Level 2 Further Maths

Laws of 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

www.corbettmaths.com/more/further-maths/
1. Write \((x^3)^2\) as a single power of \(x\)

\[ (x^3)^2 = x^{6} \]

\[ \text{.................} \] (1)

2. (a) \(c^4 \times c^n = c^8\)

Work out the value of \(n\)

\[ c^4 \times c^n = c^{n+4} \]
\[ c^{n+4} = c^8 \]
\[ n+4 = 8 \]
\[ n = 4 \]

\[ \text{.................} \] (1)

(b) \(\frac{y^{12}}{y^4} = y^m\)

Work out the value of \(m\)

\[ y^{12} \div y^4 = y^{12-4} \]
\[ y^8 = y^m \]
\[ m = 8 \]

\[ \text{.................} \] (1)

(c) \((a^n)^4 = \frac{(a^3)^6}{a^7}\)

Work out the value of \(n\)

\[ (a^n)^4 = a^{4n} \]
\[ \frac{(a^3)^6}{a^7} = a^{18-7} \]
\[ a^{11} = a^{4n} \]
\[ 11 = 4n \]
\[ n = 2.75 \]

\[ \text{.................} \] (3)
3. \[
\frac{y^7 \times y^8}{y^4 \times y^n} = y^5
\]
Find the value of \(n\)

4. (a) \[y^4 \times y^n = 1\]
Work out the value of \(n\)

(b) Simplify fully \[
\frac{a^8}{a^3 \times a^{-9}}
\]

\[
\text{.........................} \quad (2)
\]

\[
\text{.........................} \quad (1)
\]

\[
\text{.........................} \quad (2)
\]
5. Work out the value of \((2^{\frac{3}{2}} - 2^{\frac{1}{2}})^2\)

6. (a) Simplify \((2xy^2)^4\)

(b) Simplify \((3x^3y^5)^3\)

7. Simplify fully \(\left(\frac{3}{4}x^5y\right)^3\)
8. $-1 < x < 0$

Write the following expressions in order, starting with the smallest.

$$x \quad x^2 \quad x^3 \quad x^4$$

\[\text{.................} \quad (2)\]

9. Simplify fully \[
\frac{(6xy^3)^3}{4xy^5}\]

\[\text{.................} \quad (3)\]

10. Write $\sqrt[3]{w^{-10}} \times w^{-2}$ as an integer power of $w$.

\[\text{.................} \quad (2)\]
11. Given that \( a = 3^x \) and \( b = 3^y \)

(a) Write \( 3^{x+1} \) in terms of \( a \)

\[ \text{[result]} \]  

(b) Write \( 3^{x+y} \) in terms of \( a \) and \( b \)

\[ \text{[result]} \]  

(c) Write \( 3^{2y} \) in terms of \( b \)

\[ \text{[result]} \]
12. Given that \( 125^x = 25^{x+5} \)

13. Given that \( 16^x = 4^{10-x} \)

14. Find the value of \( y \)

\[ 2^y \times 4^{y+3} = 16 \]
15. Solve \( \frac{16^{2x+3}}{4^x} = 32 \)

16. Find the exact values of \( w \)

\[3^w^2 = 9 \times 27^{w+5}\]
17. Solve
\[
\frac{81^x}{9^{x+1}} = 3\sqrt{3}
\]