

Non-Calculator Questions

Algebraic Roots & Indices

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Easy (5 questions)	/6
Medium (13 questions)	/26
Hard (9 questions)	/16
Very Hard (5 questions)	/13
Total Marks	/61

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Easy Questions

1 (a) Simplify $t^{21} \div t^7$.

(1 mark)

(b) Simplify $(u^5)^5$.

(1 mark)

2 Simplify $(x^8)^3$.

(1 mark)

3 $t^x \times t^2 = t^{10}$

Find the value of x .

$x = \dots\dots\dots$

(1 mark)

4 Simplify fully $(3e)^0$

(1 mark)

5 Simplify $\frac{w^2}{w^3}$.

(1 mark)

Medium Questions

1 Simplify

$$(3x^2y^4)^3$$

(2 marks)

2 Simplify.

$$2x^2 \times 5x^5$$

(2 marks)

3 Simplify $(4xy^2)^3$.

(2 marks)

4 Simplify $8t^8 \div 4t^4$.

(2 marks)

5 Simplify $(5x^4)^3$.

(2 marks)

6 Simplify $(27x^6)^{\frac{1}{3}}$.

(2 marks)

7 Simplify $2x^3 \times 3x^2$.

(2 marks)

8 $3^{-2} \times 3^x = 81$

Find the value of x .

$x = \dots\dots\dots$

(2 marks)

9 Simplify.

i) $a^3 \times a^6$

[1]

ii) $(5xy^2)^3$

[2]

(3 marks)

10 Simplify $\left(\frac{4}{x}\right)^{-2}$.

(1 mark)

11 Simplify $a^3b^7 \div a^6b^2$.

(2 marks)

12 Simplify $5a^3c^2 \times 2a^2c^7$.

(2 marks)

13 Simplify $(3w^3)^3$.

(2 marks)

Hard Questions

1 $25 = 125^k$

Find the value of k .

$$k = \dots\dots\dots$$

(1 mark)

2 Simplify $(27x^9)^{\frac{2}{3}}$.

(2 marks)

3 Find the value of $(64x^4)^{0.5} \times 4x^{-2}$.

(3 marks)

4

$$2^3 = 4^p$$

Find the value of p .

$$p = \dots\dots\dots$$

(1 mark)

5 Find the value of n when $5^n = \frac{1}{125}$.

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

(1 mark)

6 Simplify $\left(\frac{64}{m^3}\right)^{-\frac{1}{3}}$.

(2 marks)

7 $2^p = \frac{1}{8^4}$

Find the value of p .

$p = \dots\dots\dots$

(2 marks)

8 Given that $\left(\sqrt[3]{\frac{1}{x}}\right)^4 = x^m$

find the value of m

$m = \dots\dots\dots$

(1 mark)

9 Simplify fully $\left(\frac{9t^4w^9}{18t^6w^{10}}\right)^{-2}$

(3 marks)

Very Hard Questions

1 $2^{12} \div 2^{\frac{k}{2}} = 32$

Find the value of k .

$k = \dots\dots\dots$

(2 marks)

2 Simplify $\left(\frac{27x^{12}}{64y^3}\right)^{-\frac{1}{3}}$.

(3 marks)

3 $3^{-q} \times \frac{1}{27} = 81$

Find the value of q .

$q = \dots\dots\dots$

(2 marks)

4 Simplify fully $\left(\frac{64x^6}{25y^2}\right)^{-\frac{1}{2}}$

(2 marks)

5 Given that $4^{k+3} = 16 \times 2^k$

find the value of k .

Show your working clearly.

$k = \dots\dots\dots$

(4 marks)