

Q Index Laws (Non-Calc)

- 1** Work out.

$$2^4$$

..... [1]

- 5** Write down the value of 9^0 .

..... [1]

- 5** Simplify $d^8 \div d^2$.

..... [1]

- 6** Simplify.

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

..... [1]

(b) $m^{15} \div m^5$

..... [1]

(c) $(k^3)^5$

..... [1]

- 11** Find the value of p when $6^p \times 6^4 = 6^{28}$.

$p =$ [1]

4 Simplify. $a^2 \div a^6$

..... [1]

4 Simplify $\frac{a^3 \times a^7}{a^4}$.

..... [1]

10 $5^w \div 5^{13} = 25$

Find the value of w .

$w =$ [1]

3 Simplify. $(x^8y^7) \div (x^{-1}y^3)$

..... [2]

6 Simplify.

(a) $y^3 \div y^5$

..... [1]

(b) $7x^0$

..... [1]

10 Simplify.

(a) $n^5 \times n$

..... [1]

(b) $8x^6 \div 2x^2$

..... [2]

11 Simplify $3x^3 \times 4x^4$.

..... [2]

9 Simplify $4x^4 \times 5x^5$.

..... [2]

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

..... [2]

7 Simplify.

$$30t^{30} \div 5t^5$$

..... [2]

10 Simplify $18x^{18} \div 9x^9$.

..... [2]

7 Simplify.

$$32g^{32} \div 4g^4$$

..... [2]

3 (a) Simplify, giving your answer as a single power of 7.

(i) $7^5 \times 7^6$

..... [1]

(ii) $7^{15} \div 7^5$

..... [1]

(iii) $42 + 7$

..... [1]

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

..... [3]

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

..... [2]

5 Find the value of

(a) 64^0 ,

..... [1]

(b) $64^{\frac{1}{3}}$.

..... [1]

8 Find the value of $49^{\frac{1}{2}}$.

..... [1]

10 Work out $16^{\frac{1}{4}}$.

..... [1]

12 $\sqrt{\frac{10^{400}}{10^{220} \times 10^{80}}} = 10^k$

Find the value of k .

$k =$ [3]

12 Work out the value of $32^{\frac{2}{5}}$.

..... [1]

11 Find the value of $64^{\frac{2}{3}}$.

..... [2]

(b) $7^n = \sqrt[5]{7}$

Find the value of n .

$n = \dots\dots\dots$ [1]

5 Work out $4^{\frac{3}{2}}$.

$\dots\dots\dots$ [1]

15 Simplify $(3125w^{3125})^{\frac{1}{5}}$.

$\dots\dots\dots$ [2]

18 Simplify $(343x^9)^{\frac{2}{3}}$.

$\dots\dots\dots$ [2]

17 Simplify $(81x^{12})^{\frac{3}{4}}$.

..... [2]

22 Simplify fully $(216y^{216})^{\frac{2}{3}}$.

..... [2]

14 Simplify $(25x^{16})^{\frac{3}{2}}$.

..... [2]

17 (a) Simplify.

$$(64y^{27})^{\frac{2}{3}}$$

..... [2]

21 Simplify fully.

$$(243y^{10})^{\frac{3}{5}}$$

..... [2]

21 Simplify.

(a) $(5x^4)^3$

..... [2]

(b) $(256x^{256})^{\frac{3}{8}}$

..... [2]

7 Simplify.

(a) $\frac{15w^{15}}{3w^3}$

..... [2]

(b) $(125y^6)^{\frac{2}{3}}$

..... [2]

26 $\sqrt[3]{y^2} = \sqrt[6]{x}$ and $y = \sqrt[n]{x}$.

Find the value of n .

$n = \dots\dots\dots$ [2]

21 (a) $\sqrt[5]{3} = 3^h$

Write down the value of h .

$h = \dots\dots\dots$ [1]

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

$\dots\dots\dots$ [2]

23 (a) Simplify $\left(\frac{x^2}{4}\right)^{\frac{3}{2}}$.

