Edexcel Maths C1

Topic Questions from Papers

Algebra & Functions
1. (a) Write down the value of $8^\frac{1}{3}$.

   (1)

(b) Find the value of $8^{-\frac{2}{3}}$.

   (2)
1. Factorise completely

\[ x^3 - 4x^2 + 3x. \]
5. (a) Write $\sqrt{45}$ in the form $a\sqrt{5}$, where $a$ is an integer.

(b) Express $\frac{2(3 + \sqrt{5})}{(3 - \sqrt{5})}$ in the form $b + c\sqrt{5}$, where $b$ and $c$ are integers.
6.  (a) Expand and simplify \((4 + \sqrt{3})(4 - \sqrt{3})\).

(2)

(b) Express \(\frac{26}{4 + \sqrt{3}}\) in the form \(a + b\sqrt{3}\), where \(a\) and \(b\) are integers.

(2)
2. (a) Express \( \sqrt{108} \) in the form \( a\sqrt{3} \), where \( a \) is an integer.

(b) Express \( (2 - \sqrt{3})^2 \) in the form \( b + c\sqrt{3} \), where \( b \) and \( c \) are integers to be found.

(Total 4 marks)
6. (a) Show that \((4 + 3\sqrt{x})^2\) can be written as \(16 + k\sqrt{x} + 9x\), where \(k\) is a constant to be found.

(b) Find \(\int (4 + 3\sqrt{x})^2 \, dx\).
10. (a) On the same axes sketch the graphs of the curves with equations

\[(i) \quad y = x^2(x - 2),\]  

\[(ii) \quad y = x(6 - x),\]

and indicate on your sketches the coordinates of all the points where the curves cross the x-axis.

(b) Use algebra to find the coordinates of the points where the graphs intersect.
1. Simplify \((3 + \sqrt{5})(3 - \sqrt{5})\).
2. (a) Find the value of $8^{\frac{4}{3}}$.

(b) Simplify $\frac{15x^{\frac{4}{3}}}{3x}$.
2. (a) Write down the value of $16^{\frac{1}{4}}$.  

(b) Simplify $(16x^{12})^{\frac{3}{4}}$. 

(Total 3 marks)
3. Simplify

$$\frac{5 - \sqrt{3}}{2 + \sqrt{3}}$$

giving your answer in the form $a + b\sqrt{3}$, where $a$ and $b$ are integers.
2. Factorise completely

\[ x^3 - 9x. \]

(Total 3 marks)
1. (a) Write down the value of $125^{\frac{1}{3}}$. 

(b) Find the value of $125^{-\frac{2}{3}}$. 

(Total 3 marks)
3. Expand and simplify \((\sqrt{7} + 2)(\sqrt{7} - 2)\).
1. Simplify

(a) \((3\sqrt{7})^2\)

(b) \((8 + \sqrt{5})(2 - \sqrt{5})\)
2. Given that $32 \sqrt{2} = 2^a$, find the value of $a$. 

(Total 3 marks)
2. (a) Expand and simplify \((7 + \sqrt{5})(3 - \sqrt{5})\).

(b) Express \(\frac{7 + \sqrt{5}}{3 + \sqrt{5}}\) in the form \(a + b\sqrt{5}\), where \(a\) and \(b\) are integers.
1. Write
\[ \sqrt{75} - \sqrt{27} \]

in the form \( k \sqrt{x} \), where \( k \) and \( x \) are integers.

(Total 2 marks)
1. (a) Find the value of $16^{\frac{1}{2}}$ 

(b) Simplify $x(2x^{\frac{1}{2}})^4$
3. Simplify

\[
\frac{5 - 2\sqrt{3}}{\sqrt{3} - 1}
\]

giving your answer in the form \( p + q\sqrt{3} \), where \( p \) and \( q \) are rational numbers.

(4)
1. Find the value of
   (a) \(25^{\frac{1}{3}}\)
   (b) \(25^{-\frac{2}{3}}\)

(Total 3 marks)
2. (a) Simplify \( \sqrt{32} + \sqrt{18} \)

giving your answer in the form \( a\sqrt{2} \), where \( a \) is an integer.

(2)

(b) Simplify \( \frac{\sqrt{32} + \sqrt{18}}{3 + \sqrt{2}} \)

giving your answer in the form \( b\sqrt{2} + c \), where \( b \) and \( c \) are integers.

(4)
2. (a) Evaluate $(32)^{\frac{1}{5}}$, giving your answer as an integer. 

(b) Simplify fully $\left(\frac{25x^4}{4}\right)^{\frac{1}{2}}$
2.  (a) Evaluate \((32)^{\frac{1}{5}}\), giving your answer as an integer.  

(b) Simplify fully \(\left(\frac{25x^4}{4}\right)^{\frac{1}{2}}\)  

(Total 4 marks)
3. Show that \( \frac{2}{\sqrt{12} - \sqrt{8}} \) can be written in the form \( \sqrt{a} + \sqrt{b} \), where \( a \) and \( b \) are integers. (5)
8. \[ 4x - 5 - x^2 = q - (x + p)^2 \]
where \( p \) and \( q \) are integers.

(a) Find the value of \( p \) and the value of \( q \). 

(b) Calculate the discriminant of \( 4x - 5 - x^2 \) 

(c) On the axes on page 17, sketch the curve with equation \( y = 4x - 5 - x^2 \) showing clearly the coordinates of any points where the curve crosses the coordinate axes.
Question 8 continued

\[\begin{align*}
O & \quad x \\
& \quad y \\
\end{align*}\]

(Total 8 marks)
1. Factorise completely $x - 4x^3$ (3)

(Total 3 marks)
2. Express \(8^{2x+3}\) in the form \(2^y\), stating \(y\) in terms of \(x\). 

(Total 2 marks)
3. (i) Express
\[(5 - \sqrt{8})(1 + \sqrt{2})\]
in the form \(a + b\sqrt{2}\), where \(a\) and \(b\) are integers. (3)

(ii) Express
\[\sqrt{80} + \frac{30}{\sqrt{5}}\]
in the form \(c\sqrt{5}\), where \(c\) is an integer. (3)
2. Express \( \frac{15}{\sqrt{3}} - \sqrt{27} \) in the form \( k\sqrt{3} \), where \( k \) is an integer. (4)
5. Solve

(a) \(2^r = 8\)  \hspace{1cm} (1)

(b) \(2^x \times 4^{x+1} = 8\)  \hspace{1cm} (4)
1. Simplify

\[
\frac{7 + \sqrt{5}}{\sqrt{5} - 1}
\]

giving your answer in the form \(a + b\sqrt{5}\), where \(a\) and \(b\) are integers.

(Total 4 marks)
3.  (a) Find the value of $8^3$  

(b) Simplify fully $\left(\frac{2x^{\frac{1}{2}}}{4x^2}\right)^3$
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

$u_n = a + (n - 1)d$

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