

    (B) $\frac{6x + 2}{2x}$

    (C) $-\frac{2x^2 + 28x + 10}{(x^2 - 5)^2}$

    (D) $\frac{3x^3 - 6x^2 + 5x - 3}{(x^2 - 5)^2}$

    (E) $-\frac{6x^3 + 2x^2 - 30x - 10}{(x^2 - 5)^2}$

3. The derivative of $\sqrt{x^3 + 3x - 5}$ at $x = 2$ is:

    (A) $-\frac{5}{2}$

    (B) 3

    (C) $\frac{5}{2}$

    (D) 45

    (E) undefined

4. A manufacturer is selling a product. The demand equation is given by $p = \frac{1000}{q+3}$. The marginal revenue is given by:

    (A) $-\frac{1000}{(q+3)^2}$

    (B) $\frac{3000}{(q+3)^2}$

    (C) $\frac{1000}{q+3}$

    (D) $\frac{1000q}{q+3}$

    (E) $1000(q + 3)$

5. For the demand function in the previous question, the point elasticity of demand at $p = 50, q = 17$ is:

(A) $\frac{5}{2}$

(B) $-\frac{2}{5}$

(C) $-\frac{20}{17}$

(D) $-\frac{50}{17}$

(E) $-\frac{17}{125}$

6. A company estimates that the demand equation for its product is given by $p = 10000 - q^2$ for $0 < q \leqslant 100$.

(a) Calculate the elasticity of demand as a function of q.

(b) Calculate the price that the company should charge in order to maximise its revenue.