A Level Maths

Topic: Laws of Indices and Surds

Instructions

Answer all questions. Show complete working. Apply the laws of indices and surds wherever appropriate.

Practice Questions

1. Simplify the following expressions using the laws of indices:
   (i) $x^5 \times x^3$
   (ii) $\dfrac{y^7}{y^4}$
   (iii) $(a^2)^3$
   (iv) $\dfrac{4x^6}{2x^2}$
2. Express the following in terms of positive indices:
   (i) $\dfrac{1}{x^{-3}}$
   (ii) $\dfrac{y^4}{y^{-2}}$
   (iii) $x^{\frac{1}{2}} \times x^{\frac{1}{3}}$
3. Simplify the following surds:
   (i) $\sqrt{50}$
   (ii) $\sqrt{72} + \sqrt{18}$
   (iii) $\dfrac{\sqrt{8}}{\sqrt{2}}$
   (iv) $\sqrt{5} \times \sqrt{20}$

4. Solve the following using the laws of indices:
   (i) $(3^4) \times (3^2)$
   (ii) $\dfrac{2^7}{2^3}$
   (iii) $(4^2)^3$
   (iv) $(2^3) \times (2^{-5})$
5. Simplify the following expressions involving surds:
   (i) $\dfrac{2\sqrt{3}}{\sqrt{5}}$
   (ii) $\sqrt{3} + \sqrt{12}$
   (iii) $\sqrt{a} \times \sqrt{b}$
6. Given that $\sqrt{x} = 5$, find the value of x.
7. Express $\sqrt{8}$ in its simplest form.
8. Simplify the expression $\dfrac{\sqrt{27}}{\sqrt{3}}$.
9. Solve $x^2 = 49$ using the laws of indices.

Multiple-Choice Questions

1. Simplify the expression $\frac{a^5}{a^2}$:
   A. a^3
   B. a^7
   C. $a^1 0$
   D. a^2
2. Which of the following is equivalent to $\sqrt{18}$?
   A. $3\sqrt{2}$
   B. $2\sqrt{3}$
   C. $3\sqrt{3}$
   D. $4\sqrt{2}$
3. The value of $\sqrt{7} \times \sqrt{49}$ is:
   A. 7
   B. 49
   C. $7\sqrt{7}$

D. 14

4. If $x = 4$, what is the value of $x^{\frac{3}{2}}$?

   A. 8

   B. 16

   C. 4

   D. 64

5. Which of the following is the correct simplification of $\frac{3}{\sqrt{5}}$?

   A. $\frac{3\sqrt{5}}{5}$

   B. $\frac{3}{5}$

   C. $\frac{5\sqrt{3}}{5}$

   D. $\frac{3}{\sqrt{5}}$