POWERS AND ROOTS

[ESTIMATED TIME: 50 minutes]



32

1. [3 marks]

(a) Write $3 \times 3 \times 3 \times 3 \times 3$ as a single power of 3

(1)

(b) Write $\frac{7^5 \times 7^9}{7^6}$ as a single power of 7

(2)

2. [4 marks]

(a) Write $2^3 \times 2^6$ as a single power of 2

(1)

(b) Write $\frac{3^9}{3^4}$ as a single power of 3

(1)

(c)
$$\frac{5^n}{5^4 \times 5^6} = 5^3$$

Find the value of n.

n =



(a) Write $2^3 \times 2^4$ as a single power of 2

(1)

(b) $280 = 2^n \times 5 \times 7$

Find the value of n.

 $n = \dots$ (2)

4. [4 marks]

(a) Simplify, leaving your answers in index form,

(i) $7^5 \times 7^3$

.....

(ii) $5^9 \div 5^3$

(2)

(b) Solve $\frac{2^9 \times 2^4}{2^n} = 2^8$

 $n = \dots$ (2)

- (a) Simplify, leaving your answers in index form,
 - (i) $6^5 \times 6^2 \times 6$

.....

(ii) $(9^7)^2$

(2)

(b) $\frac{5^n \times 5^3}{5^6} = 5^4$

Find the value of n.

n = (2)

6. [3 marks]

(a) Simplify, leaving your answer in index form

(i) $2^4 \times 2^3$

.....

(ii) $3^8 \div 3^2$

(2)

(b) $5^x = 1$

Find the value of x.

 $x = \dots$ (1)

Evaluate the following.

Give your answers as fractions.

(a) 2^{-3}

(1)

(b) $\left(\frac{27}{343}\right)^{\frac{1}{3}}$

(1)

(c) $\left(\sqrt{\frac{3}{8}}\right)^4$

(1)

8. [5 marks]

(a) Find the value of $(9^{\frac{1}{2}})^4$

(1)

(b) Express 5²⁰ as a power of 25

(2)

(c) Express $\sqrt{8}$ as a power of 2

(2)

(a) Simplify $\left(4h^{\frac{2}{3}}\right)^3$



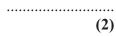
$$\frac{a\sqrt{a}}{\sqrt[3]{a^2}} = a^k$$

(b) Work out the value of k.



10. [7 marks]

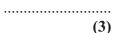
(a) Express $8^{\frac{1}{2}}$ as a power of 2



(b) Express $\sqrt{3}$ as a power of 9



(c) Express $\frac{1}{4\sqrt{2}}$ as a power of 2



(a) (i) Write down the value of 10° .

.....

(ii) Write down the value of 10^{-2} .

(2)

(b) (i) Write 8 as a power of 2

.....

(ii) Write 2 as a power of 8

.....

(iii) Write $\frac{1}{4}$ as a power of 2

(3)

(c) Evaluate $\left(\frac{27}{343}\right)^{\frac{2}{3}}$

.....

(2)

Solve $3 \times 4^{2k+8} = 24$

Show your working clearly.

k =

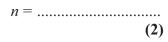
13. [3 marks]

 $y = 16 \times 10^{8k}$ where k is an integer.

Find an expression, in terms of k, for $y^{\frac{5}{4}}$. Give your answer in standard form.



(a) $(\sqrt{a})^7 = k\sqrt{a}$, where $k = a^n$ Find the value of n.



(b) Express $\frac{1}{2\sqrt{2}}$ as a power of 2

