Level 2 Further Maths

Negative Indices
Fractional Indices

Ensure you have: Pencil or pen

Guidance
1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Revision for this topic
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1. Write as a single power of $x$

(a) \( \frac{1}{x^3} \)

(b) $\sqrt{x}$

(c) \( \sqrt{\frac{1}{x^8}} \)

\[
\sqrt{x^{-8}} = x^{-4}
\]

\[
(x^{-4} \times x^{-4} = x^{-8})
\]

(d) \( \frac{1}{\sqrt[3]{x^2}} \)

\[
\frac{1}{x^{\frac{2}{3}}}
\]
2. Write \( \frac{m^3 \times m^2}{(m^7)^2} \) as a single power of \( m \)

\[
\frac{m^5}{m^{14}}
\]

\( m^{-9} \) (2)

3. Given that \( 2^m + 2^n = \frac{9}{32} \)

Find \( mn \)

\[
\frac{1}{4} + \frac{1}{32} = \frac{8}{32} + \frac{1}{32} = \frac{9}{32}
\]

\[2^{-2} + 2^{-5} \]

\[-2 \times -5 \]

\[10 \] (3)
4. $x \quad x^3 \quad x^0 \quad x^{-2}$

Find a value of $x$ such that the expressions above are in order, from smallest to largest.

$x = 0.5$

$x \quad x^3 \quad x^0 \quad x^{-2}$

- $0.5$
- $0.125$
- $1$
- $4$

5. Write $\sqrt{w^5}$ as a single power of $w$.

$w^{\frac{5}{2}}$

6. Write $27$ in the form $9^n$.

$9^{\frac{3}{2}}$
7. Simplify \((16x^8)^{\frac{3}{4}}\)

8. Evaluate \(\left(\frac{8}{125}\right)^{-\frac{2}{3}}\)

\[
\frac{2}{5} \quad \frac{4}{25}
\]

9. \(3^x = 9\sqrt{3}\) and \(3^y = \frac{1}{\sqrt{3}}\)

Work out \(3^{x-y}\)

\[
3^x = 3^\frac{5}{2} \\
3^y = 3^{-\frac{1}{2}}
\]

\[
3^{x-y} = 3^x \div 3^y = 3^{\frac{5}{2}} \div 3^{-\frac{1}{2}} = 3^3
\]

\(\text{27}\)