

SAMPLE PAPER 2014: PAPER 1

QUESTION 6 (25 MARKS)

Question 6 (a)

- (i) 1. $I_1 = \frac{1}{4}x^4 + x^3 + 3x + 1$
 2. $I_2 = \frac{1}{4}x^4 + x^3 + 3x + 2$
 3. $I_3 = \frac{1}{4}x^4 + x^3 + 3x + 3$

FORMULAE AND TABLES BOOK
Calculus: Integrals [page 26]

$$\int x^n dx = \frac{x^{n+1}}{n+1} + c, n \neq -1$$

(ii) $\int f(x) dx = h(x)$

$h(x)$ is an indefinite integral which means that when you differentiate it with respect to x you get $h'(x)$

or

$$h'(x) = f(x).$$

(iii) $I = \frac{1}{4}x^4 + x^3 + 3x + c$

QUESTION 6 (b)

(i) $h(x) = x \ln x$

$$h'(x) = x \times \frac{1}{x} + (\ln x) \times 1 = 1 + \ln x$$

FORMULAE AND TABLES BOOK
Calculus: Product rule [page 25]

$$y = uv \Rightarrow \frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

(ii) $h'(x) = 1 + \ln x \Rightarrow \ln x = h'(x) - 1$

$$\int \ln x dx = \int (h'(x) - 1) dx = h(x) - x + c = x \ln x - x + c$$

FORMULAE AND TABLES BOOK
Calculus: Derivatives [page 25]

$$y = \ln x \Rightarrow \frac{dy}{dx} = \frac{1}{x}$$