

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	V. Hard

Time allowed: 60

Score: /49

Percentage: /100

Question 1

(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]

Question 3

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**

(b) $\left(\frac{2}{9}x^{\frac{1}{2}} \times \frac{1}{18}x^{-\frac{3}{4}}\right)^{-\frac{1}{4}}$

[3 marks]

Question 3

$$(c) \frac{\left(8x^{-\frac{2}{3}}\right)^{\frac{2}{3}}}{\left(64x^{-\frac{1}{3}}\right)^{\frac{1}{3}}}$$

[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]

Question 5

(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]

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]

Question 8

A square has an area of $(49 + 12\sqrt{5}) \text{ m}^2$ and a side length of $(a + b\sqrt{5}) \text{ m}$.

- (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]



Head to [savemyexams.co.uk](https://www.savemyexams.co.uk) for more awesome resources