



MATHS

BOOKS - ICSE

INDICES (EXPONENTS)

3 Marks Questions

1. Evaluate : $\left(\frac{16}{81}\right)^{-3/4} \times \left(\frac{\left(\frac{49}{9}\right)^{3/2}}{\left(\frac{343}{216}\right)^{2/3}}\right)$

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2. Simplify : $\frac{5^{n+3} - 6 \times 5^{n+1}}{9 \times 5^n - 5^n \times 2^2}$

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3. Simplify each of the following and express with positive index :

$$\left[1 - \left\{ 1 - (1 - n)^{-1} \right\}^{-1} \right]^{-1}$$

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4. Simplify $\frac{8^{3a} \times 2^5 \times 2^{2a}}{4 \times 2^{11a} \times 2^{-2a}}$

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5. If $a^x = b$, $b^y = c$ and $c^z = a$, prove that $xyz = 1$

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6. If $4^{x+3} = 112 + 8 \times 4^x$, find $(18x)^{3x}$

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7. Solve for x : $\left(a^{3x+3} \times (a^3)^4\right) = a^{8x+12}$

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8. If $3^{4x} = (81)^{-1}$ and $(10)^{1/y} = 0.0001$, find the value of $2^{-x} \times (16)^y$.

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9. Evaluate:
$$\frac{2^n \times 6^{m+1} \times 10^{m-n} \times 15^{m+n-2}}{4^m \times 3^{2m+n} \times 25^{m-1}}$$

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10. Evaluate:
$$\left(\frac{x^q}{x^r}\right)^{\frac{1}{qr}} \times \left(\frac{x^r}{x^p}\right)^{\frac{1}{rp}} \times \left(\frac{x^p}{x^q}\right)^{\frac{1}{pq}}$$

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11. Evaluate : $\frac{4}{(216)^{-2/3}} + \frac{1}{(256)^{-3/4}} + \frac{2}{(343)^{-1/3}}$

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12. Simplify : $\left(\frac{8}{27}\right)^{-1/3} \times \left(\frac{25}{4}\right)^{1/2} \times \left(\frac{4}{9}\right)^0 + \left(\frac{125}{64}\right)^{1/3}$

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13. Evaluate for x $\left(\sqrt{\frac{5}{3}}\right)^{x-8} = \left(\frac{27}{125}\right)^{2x-3}$

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14. Evaluate $\left(\frac{1}{4}\right)^{-2} - 3(8)^{2/3} \times 4^0 + \left(\frac{9}{10}\right)^{-1/2}$

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15. Solve for x :

$$\left(\sqrt[3]{\frac{3}{5}}\right)^{2x+2} = \frac{25}{9}$$

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4 Marks Questions

1. Prove that:

$$\left(\frac{x^a}{x^b}\right)^a \wedge 2 + ab + b^2 x \left(\frac{x6b}{x^c}\right)^b \wedge 2 + bc + c^2 x \left(\frac{x^c}{x^a}\right)^c \wedge 2 + ca + a^2$$

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2. If $1960 = 2^a \times 5^b \times 7^c$, calculate the value of $2^{-a} \times 7^b \times 5^{-c}$

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3. If $a = x^{m+n} y^l$, $b = x^{n+l} y^m$ and $c = x^{l+m} y^n$, prove that $a^{m-n} b^{n-l} c^{l-m} = 1$

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4. Solve for x and y if :

$$(\sqrt{32})^x \div 2^{y+1} = 1 \text{ and } 8^y - 16^{4-\frac{x}{2}} = 0$$

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5. If $a^x = b^y = c^z$ and $b^2 = ac$, then show that $y = \frac{2zx}{z+x}$

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6. If $5^{-p} = 4^{-q} = 20^r$. Show that $\frac{1}{p} + \frac{1}{q} + \frac{1}{r} = 0$

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7. If $2^x = 4^y = 8^z$ and $\frac{1}{2x} + \frac{1}{4y} + \frac{1}{8z} = 4$ find the value of x .

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8. If $m = \sqrt[3]{125}$ and $n = \sqrt[3]{64}$, find the value of $m - n - \frac{1}{m^2 + mn + n^2}$.

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9. Prove that: $\frac{a^{-1}}{a^{-1} + b^{-1}} + \frac{a^{-1}}{a^{-1} - b^{-1}} = \frac{2b^2}{b^2 - a^2}$

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