1.1 Laws of Indices & Surds

Question Paper

Course	Edexcel IAL Maths: Pure 1
Section	1. Algebra & Functions
Topic	1.1 Laws of Indices & Surds
Difficulty	Medium

Time allowed: **50**

Score: **/40**

Percentage: **/100**

Question 1

(a) Write down the value of $27^{\frac{1}{3}}$

[1 mark]

Question 1

(b) Use your answer to part (a) to show that $27^{\frac{2}{3}} = 9$.

[2 marks]

Question 2

(a) Given that $a^{\frac{1}{3}} = 2$, find the value of a.

[2 marks]

Question 2

(b) Simplify $x^2 \div x^{\frac{5}{3}}$

[2 marks]

Question 3

Simplify the following expressions:

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

[2 marks]

Question 3

(b) $24x^3 \div 8x^{\frac{11}{5}}$

[2 marks]

Question 3

(c) $15x^{-\frac{2}{3}} \div 10x^{-\frac{2}{3}}$

[2 marks]

Question 4

Given that $y = \frac{1}{16}x^4$, express each of the following in the form ax^n, where a and n are constants.

(a) $y^{\frac{1}{2}}$

[1 mark]

Question 4

(b) y^{-1}

[1 mark]

Question 4

(c) $y^{-\frac{3}{2}}$

[2 marks]

Question 5

(a) Simplify $3\sqrt{5} + 4\sqrt{3} - 7\sqrt{3} + \sqrt{5}$

[2 marks]

Question 5

(b) By expanding and simplifying, show that

$$(\sqrt{3} - 5)(\sqrt{3} + 5) = -22$$

[2 marks]

Question 6

(a) Give an example to show that $\sqrt{a} + \sqrt{b} = \sqrt{a+b}$ is not true in general.

[1 mark]

Question 6

(b) Show that $\frac{14}{4+\sqrt{2}} = 4 - \sqrt{2}$.

[3 marks]

Question 7

Solve the equation $6 - x\sqrt{7} = \frac{2x}{\sqrt{7}}$, giving your answer in the form $\frac{a\sqrt{7}}{b}$ where a and b are integers.

[4 marks]

Question 8

A rectangle has an area of 14 m^2 and a length of $\left(3-\sqrt{2}\right)$ m. Find the width of the rectangle, showing clear algebraic working. Give your answer as an exact value.

[4 marks]

Question 9

(a) Show that $\frac{\left(3-\sqrt{x}\right)^2}{x}$ can be written as $9x^{-1}-6x^{-\frac{1}{2}}+1$.

[2 marks]

Question 9

(b) Given that $128\sqrt{2} = 2^a$, find the value of a.

[3 marks]

Question 9

(c) Show that $\frac{x(2x^4-\sqrt{x})}{\sqrt{x}}$ can be written as $2x^a - x^b$, where a and b are rational numbers to be found.

[2 marks]