

A-Level Edexcel

MATHS CORE

UNIT C12(IAL)

2015 – 2019

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1 - (6663-S 2016-Unit C12(IAL)-Q3) - ALGEBRA

Answer this question without a calculator, showing all your working and giving your answers in their simplest form.

(i) Solve the equation

$$4^{2x+1} = 8^{4x} \quad (3)$$

(ii) (a) Express

$$3\sqrt{18} - \sqrt{32}$$

in the form $k\sqrt{2}$, where k is an integer.

(2)

(b) Hence, or otherwise, solve

$$3\sqrt{18} - \sqrt{32} = \sqrt{n} \quad (2)$$

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2 - (6663-W 2016-Unit C12(IAL)-Q3) - ALGEBRA

Answer this question without the use of a calculator and show your method clearly.

(i) Show that

$$\sqrt{45} - \frac{20}{\sqrt{5}} + \sqrt{6}\sqrt{30} = 5\sqrt{5} \quad (2)$$

(ii) Show that

$$\frac{17\sqrt{2}}{\sqrt{2} + 6} = 3\sqrt{2} - 1 \quad (3)$$

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3 - (6663-S 2017-Unit C12(IAL)-Q2) - ALGEBRA

Simplify the following expressions fully.

(a) $\left(\frac{1}{9}x^4\right)^{0.5}$ (1)

(b) $\left(\frac{x}{\sqrt{2}}\right)^{-2}$ (1)

(c) $x\sqrt{3} \div \sqrt{\frac{48}{x^4}}$ (2)

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4 - (6663-S 2017-Unit C12(IAL)-Q8) - ALGEBRA, INTEGRATION

(a) Find $\int (3x^2 + 4x - 15)dx$, simplifying each term.

(3)

Given that b is a constant and

$$\int_b^4 (3x^2 + 4x - 15)dx = 36$$

(b) show that $b^3 + 2b^2 - 15b = 0$

(2)

(c) Hence find the possible values of b .

(3)

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ANSWERS

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1 - (6663-S 2016-Unit C12(IAL)-Q3) - ALGEBRA

(i)	Either $4^{2x+1} = 2^{2(2x+1)}$ and $8^{4x} = 2^{3 \times 4x}$ or $8^{4x} = 4^{\frac{3}{2} \times 4x}$ $2(2x+1) = 12x \Rightarrow x = \frac{1}{4}$	M1 dM1A1 (3)
(ii)(a)	$3\sqrt{18} - \sqrt{32} = 9\sqrt{2} - 4\sqrt{2} = 5\sqrt{2}$	M1A1 (2)
(b)	$\sqrt{n} = 5\sqrt{2} \Rightarrow n = (5\sqrt{2})^2 = 25 \times 2 = 50$	M1A1 (2)
		(7 marks)

2 - (6663-W 2016-Unit C12(IAL)-Q3) - ALGEBRA

(i)	$\begin{aligned} & \sqrt{45} - \frac{20}{\sqrt{5}} + \sqrt{6}\sqrt{30} \\ &= \sqrt{9}\sqrt{5} - \frac{20\sqrt{5}}{\sqrt{5}\sqrt{5}} + \sqrt{6}\sqrt{6}\sqrt{5} = 3\sqrt{5} - 4\sqrt{5} + 6\sqrt{5} \\ &= 5\sqrt{5} \end{aligned}$	M1 A1* [2]
(ii)	$\begin{aligned} \text{LHS} &= \frac{17\sqrt{2}(\sqrt{2}-6)}{(\sqrt{2}+6)(\sqrt{2}-6)} \\ &= \frac{17 \times 2 - 17 \times 6\sqrt{2}}{2-36} \quad \text{oe} \\ &= \frac{34 - 102\sqrt{2}}{-34} = 3\sqrt{2} - 1^* \end{aligned}$	M1 A1 A1* [3]
		5 marks

3 - (6663-S 2017-Unit C12(IAL)-Q2) - ALGEBRA

(a)	$\frac{1}{3}x^2$	B1 (1)
(b)	$\left(\frac{x}{\sqrt{2}}\right)^{-2} = \frac{2}{x^2}$	B1 (1)
(c)	$\sqrt{3}(x) \div \sqrt{\frac{48}{x^4}} = \frac{\sqrt{3}}{\sqrt{48}} \times x\sqrt{x^4} = \frac{1}{4}x^3$	M1A1 (2)
		(4 marks)

4 - (6663-S 2017-Unit C12(IAL)-Q8) - ALGEBRA, INTEGRATION

(a)	$\int (3x^2 + 4x - 15) dx = x^3 + 2x^2 - 15x + c$	M1A1A1 (3)
(b)	$\int_b^4 (3x^2 + 4x - 15) dx = [x^3 + 2x^2 - 15x + c]_b^4 = 36$ $(64 + 32 - 60) - (b^3 + 2b^2 - 15b) = 36$ $b^3 + 2b^2 - 15b = 0$	M1 A1* (2)
(c)	$b = 0$ $b^2 + 2b - 15 = 0 \Rightarrow (b + 5)(b - 3) = 0$ $b = -5, 3$	B1 M1 A1 (3) (8 marks)

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