

1

(a) Find the value of $\sqrt[4]{81 \times 10^8}$

.....
(2)

(b) Find the value of $64^{-\frac{1}{2}}$

.....
(2)

(c) Write $\frac{3^n}{9^{n-1}}$ as a power of 3

.....
(2)

(Total for Question 1 is 6 marks)

2

$$16^{\frac{1}{5}} \times 2^x = 8^{\frac{3}{4}}$$

Work out the exact value of x .

.....
(Total for Question 2 is 3 marks)

3

$$(ax^6)^{\frac{1}{n}} = 7x^3$$

Work out the value of a and the value of n .

$$a = \dots\dots\dots$$

$$n = \dots\dots\dots$$

(Total for Question 3 is 2 marks)

- 4 Given that $9^{-\frac{1}{2}} = 27^{\frac{1}{4}} \div 3^{x+1}$
find the exact value of x .

$x = \dots\dots\dots$

(Total for Question 4 is 3 marks)

5 (a) Work out the value of $\left(\frac{16}{81}\right)^{\frac{3}{4}}$

.....
(2)

$$3^a = \frac{1}{9} \qquad 3^b = 9\sqrt{3} \qquad 3^c = \frac{1}{\sqrt{3}}$$

(b) Work out the value of $a + b + c$

.....
(2)

(Total for Question 5 is 4 marks)

6

(a) Simplify $8^2 \times \sqrt[3]{4^6}$

Give your answer in the form 2^a where a is an integer.

Show each stage of your working clearly.

.....
(3)

Given that $n^{\left(-\frac{4}{5}\right)} = \left(\frac{1}{2}\right)^4$ where $n > 0$

(b) find the value of n .

$n =$
(4)

(Total for Question 6 is 7 marks)

7

$$2^{2y} \times 2^{3y+2} = \frac{8^{5y}}{4^n}$$

Find an expression for n in terms of y .

Show clear algebraic working and simplify your expression.

(Total for Question 7 is 4 marks)

8 (a) $\sqrt{2} \div \frac{8^3}{16^{\frac{3}{2}}} = 2^n$

Work out the value of n
Show your working clearly.

$n = \dots\dots\dots$
(3)

(b) Find 4% of 4.5×10^{157}
Give your answer in standard form.

$\dots\dots\dots$
(3)

(Total for Question 8 is 6 marks)

9

$$\frac{18 \times (\sqrt{27})^{4n+6}}{6 \times 9^{2n+8}} = 3^x$$

Express x in terms of n

Show your working clearly and simplify your expression.

$x = \dots\dots\dots$

(Total for Question 9 is 3 marks)

10 Find the values of n such that

$$\frac{10^{4n} \times 2^{3(n^2-5n)} \times 5^{2(1-2n)}}{20^2} = 1$$

Show clear algebraic working.

(Total for Question 10 is 5 marks)