



MATHS

BOOKS - RESONANCE DPP ENGLISH

RELATIONS AND FUNCTIONS XII

Others

1. If $f(x) = \frac{x-1}{x+1}$, then $f(f(ax))$ in terms of $f(x)$ is equal to
- (a) $\frac{f(x)-1}{a(f(x)-1)}$ (b) $\frac{f(x)+1}{a(f(x)-1)}$ (c) $\frac{f(x)-1}{a(f(x)+1)}$ (d) $\frac{f(x)+1}{a(f(x)+1)}$



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2. Let f be a real valued function defined by $f(x) = \frac{e^x - e^{-|x|}}{e^x + e^{|x|}}$, then the range of $f(x)$ is: (a) \mathbb{R} (b) $[0, 1]$ (c) $[0, 1)$ (d) $\left[0, \frac{1}{2}\right)$

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3. If $x = 3 - \sqrt{8}$, then $x^3 + \frac{1}{x^3}$ is equal to a. 6 b. 198 c. $6\sqrt{2}$ d. 102

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4. If $a + b + c = 0$ and $a^2 + b^2 + c^2 = 1$, then the value of $a^4 + b^4 + c^4$ is 1 b. 4 c. $\frac{1}{2}$ d. $\frac{1}{4}$

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5. The value of x satisfying the equation

$$\frac{6x + 2a + 3b + c}{6x + 2a - 3b - c} = \frac{2x + 6a + b + 3c}{2x + 6a - b - 3c}$$
 is a. ab/c b. $2ab/c$ c.

$ab/3c$ d. $ab/2c$



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6. Find the number of positive integers x for which

$$f(x) = x^3 - 8x^2 + 20x - 13, \text{ is prime number.}$$



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7. The least integral value of ' m ' for which the expression

$$mx^2 - 4x + 3m + 1 \text{ is positive for every } x \in R \text{ is: 1 b. } -2 \text{ c. } -1$$

d. 2



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8. Values of x satisfying the inequality

$$|x^2 + 8x + 7| \geq |x^2 + 4x + 4| + |4x + 3| \text{ for } x \in R \text{ are a.}$$

($-2, \infty$) b. $\left(\frac{3}{4}, \infty\right) \cup \{-2\}$ c. $\left[-\frac{3}{4}, \infty\right) \cup \{-2\}$ d.

$\left[-\frac{4}{3}, \infty\right)$

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9. Let $N = \frac{\log_3 135}{\log_{15} 3} - \frac{\log_3 5}{\log_{405} 3}$. Then N is

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10. $f(x) = \frac{x}{x-1}$ then $\frac{f(a)}{f(a+1)}$ is equal to a. $f(-a)$ b. $f(1/a)$
c. $f(a^2)$ d. $f\left(-\frac{a}{a-1}\right)$

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11. Suppose f is a real function satisfying $f(x + f(x)) = 4f(x)$ and $f(1) = 4$. Then the value of $f(21)$ is

21 64 105

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12. If $f(x) = \frac{2}{4^x + 2}$ for real numbers x , then $f\left(\frac{1}{2011}\right) + f\left(\frac{2}{2011}\right) + \dots + f\left(\frac{2010}{2011}\right)$. (a)1005 (b)1004 (c)

1006 (d)1008

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13. A polynomial $P(x)$ of third degree vanish when $x = 1$ & $x = -2$. This polynomial have the values 4 & 28 when $x = -1$ and $x = 2$ respectively. $P(i)$, where $i = \sqrt{-1}$ is a. purely real b.

Purely imaginary c. imaginary d. None of these



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14. Solve the following inequalities $\frac{x-1}{x} - \frac{x+1}{x-1} < 2$



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15. Solve inequality $\frac{x^2 - 5x + 6}{x^2 + x + 1} < 0$



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16. solve the given inequation $\frac{x^2 + 4x + 4}{2x^2 - x - 1} > 0$



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17.
$$\frac{(x-4)^{2005} x + 8^{2008} (x+1)}{x^{2006} (x-2)^3 x + 3^5 0 (x-6) (x+9)^{2010}} \leq 0$$



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18. Solve the following inequalities $\frac{(x - 1)(x - 2)(x - 3)}{(x + 1)(x + 2)(x + 3)} > 1$



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19. The sum of the series $\frac{1^2}{2!} + \frac{2^2}{3!} + \frac{3^2}{4!} + \dots$ is a. $e + 1$ b. $e - 1$ c. $2e + 1$ d. $2e - 1$



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20. The function $f(x) = \frac{4 - x^2}{4x - x^3}$ (a) discontinuous at only one point (b) discontinuous exactly at two points (c) discontinuous exactly at three points (d) none of these



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21. If A is the set of even natural numbers less than 8 and B in the set prime numbers less than 7, then the number of relations from A to B is

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22. If range of the function $f(x) = \frac{2 \sin^2 x + 2 \sin x + 3}{\sin^2 x + \sin x + 1}$ is $[p, q]$, then the value of $3p + 6q + 1$ is (a) $\frac{10}{3}$ (b) $\frac{7}{3}$ (c) 28 (d) None of these

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23. In function $f(x) = \cos^{-1} x + \cos^{-1} \left(\frac{x}{2} + \frac{\sqrt{3 - 3x^2}}{2} \right)$, then Range of $f(x)$ is $\left[\frac{\pi}{3}, \frac{10\pi}{3} \right]$ Range of $f(x)$ is $\left[\frac{\pi}{3}, 5\pi \right]$

$f(x)$ is one-one for $x \in \left[-1, \frac{1}{2}\right]$ $f(x)$ is one-one for $x \in \left[\frac{1}{2}, 1\right]$

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24. An extremum value of the function

$f(x) = (\arcsin x)^3 + (\arcsin x)^3$ is $\frac{7\pi^3}{8}$ (b) $\frac{\pi^3}{8}$ (c) $\frac{\pi^3}{32}$ (d) $\frac{\pi^3}{16}$

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25. If x, y, z are all different real numbers, then

$$\frac{1}{(x-y)^2} + \frac{1}{(y-z)^2} + \frac{1}{(z-x)^2} = \left(\frac{1}{x-y} + \frac{1}{y-z} + \frac{1}{z-x} \right)^2$$

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