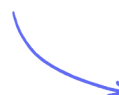


Algebraic Roots & Indices

Algebraic Roots & Indices

Easy (15 questions)	/21
Medium (16 questions)	/47
Hard (19 questions)	/54
Total Marks	/122

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Easy Questions

1 Simplify $(m^{-2})^5$

(1 mark)

2 (a) Simplify $m^5 \div m^3$

(1 mark)

(b) Simplify $5x^4y^3 \times x^2y$

(2 marks)

3 (a) Simplify $m^5 \times m^3$

(1 mark)

(b) Simplify $\frac{p^6}{p^2}$

(1 mark)

4 (a) Simplify $p^2 \times p^5$

(1 mark)

(b) Simplify $g^6 \div g^4$

(1 mark)

(c) Simplify $(k^3)^2$

(1 mark)

5 Simplify $t^8 \div t^3$

(1 mark)

6 (a) Simplify $(t^3)^2$

(1 mark)

(b) Simplify $\frac{w^9}{w^4}$

(1 mark)

7 Simplify $(3x^2y)^0$

(1 mark)

8 Simplify $\frac{x^9}{x^2}$

(1 mark)

9 Write down the value of g^0

(1 mark)

10 Simplify $e^8 \div e^2$

(1 mark)

11 Simplify $w^1 \times w^0$

A. 1

B. 0

C. w

D. w^2

(1 mark)

12 Given that $y^{18} \div y^6 = y^k$, find the value of k .

$k = \dots\dots\dots$

(1 mark)

13 Simplify $a^6 \div a^2$

(1 mark)

14 Simplify $(b^5)^3$

(1 mark)

15 Simplify $\frac{3y^3}{y^{-4}}$

(1 mark)

Medium Questions

1 Simplify $5u^2w^4 \times 7uw^3$

(2 marks)

2 Simplify $(9x^8y^3)^{\frac{1}{2}}$

(2 marks)

3 (a) Simplify $a^4 \times a^5$

(1 mark)

(b) Simplify $\frac{45e^6f^8}{5ef^2}$

(2 marks)

(c) Write down the value of $9^{\frac{1}{2}}$

(1 mark)

4 (a) Simplify $x^7 \times x^3$

(1 mark)

(b) Simplify $(m^4)^3$

(1 mark)

(c) Simplify $\frac{36af^8}{12a^5f^2}$

(2 marks)

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

(2 marks)

6 (a) Simplify $(p^3)^2$

(1 mark)

(b) Simplify $\frac{t^8}{t^3}$

(1 mark)

(c) $2^3 \times 2^n = 2^9$

Work out the value of n .

(1 mark)

(d) $2x^3 = 128$

Work out the value of x .

(1 mark)

7 Simplify fully $\frac{p^3 \times p^4}{p^2}$

(2 marks)

8 (a) Solve $3x^2 = 147$

(2 marks)

(b) Work out the value of 2^{-3}

(1 mark)

(c) Simplify $(3x^2)^3$

(2 marks)

(d) $w = 4p - 16$

Make p the subject of this formula.

(2 marks)

9 Simplify $2a^3b \times 5a^2b^3$

(2 marks)

10 Simplify fully $\frac{n^7 \times n^3}{n^6}$

(2 marks)

11 (a) Simplify $m^3 \times m^4$

(1 mark)

(b) Simplify $(5np^3)^3$

(2 marks)

(c) Simplify $\frac{32q^9r^4}{4q^3r}$

(2 marks)

12 Simplify $(2x^3y^5)^4$

(2 marks)

13 Simplify $(16e^{10} f^6)^{\frac{1}{2}}$

(2 marks)

14 Simplify fully.

$$\frac{3a^8 \times 2a^5}{a^2}$$

(3 marks)

15 Show that $a^5 \times (a^3)^2$ can be expressed as a^{11} .

(2 marks)

16 Simplify $\frac{3b^2c}{d^2} \times \frac{10bc^5d}{c}$

(2 marks)

Hard Questions

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

Work out the exact value of x .

(3 marks)

2 (a) $p^3 \times p^x = p^9$

Find the value of x .

(1 mark)

(b) $(7^2)^y = 7^{10}$

Find the value of y .

(1 mark)

(c) $100^a \times 1000^b$ can be written in the form 10^w

Show that $w = 2a + 3b$

(2 marks)

3 (a) Simplify fully $(3e)^0$

(1 mark)

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

(2 marks)

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

find the value of m

$m = \dots\dots\dots$

(1 mark)

5 Given that $\frac{7^{206} \times 7^m}{7^{214}} = 7^{-3}$

find the value of m

$m = \dots\dots\dots$

(2 marks)

6 Simplify completely $\left(\frac{16w^8}{y^{20}}\right)^{-\frac{3}{4}}$

(3 marks)

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

find the value of n .

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

(4 marks)

8 Given that $\frac{y^5 \times y^n}{y^6} = y^{13}$

work out the value of n .

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

(2 marks)

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

(1 mark)

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

find the value of k .

Show your working clearly.

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

(4 marks)

11 Write $27 \times (3^2)^7$ as a single power of 3

(3 marks)

12 Write 16×8^{2x} as a power of 2 in terms of x

(3 marks)

13 Choose the expression that is equivalent to $4(2^n + 2^{n-1})$

A. $2^{n+2} + 2^{n+1}$

B. $2^{2n} + 2^{2(n-1)}$

C. $8^n + 8^{n-1}$

D. $2^{n+2} + 2^{n-1}$

(1 mark)

14 Simplify fully $\frac{a^3b^2}{cd} \times \frac{c}{ab^5}$

(3 marks)

15 $\sqrt{6^2 + 8^2} = \sqrt[3]{125a^3}$

Work out the value of a .

(4 marks)

16 $(ar^b)^4 = 16r^{20}$ where a and b are positive integers.

Work out a and b

$a = \dots\dots\dots$

$b = \dots\dots\dots$

(2 marks)

17 (a) Simplify $4a^{\frac{1}{2}} \times 3a^2$

(2 marks)

(b) Simplify $\left[\frac{2a^2}{a^{-3}} \right]^3$

(3 marks)

18 Show that $\sqrt[3]{a^4} \times \frac{1}{a}$ can be expressed as $a^{\frac{1}{3}}$.

(3 marks)

19 Show that $(a^3)^{-\frac{1}{3}} \times (a^2)^{\frac{1}{2}} = 1$.

(3 marks)