

Definite and Indefinite Integrals (From OCR 4722)**Q1, (Jun 2005, Q3)**

(i) Find $\int (2x + 1)(x + 3) dx$. [4]

(ii) Evaluate $\int_0^9 \frac{1}{\sqrt{x}} dx$. [3]

Q2, (Jun 2007, Q6)

(a) (i) Find $\int x(x^2 - 4) dx$. [3]

(ii) Hence evaluate $\int_1^6 x(x^2 - 4) dx$. [2]

(b) Find $\int \frac{6}{x^3} dx$. [3]

Q3, (Jan 2009, Q1)

Find

(i) $\int (x^3 + 8x - 5) dx$, [3]

(ii) $\int 12\sqrt{x} dx$. [3]

Q4, (Jun 2009, Q4)

(i) Find the binomial expansion of $(x^2 - 5)^3$, simplifying the terms. [4]

(ii) Hence find $\int (x^2 - 5)^3 dx$. [4]

Q5, (Jan 2011, Q6a,bi)

(a) Find $\int \frac{x^3 + 3x^{\frac{1}{2}}}{x} dx$. [4]

(b) (i) Find, in terms of a , the value of $\int_2^a 6x^{-4} dx$, where a is a constant greater than 2. [3]

Q6, (Jan 2013, Q9)

The positive constant a is such that $\int_a^{2a} \frac{2x^3 - 5x^2 + 4}{x^2} dx = 0$.

(i) Show that $3a^3 - 5a^2 + 2 = 0$. [6]

(ii) Show that $a = 1$ is a root of $3a^3 - 5a^2 + 2 = 0$, and hence find the other possible value of a , giving your answer in simplified surd form. [6]

Q7, (Jun 2014, Q6)

(i) Find the binomial expansion of $\left(x^3 + \frac{2}{x^2}\right)^4$, simplifying the terms. [5]

(ii) Hence find $\int \left(x^3 + \frac{2}{x^2}\right)^4 dx$. [4]

Q8, (Jun 2015, Q6i,ii)

The cubic polynomial $f(x)$ is defined by $f(x) = x^3 - 19x + 30$.

(i) Given that $x = 2$ is a root of the equation $f(x) = 0$, express $f(x)$ as the product of 3 linear factors. [4]

(ii) Use integration to find the exact value of $\int_{-5}^3 f(x) dx$. [4]

Q9, (Jun 2016, Q5a,bi)

(a) Find $\int (x^2 + 2)(2x - 3) dx$. [3]

(b) (i) Find, in terms of a , the value of $\int_1^a (6x^{-2} - 4x^{-3}) dx$, where a is a constant greater than 1. [4]

Q10, (Jun 2018, Q4)

(a) Find $\int_1^4 (3\sqrt{x} + 5) dx$. [4]

(b) Find $\int \frac{6x^4 + 4}{x^2} dx$. [3]
