Exercises

7.1.1 Use the product rule to differentiate:

(a) $(x^4 - 3x^2)(5x + 1)$ (b) $(6x^3 + x)(x^6 - 3x^4 - 2)$

(c) $(x^m + 8)(5x^2 + 2x^{-n})$ (d) $(4x^4 + 2x^2 - 1)(x + 5)x^n$

In parts (c) and (d), m and n are positive integers.

7.1.2 Use the quotient rule to differentiate:

(a) $(1 + 2x)/(1 - 2x)$ (b) $(x^2 + 1)/(2x^3 + 1)$

(c) $(a + bx)/(0.3x^2 + 0.6x^4)$ (d) $(3x + a)/(x^2 + b)$

In parts (c) and (d), a and b are constants.

7.1.3 Capital K and labour L in an economy are given by the linear functions

$$K = 2 + 3t, \quad L = 1 + 4t,$$

where t denotes time. Find the rate of change with respect to time of the capital-labour ratio K/L.

7.2 The composite function