



## MATHS

### BOOKS - ARIHANT PUBLICATION BIHAR

### RATIONAL EXPRESSIONS

#### Solved Examples

1. Reduce  $\frac{3x^2 - 11x - 4}{6x^2 - 7x - 3}$  to its lowest terms.

A.  $\frac{x - 2}{2x - 3}$

B.  $\frac{x - 4}{2x - 3}$

C.  $\frac{x - 1}{2x - 3}$

D.  $\frac{x - 4}{x - 3}$

**Answer: B**



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2. What should be subtrated from  $\frac{7x}{x^2 + x - 12}$  to get  $\frac{8}{x + 4}$  ?

A.  $\frac{2}{(x - 3)}$

B.  $\frac{2}{(2x - 3)}$

C.  $\frac{x + 1}{(x - 3)}$

D.  $\frac{24 - x}{x^2 + x - 12}$

**Answer: D**



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3. Find the product of  $\frac{x^2 - 1}{x^2 + 1}$  and  $\frac{x + 3}{x + 1}$

A.  $\frac{x^2 + 2x - 3}{x^2 + 1}$

B.  $\frac{x - 2}{x^2 + 1}$

C.  $\frac{x^2 - 2}{x^2 + 1}$

D.  $\frac{x^2 - 2}{x + 1}$

**Answer: A**



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4. If  $R = \frac{x^2 + 2}{x - 3}$  and  $S = \frac{x + 1}{x}$ , then find

$R + S$

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5. If  $R = \frac{x^2 + 2}{x - 3}$  and  $S = \frac{x + 1}{x}$ , then find

$R - S$

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6. If  $R = \frac{x^2 + 2}{x - 3}$  and  $S = \frac{x + 1}{x}$ , then find

$R \cdot S$

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7. If  $R = \frac{x^2 + 2}{x - 3}$  and  $S = \frac{x + 1}{x}$ , then find

$$R \div S$$



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## Exam Booster For Cracking Exam

1. Which of the following algebraic expressions are polynomials?

I.  $x^3 + \sqrt{3x} + 4$ , II.  $x^2 + 2\sqrt{x} + 4$

III.  $x^2 + \sqrt{x - 1}$ , IV.  $x^2 + 3x + 4$

A. I,II and III

B. Only IV

C. All of these

D. None of these

**Answer: B**



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2. Which of the following are rational expressions ?

I.  $\frac{x^3 - 3x^2 + 2}{x^2 + 1}$ , II.  $\frac{z^3 - 3z^2}{2z + 3}$

III.  $\frac{x^2 - x + 2}{x + 3}$ , IV.  $\frac{x^3 + 3x^2 - 1}{x^2 + \sqrt{x - 1}}$

A. I ,II and III

B. II,III and IV

C. All of these

D. None of these

**Answer: A**



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3. If  $A = \frac{x + 1}{x - 1}$  and  $B = \frac{x - 2}{x + 1}$ , then  $A + B$  is

A.  $\frac{2x^2 - x + 3}{(x^2 - 1)}$

B.  $\frac{2(x^2 + 1)}{(x^2 - 1)}$

C.  $\frac{(x^2 + 1)}{(x^2 - 1)}$

D. None of these

**Answer: D**



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4. If  $R = \frac{a^3 + 1}{a - 1}$  and  $S = \frac{a^2 - a + 1}{a - 1}$ , then  $R \div S$

is

A.  $\frac{a - 1}{a + 1}$

B.  $\frac{1}{a^2 + a + 1}$

C.  $a+1$

D.  $\frac{(a + 1)^2}{(a - 1)}$



**Answer: D**



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5. The expression to be added to  $(7x^2 - x + 9)$  to produce  $(5x^2 - 4)$  is

A.  $-2x^2 + x - 13$

B.  $2x^2 + 3$

C.  $2x^2 - 3$

D.  $2x^2 + 7x$

**Answer: A**



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6.  $\frac{x^2 - x - 2}{x^2 - 3x + 2}$  is lowest term is

A.  $\frac{(x - 1)}{(2x + 3)}$

B.  $\frac{x^2 - x - 2}{2x^2 + x - 3}$

C.  $\frac{x - 2}{2x + 3}$

D.  $\frac{x + 1}{x - 1}$

**Answer: B**



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7. The simplified form of  $\frac{(a + 2)}{(a + 3)} - \frac{(a - 3)}{(a + 2)}$  is

A.  $\frac{1}{a^2 + 5a + 6}$

B.  $\frac{4a + 13}{a^2 + 5a + 6}$

C. 0

D.  $\frac{(a + 2)^2}{a^2 + 5a + 6}$

**Answer: A**



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8.  $\left( \frac{x - 1}{x^2 - 1} - \frac{2}{x} \right)$  expressed a rational expression is

A.  $\frac{x^2 - 2}{x(x^2 - 1)}$

B.  $-\frac{(x - 2)}{x(x - 1)}$

C.  $\frac{2(x + 1)}{(x^3 - 1)}$

D.  $-\frac{x + 2}{x(x + 1)}$

**Answer: B**



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9. The product of additive inverse of  $\frac{x + 6}{x + 2}$  and  $\frac{5x + 2}{5x - 3}$  is:

