



Pure Year 1 exam questions (AS maths)-AQA

NOTE:

Please be aware that in the Year 12 collections, you will find questions from the A-Level (Year 13) papers. However, these questions are intentionally included because they align with Year 12 content and topics.

Happy studying!

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Ch 2 Surds and indices

June 2022 Question 7 Paper 2

7 The expression

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

can be written in the form $a + b\sqrt{n}$, where a and b and n are rational but \sqrt{n} is irrational.

Find expressions for a and b in terms of n .

[4 marks]

ANSWER

Q	Marking instructions	AO	Marks	Typical solution
7	Recalls that correct step is to multiply top and bottom by $2 - \sqrt{n}$ PI by subsequent work	1.2	M1	$\frac{3 - \sqrt{n}}{2 + \sqrt{n}} \times \frac{2 - \sqrt{n}}{2 - \sqrt{n}}$
	Multiplies numerator and denominator by $(2 - \sqrt{n})$ to get correct terms (condone sign errors) Does not need to be simplified PI by correct simplification	1.1a	M1	$\frac{6 - 3\sqrt{n} - 2\sqrt{n} + n}{4 + 2\sqrt{n} - 2\sqrt{n} - n}$
	Obtains correct simplified numerator and denominator not necessarily in a fraction	1.1b	A1	$\frac{6 + n - 5\sqrt{n}}{4 - n}$
	States correct expressions for a and b Or gives expression with a and b correctly identified	1.1b	A1	$a = \frac{6 + n}{4 - n}$ $b = \frac{-5}{4 - n}$
Question 7 Total			4	

November 2021 Question 6 Paper 3 (A-Level)

6 Given that $x > 0$ and $x \neq 25$, fully simplify

$$\frac{10 + 5x - 2x^{\frac{1}{2}} - x^{\frac{3}{2}}}{5 - \sqrt{x}}$$

Fully justify your answer.

[4 marks]

ANSWER

Q	Marking instructions	AO	Marks	Typical solution
6	Begins to solve the problem using an appropriate technique eg factorising or grouping terms in numerator or writing $y = \sqrt{x}$ PI if $2 + x$ or $25 - x$ or $5 - x^{1/2}$ seen or multiplies by $\frac{5 + \sqrt{x}}{5 + \sqrt{x}}$	3.1a	M1	$\frac{10 + 5x - 2x^{\frac{1}{2}} - x^{\frac{3}{2}}}{5 - \sqrt{x}} \times \frac{5 + \sqrt{x}}{5 + \sqrt{x}}$ $= \frac{50 + 25x - 10x^{\frac{1}{2}} - 5x^{\frac{3}{2}} + 10\sqrt{x} + 5x\sqrt{x} - 2x - x^{\frac{3}{2}}\sqrt{x}}{25 - x}$ $= \frac{50 + 23x - x^2}{25 - x}$ $= \frac{(25 - x)(2 + x)}{25 - x}$ $= 2 + x$
	Obtains one correct common factor in numerator eg $2 + x$ or $25 - x$ or $5 - x^{1/2}$ or expands numerator condone one error may be unsimplified	1.1a	M1	
	Obtains second correct common factor in numerator or obtains correct simplified numerator and denominator PI in long division	1.1a	M1	
	Completes manipulation by cancelling common factor to obtain $2 + x$	1.1b	A1	
Total			4	

June 2019 Question 4 Paper 1

- 4 Show that $\frac{\sqrt{6}}{\sqrt{3}-\sqrt{2}}$ can be expressed in the form $m\sqrt{n} + n\sqrt{m}$, where m and n are integers.

Fully justify your answer.

[4 marks]

ANSWER

Q	Marking Instructions	AO	Marks	Typical Solution
4	Multiplies by $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}}$	AO1.1a	M1	$\frac{\sqrt{6}}{\sqrt{3}-\sqrt{2}} \times \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ $= \frac{\sqrt{18}+\sqrt{12}}{3-2}$ $\frac{\sqrt{18}+\sqrt{12}}{1}$ $= \sqrt{9 \times 2} + \sqrt{4 \times 3}$ $= 3\sqrt{2} + 2\sqrt{3}$
	Correctly evaluates denominator to get 3 – 2 or 1	AO1.1b	A1	
	Evaluates numerator, one term correct $\sqrt{18}$ or $\sqrt{12}$ or $3\sqrt{2}$ or $2\sqrt{3}$	AO1.1b	A1	
	Completes solution CAO	AO2.1	R1	
Total			4	

June 2019 Question 2 Paper 2 (A-Level)

2 Simplify $\sqrt{a^{\frac{2}{3}} \times a^{\frac{2}{5}}}$

Circle your answer.

[1 mark]

$a^{\frac{2}{15}}$

$a^{\frac{4}{15}}$

$a^{\frac{8}{15}}$

$a^{\frac{16}{15}}$

ANSWER

Q	Marking instructions	AO	Mark	Typical solution
2	Circles the correct response	1.1b	B1	$a^{\frac{8}{15}}$
	Total		1	