

HARDER ALGEBRAIC INDICES

Task 1

1) The equation $3^{\frac{1}{2}} \times 3^{\frac{3}{4}} = 3^p$
Work out the value of p .

2) Given that $\frac{16}{2^6} = 2^n$
Work out the value of n .

3) Given that $\frac{25}{5^{-3}} = 5^k$
Work out the value of k .

4) Write $\sqrt{3} \times 9 \times 27$ as a single power of 3.

5) Given that $64 \times \sqrt{2} = 2^x$
Work out the value of x .

Task 2 – Fully simplify each of the following expressions.

6) $(36a^8)^{\frac{1}{2}}$

7) $(121b^{10})^{\frac{1}{2}}$

8) $(49c^4)^{\frac{3}{2}}$

9) $(27d^{12})^{\frac{2}{3}}$

10) $(8x^6y^9)^{\frac{2}{3}}$

11) $(64m^9n^6)^{\frac{1}{3}}$

12) $(16p^{20})^{\frac{3}{4}}$

13) $(81q^6r^{10})^{\frac{1}{2}}$

14) $\left(\frac{36x^8}{y^4}\right)^{\frac{1}{2}}$

15) $\left(\frac{64a^{12}}{16b^8}\right)^{\frac{1}{2}}$

Task 3 – Fully simplify each of the following expressions.

16) $(5x^3y^6)^{-2}$

17) $\left(\frac{z^4}{9}\right)^{-\frac{1}{2}}$

18) $\left(\frac{9x^2}{16y^6}\right)^{-\frac{1}{2}}$

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

20) $(25a^2b^6)^{-\frac{3}{2}}$

21) $\left(\frac{8p^6}{q^{12}}\right)^{-\frac{2}{3}}$

22) $\left(\frac{16x^4y^8}{32x^6y^{10}}\right)^{-1}$

23) $\left(\frac{49a^4b^6}{121a^6b^8}\right)^{-\frac{1}{2}}$

24) $\left(\frac{16m^6}{p^{12}}\right)^{-1/2}$

Challenge

25) Solve

$$\frac{2^{4x+1} \times 4^{x-2}}{8^{x-3}} = 256^{\frac{1}{2}}$$