Edexcel Maths C2

Topic Questions from Papers

Exponentials and Logarithms
2. Solve

(a) \( 5^x = 8 \), giving your answer to 3 significant figures,

(b) \( \log_2(x + 1) - \log_2 x = \log_2 7 \).
3. (i) Write down the value of \( \log_a 36 \).

(ii) Express \( 2 \log_a 3 + \log_a 11 \) as a single logarithm to base \( a \).
4. Solve the equation

\[ 5^x = 17, \]

giving your answer to 3 significant figures.

(Total 3 marks)
6. (a) Find, to 3 significant figures, the value of \( x \) for which \( 8^x = 0.8 \).

(b) Solve the equation

\[
2\log_3 x - \log_3 7x = 1.
\]
5. Given that $a$ and $b$ are positive constants, solve the simultaneous equations

\[ a = 3b, \]
\[ \log_3 a + \log_3 b = 2. \]

Give your answers as exact numbers.
4. (a) Find, to 3 significant figures, the value of \( x \) for which \( 5^x = 7 \). 

(b) Solve the equation \( 5^{2x} - 12(5^x) + 35 = 0 \).
4. Given that $0 < x < 4$ and

$$\log_5 (4 - x) - 2 \log_5 x = 1,$$

find the value of $x$. (6)
8. (a) Find the value of $y$ such that

$$\log_2 y = -3$$

(b) Find the values of $x$ such that

$$\frac{\log_2 32 + \log_2 16}{\log_2 x} = \log_2 x$$
5. (a) Find the positive value of $x$ such that

$$\log_x 64 = 2$$

(b) Solve for $x$

$$\log_2 (11 - 6x) = 2 \log_2 (x - 1) + 3$$
7. (a) Given that

\[ 2 \log_3(x-5) - \log_3(2x-13) = 1, \]

show that \( x^2 - 16x + 64 = 0. \) (5)

(b) Hence, or otherwise, solve \( 2 \log_3(x-5) - \log_3(2x-13) = 1. \) (2)
8. (a) Sketch the graph of \( y = 7^x, \quad x \in \mathbb{R} \), showing the coordinates of any points at which the graph crosses the axes. 

(b) Solve the equation

\[
7^{2x} - 4(7^x) + 3 = 0
\]

giving your answers to 2 decimal places where appropriate.
3. Find, giving your answer to 3 significant figures where appropriate, the value of $x$ for which

(a) $5^x = 10$.

(b) $\log_3(x - 2) = -1$. 

(2)

(2)
4. Given that \( y = 3x^2 \),

(a) show that \( \log_3 y = 1 + 2 \log_3 x \)

(b) Hence, or otherwise, solve the equation

\[ 1 + 2 \log_3 x = \log_3 (28x - 9) \]
2. Find the values of $x$ such that

$$2 \log_3 x - \log_3(x - 2) = 2$$
6. Given that \(2 \log_2(x+15) - \log_2 x = 6\)

   (a) Show that \(x^2 - 34x + 225 = 0\)  
      
   (b) Hence, or otherwise, solve the equation \(2 \log_2(x+15) - \log_2 x = 6\)
6. Given that \( \log_3 x = a \), find in terms of \( a \),

(a) \( \log_3 (9x) \)  

(b) \( \log_3 \left( \frac{x^5}{81} \right) \)

(giving each answer in its simplest form.

(c) Solve, for \( x \),

\[
\log_3 (9x) + \log_3 \left( \frac{x^5}{81} \right) = 3
\]

(giving your answer to 4 significant figures.)
Question 6 continued
7. (i) Find the exact value of \( x \) for which

\[
\log_2(2^x) = \log_2(5x + 4) - 3
\]

(ii) Given that

\[
\log_a y + 3\log_a 2 = 5
\]

express \( y \) in terms of \( a \).

Give your answer in its simplest form.
Core Mathematics C2

Candidates sitting C2 may also require those formulae listed under Core Mathematics C1.

Cosine rule

\[ a^2 = b^2 + c^2 - 2bc \cos A \]

Binomial series

\[(a+b)^n = a^n + \binom{n}{1}a^{n-1}b + \binom{n}{2}a^{n-2}b^2 + \ldots + \binom{n}{r}a^{n-r}b^r + \ldots + b^n \quad (n \in \mathbb{N})\]

where \( \binom{n}{r} = \frac{n!}{r!(n-r)!} \)

\[(1+x)^n = 1 + nx + \frac{n(n-1)}{1 \times 2}x^2 + \ldots + \frac{n(n-1)\ldots(n-r+1)}{1 \times 2 \times \ldots \times r}x^r + \ldots \quad (|x|<1, \ n \in \mathbb{R})\]

Logarithms and exponentials

\[ \log_a x = \frac{\log_b x}{\log_b a} \]

Geometric series

\[ u_n = ar^{n-1} \]

\[ S_n = \frac{a(1-r^n)}{1 - r} \]

\[ S_n = \frac{a}{1 - r} \quad \text{for} \quad |r| < 1 \]

Numerical integration

The trapezium rule:

\[ \int_{a}^{b} y \ dx \approx \frac{1}{2} h \{y_0 + y_n + 2(y_1 + y_2 + \ldots + y_{n-1})\}, \text{ where } h = \frac{b-a}{n} \]
Core Mathematics C1

**Mensuration**

Surface area of sphere = $4\pi r^2$

Area of curved surface of cone = $\pi r \times$ slant height

**Arithmetic series**

\[ u_n = a + (n - 1)d \]

\[ S_n = \frac{1}{2} n(a + l) = \frac{1}{2} n[2a + (n - 1)d] \]