..... [2]

8 Write 4^{-2} as a fraction.

..... [1]

15 $4^x = \frac{1}{64}$

Find the value of x .

$x =$ [1]

13 (a) Simplify $h^2 \times h^5$.

..... [1]

(b) Simplify $\left(\frac{7}{x}\right)^{-3}$.

..... [1]

(c) $a^8 \div a^p = a^2$

Find the value of p .

$p =$ [1]

8 Find the value of

(a) $\left(\frac{1}{2}\right)^{-3}$,

..... [1]

8 Find the value of $125^{-\frac{1}{3}}$.

..... [1]

11 Work out $4^{-\frac{3}{2}}$.

..... [2]

19 Find the value of $27^{-\frac{2}{3}}$.

..... [2]

4 Work out $(64)^{-\frac{2}{3}}$.

..... [2]

17 Find the value of

(a) $125^{\frac{2}{3}}$

..... [2]

(b) $4^{-\frac{5}{2}}$.

..... [2]

20 Simplify fully.

(a) $(81x^{16})^{\frac{3}{4}}$

..... [2]

(b) $\left(\frac{1}{y^2}\right)^{-\frac{1}{2}}$

..... [1]

2 (a) Simplify fully.

(i) $p^3 \times p^{11}$

..... [1]

(ii) $\frac{18m^6}{3m^2}$

..... [2]

(iii) $\left(\frac{27x^9y^{27}}{64}\right)^{-\frac{1}{3}}$

..... [3]

9 (a) Simplify.

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

..... [2]

(ii) $\left(\frac{16}{x^{16}y^8}\right)^{-\frac{3}{2}}$

..... [3]

(b) $2^{12} \div 2^{\frac{k}{2}} = 32$

Find the value of k .

$k =$ [2]

13 (a) $3^{3p} \times 3^{2p} = 729$

Find the value of p .

$p = \dots\dots\dots$ [2]

(b) Simplify.

$(32x^{10})^{\frac{1}{5}}$

$\dots\dots\dots$ [2]

(c) $(243y^{20})^{\frac{2}{5}}$

$\dots\dots\dots$ [2]

6 Find the value of p when $2^6 \div 4^p = 2^7$.

$p = \dots\dots\dots$ [3]

- 11 (a) Simplify fully.
 $(4ab^5)^4$

..... [2]

(b) $2p^{\frac{1}{3}} = 6$

Find the value of p .

$p =$ [1]

(c) $81^2 \div 3^t = 9$

Find the value of t .

$t =$ [2]

17 $3^x = 27^{x+2}$

Find the value of x .

$x =$ [2]

16

$$8^{\frac{4}{3}} = 32^x$$

Find the value of x .

$$x = \dots\dots\dots [2]$$

13 (a) Write 243×27^{2n} as a single power of 3 in terms of n .

$$\dots\dots\dots [2]$$

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

..... [2]

(b) $25 = 125^k$

Find the value of k .

$k =$ [1]

25 $m^{-\frac{1}{4}} = 27m^{-1}$

Find the value of m .

$m = \dots\dots\dots$ [3]

(d) $5^n + 5^n + 5^n + 5^n + 5^n = 5^m$

Find an expression for m in terms of n .

$m = \dots\dots\dots$ [2]

22 (a) Simplify.

$$\frac{x^{\frac{2}{3}}}{x^{\frac{8}{3}}}$$

..... [1]

(b) $16 = 64^k$

Find the value of k .

$k =$ [1]

(c) Solve.

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

$x =$ [3]

21

$$\frac{16^{5m}}{4} = 64^{2n}$$

Find m in terms of n .

$$m = \dots\dots\dots [3]$$

(b)

$$16^x \times \left(\frac{1}{2}\right)^x = 4^{x+3}$$

Find the value of x .

$$x = \dots\dots\dots [4]$$

(e) $3^{2x-1} = \frac{1}{9^x} \times 3^{2y-x}$

Find an expression for y in terms of x .

$y = \dots\dots\dots$ [4]