Question 7 **(6 marks)**

Given that $\log_{10}2 = x$ and $\log_{10}7 = y$

(a) express $\log_{10}14$ in terms of x and y. (2 marks)

(b) show that $\log_{10}17.5 = y - 2x + 1$. (2 marks)

(c) evaluate 10^{y-x}. (2 marks)

(a) Differentiate $2x\sin(3x)$ with respect to x. (2 marks)

(b) Hence show that $\int x\cos(3x)dx = \frac{3x\sin(3x) + \cos(3x)}{9} + c$. (3 marks)