A.  $\frac{5x^2 + 32x + 12}{5x^2 - 7x + 6}$

B.  $\frac{5x^2 + 32x + 12}{5x^2 + 7x - 6}$

C.  $\frac{5x^2 + 32x + 12}{5x^2 + 7x + 6}$

D. None of these

Answer: B



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10. The rational expression which should be added to

$$\frac{2x^3 + 1}{x^2 + 2} \text{ to get } \frac{x^3 - x^2 + 5}{x^2 + 2} \text{ is}$$

A. 1

B.  $\frac{x^3 - x^2 - 4}{x^2 + 2}$

C.  $\frac{-x^3 - x^2 + 4}{x^2 + 2}$

D. None of these

Answer: C



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11. The value of:

$$\left(1 + \frac{1}{a+1}\right) \left(1 + \frac{1}{a+2}\right) \left(1 + \frac{1}{a+3}\right) \left(1 + \frac{1}{a+4}\right)$$

is

A.  $\frac{a+5}{a+1}$

B.  $\frac{1}{a+1}$

C.  $a+5$

D. None of these

**Answer: A**



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12. The expression  $\frac{(x + 1)(x - 2)(x^2 - 9x + 14)}{(x - 7)(x^2 - 4)}$  in

the lowest terms is

A.  $x + 2$

B.  $x - 3$

C.  $x + 3$

D. None of these

**Answer: D**



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13. The value of  $\frac{a}{(a - b)(x - a)} + \frac{b}{(b - a)(x - b)}$  is

A.  $\frac{x}{(x - a)(x - b)}$

B.  $\frac{x - a}{(x - b)(x - c)}$

C.  $\frac{x - c}{(x - b)(a - x)}$

D. None of these

**Answer: A**



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**14.** The sum of the rational expression  $\frac{x - 3}{x^2 + 1}$  and its reciprocal is

A.  $\frac{2x^2 - 6x + 10}{x - 3}$

B.  $\frac{x^4 + 3x^2 - 6x + 10}{x^3 - 3x^2 + x - 3}$



C.  $\frac{x^4 + 2x^2 - 6x - 10}{x^3 - 3x^2 + x - 3}$

D. None of these

**Answer: B**



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15. If  $A = 4x + \frac{1}{x}$ , then the value of  $A + \frac{1}{A}$  is

A.  $\frac{x}{4x^2 + 1}$

B.  $\frac{4x^2 + 1}{x}$

C.  $\frac{1}{4x^3 + x}$

D. None of these

Answer: D



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16. If  $x = \frac{b}{a - b}$  and  $y = \frac{b}{a + b}$  then the value of  $\frac{1}{x} + \frac{1}{y}$  is

A.  $\frac{a^2 + b^2}{ab}$

B.  $\frac{b^2 - a^2}{ab}$

C.  $\frac{a^2 - b^2}{ab}$

D. None of these

Answer: A



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17. The value of

$$\frac{a}{(a-b)(a-c)} + \frac{b}{(b-c)(b-a)} + \frac{c}{(c-a)(c-b)}$$

is:

A. 0

B. 2

C. 1

D. None of these

**Answer: A**



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18. If  $A = \left(\frac{x-1}{x+1}\right)$  and  $B = \left(\frac{x+1}{x-1}\right)$ , then the value of  $(A+B)^2$  is:

A.  $\frac{4x^2 + 8x^2 + 4}{x^2 - 2x - 1}$

B.  $\frac{4x^4 + 8x^2 + 4}{x^4 + 2x^2 - 1}$

C.  $\frac{4x^4 - 8x^2 + 4}{x^4 - 2x^2 + 1}$

D. None of these

**Answer: C**



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19. The value of

$$\frac{1}{(1-a)(1-b)} + \frac{a^2}{(1-a)(b-a)} - \frac{b^2}{(b-1)(a-b)}$$

is:

A. 1

B. 0

C. 2

D. 5

**Answer: A**



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20. The value of  $\frac{\left(\frac{x}{y} - \frac{y}{x}\right)\left(\frac{y}{z} - \frac{z}{y}\right)\left(\frac{z}{x} - \frac{x}{z}\right)}{\left(\frac{1}{x^2} - \frac{1}{y^2}\right)\left(\frac{1}{y^2} - \frac{1}{z^2}\right)\left(\frac{1}{z^2} - \frac{1}{x^2}\right)}$  is

A.  $x^2y^2z^2$

B.  $-x^2y^2z^2$

C.  $-x^2y^2$

D. None of these

**Answer: B**



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21. If  $\alpha$ ,  $\beta$  and  $\gamma$  are the roots of the cubic equation  $(x - 1)(x^2 + x + 3) = 0$ , then the value of  $\alpha^3 + \beta^3 + \gamma^3$  is:

A. 3

B. 0

C. 9

D. None of these

**Answer: C**



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22. When  $x^5 - 5x^4 + 9x^3 - 6x^2 - 16x + 13$  is divided by  $x^2 - 3x + a$ , then quotient and remainders are  $x^3 - 2x^2 + x + 1$  and  $-15x + 11$  respectively. Find the value of  $a$ .

A. 2

B. 5

C. 7

D. 9

**Answer: A**



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