1.1 Laws of Indices & Surds

Question Paper

Course	Edexcel IAL Maths: Pure 1
Section	1. Algebra & Functions
Торіс	1.1 Laws of Indices & Surds
Difficulty	V. Hard

Time allowed:	60
Score:	/49
Percentage:	/100

(a) Write down the value of $256^{\frac{1}{4}}$

[1 mark]

Question 1

(b) Use your answer to part (a) to show that $1 \div 256^{-\frac{3}{4}} = 64$.

[2 marks]

Question 2

(a) Given that $a^{\frac{2}{3}} = 16$, find the possible values of *a*.

[3 marks]

Question 2

(b) Simplify $x^{-\frac{2}{3}} \div x^{-\frac{3}{4}}$

[2 marks]

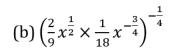


Simplify the following expressions, giving your answers in the form ax^n where a and n are rational numbers and any fractions are in lowest terms.

(a)
$$(8x^2)^{-\frac{1}{3}} \times \frac{1}{4}x^{-\frac{1}{3}}$$

[3 marks]

Question 3



[3 marks]





[3 marks]

Question 4

Given that $y = \frac{81}{16}x^{-12}$, express each of the following in the form ax^n , where a and n are constants.

(a) $y^{\frac{3}{4}}$

[1 mark]

Question 4

(b) $y^{-\frac{1}{2}}$

[1 mark]

Question 4 (c) $\left(y^{\frac{1}{2}}\right)^{-3}$

[2 marks]

(a) Show that $2\sqrt{18} + \sqrt{50} - 5\sqrt{32} = a\sqrt{b}$, where *a* and *b* are integers.

[3 marks]

Question 5

(b) By expanding and simplifying, show that $(\sqrt{12} - 3)(2 - \sqrt{75}) = 19\sqrt{3} - 36$

[3 marks]

Question 6

(a) $\sqrt{a} - \sqrt{b} = \sqrt{a - b}$ is not true in general. Give an example of an *a* and a *b* for which it *is* true.

[1 mark]

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Question 6

(b) Show that $\frac{2-\sqrt{3}}{1+\sqrt{3}} = a + b\sqrt{3}$, where *a* and *b* are rational numbers.

[4 marks]

Question 7

Solve the equation $\sqrt{20} + \frac{\sqrt{5}}{2x} = \frac{1}{x\sqrt{45}}$

[5 marks]

Question 8

(a) Expand $(a + b\sqrt{5})^2$.

[2 marks]

A square has an area of $(49 + 12\sqrt{5})$ m² and a side length of $(a + b\sqrt{5})$ m.

(b) Show that ab = 6, and explain why this proves that a and b must both be non-negative.

[2 marks]

Question 8

(c) Show that $a^4 - 49a^2 + 180 = 0$.

[3 marks]

Question 8

(d) By using the substitution $y = a^2$ or otherwise, solve the equation $a^4 - 49a^2 + 180 = 0$. Hence determine the side length of the square.

[5 marks]