

MATH RAILWAY RPF 19 NOVEMBER 2018)

Formulae

$$(a + b)^2 = a^2 + 2ab + b^2$$

$$(a - b)^2 = a^2 - 2ab + b^2$$

$$(a + b)^2 + (a - b)^2 = 2(a^2 + b^2)$$

$$(a + b)^2 - (a - b)^2 = 4ab$$

$$(a + b)^3 = a^3 + b^3 + 3ab(a + b)$$

$$(a - b)^3 = a^3 - b^3 - 3ab(a - b)$$

$$(a^2 - b^2) = (a + b)(a - b)$$

$$(a^3 + b^3) = (a + b)(a^2 - ab + b^2)$$

$$(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$$

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$$

$$(a - b - c)^2 = a^2 + b^2 + c^2 - 2(ab + ac - bc)$$

$$(a + b + c)^3 = a^3 + b^3 + c^3 + 3(a+b)(b+c)(c+a)$$

$$(a^3 + b^3 + c^3 - 3abc) = (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca)$$

$$\text{If } a + b + c = 0 \text{ then, } a^3 + b^3 + c^3 = 3abc$$

$$a^2 + b^2 + c^2 - ab - bc - ca = \frac{1}{2}[(a - b)^2 + (b - c)^2 + (c - a)^2]$$

$$\text{If } x + \frac{1}{x} = 2, \text{ then } x^n + \frac{1}{x^n} = 2 (\because x = 1)$$

$$\text{If } x + \frac{1}{x} = -2, \text{ when 'n' is even then } x^n + \frac{1}{x^n} = 2 (\because x = -1)$$

$$\text{If } x + \frac{1}{x} = -2, \text{ when 'n' is odd then } x^n + \frac{1}{x^n} = -2 (\because x = -1)$$

$$\text{If } x + \frac{1}{x} = -2, \text{ when 'n' is odd/even and 'm' is even/odd then}$$

$$x^n + \frac{1}{x^m} = 0 (\because x = -1)$$

$$\text{If } x + \frac{1}{x} = \sqrt{3}, \text{ then } x^3 + \frac{1}{x^3} = 0$$

$$\text{If } x + \frac{1}{x} = a, \text{ then } x^2 + \frac{1}{x^2} = a^2 - 2$$

$$\text{If } x + \frac{1}{x} = a, \text{ then } x^3 + \frac{1}{x^3} = a^3 - 3a$$

$$\text{If } x + \frac{1}{x} = a, \text{ then } x^4 + \frac{1}{x^4} = a^4 - 4a^2 + 2$$

$$\text{If } x + \frac{1}{x} = a, \text{ then } x^5 + \frac{1}{x^5} = (a^2 - 2)(a^3 - 3a) - a$$

$$\text{If } x + \frac{1}{x} = a, \text{ then } x^6 + \frac{1}{x^6} = (a^3 - 3a)^2 - 2$$

$$\text{If } x - \frac{1}{x} = a, \text{ then } x^2 + \frac{1}{x^2} = a^2 + 2$$

$$\text{If } x - \frac{1}{x} = a, \text{ then } x^3 - \frac{1}{x^3} = a^3 + 3a$$

$$\text{If } x - \frac{1}{x} = a, \text{ then } x^4 + \frac{1}{x^4} = a^4 + 4a^2 + 2$$

$$\text{EX: If } x + \frac{1}{x} = 2, \text{ then value of } x^5 + \frac{1}{x^5} \text{ is :}$$

$$\text{यदि } x + \frac{1}{x} = 2, \text{ तो } x^5 + \frac{1}{x^5} \text{ का मान है :}$$

$$1. 0 \quad 2. 1 \quad 3. 2 \quad 4. 32$$

$$\text{EX: If } x + \frac{1}{x} = -2, \text{ then value of } x^{51} + \frac{1}{x^{52}} \text{ is :}$$

$$\text{यदि } x + \frac{1}{x} = -2, \text{ तो } x^{51} + \frac{1}{x^{52}} \text{ का मान है :}$$

$$1. 0 \quad 2. -2 \quad 3. 2 \quad 4. 1$$

$$\text{EX: If } \left(x + \frac{1}{x}\right)^2 = 3, \text{ then value of } x^{21} + x^{15} + x^9 + x^3 + 1 \text{ is :}$$

$$\text{यदि } \left(x + \frac{1}{x}\right)^2 = 3, \text{ तो } x^{21} + x^{15} + x^9 + x^3 + 1 \text{ का मान है :}$$

$$1. 0 \quad 2. 1 \quad 3. 3 \quad 4. 7$$

$$\text{EX: If } x + \frac{1}{x} = 5, \text{ then value of } x^2 + \frac{1}{x^2} \text{ is :}$$

$$\text{यदि } x + \frac{1}{x} = 5, \text{ तो } x^2 + \frac{1}{x^2} \text{ का मान है :}$$

$$1. 27 \quad 2. 25 \quad 3. 23 \quad 4. 5$$

$$\text{EX: If } x - \frac{1}{x} = 7, \text{ then value of } x^2 + \frac{1}{x^2} \text{ is :}$$

$$\text{यदि } x - \frac{1}{x} = 7, \text{ तो } x^2 + \frac{1}{x^2} \text{ का मान है :}$$

$$1. 47 \quad 2. 49 \quad 3. 51 \quad 4. 53$$

$$\text{EX: If } x + \frac{1}{x} = 3, \text{ then value of } x^3 + \frac{1}{x^3} \text{ is :}$$

$$\text{यदि } x + \frac{1}{x} = 3, \text{ तो } x^3 + \frac{1}{x^3} \text{ का मान है :}$$

$$1. 0 \quad 2. 27 \quad 3. 18 \quad 4. 36$$

$$\text{EX: If } x - \frac{1}{x} = 6, \text{ then value of } x^3 - \frac{1}{x^3} \text{ is :}$$

$$\text{यदि } x - \frac{1}{x} = 6, \text{ तो } x^3 - \frac{1}{x^3} \text{ का मान है :}$$

$$1. 198 \quad 2. 216 \quad 3. 234 \quad 4. 236$$

$$\text{EX: If } x + \frac{1}{x} = 5, \text{ then value of } x^4 + \frac{1}{x^4} \text{ is :}$$

$$\text{यदि } x + \frac{1}{x} = 5, \text{ तो } x^4 + \frac{1}{x^4} \text{ का मान है :}$$

$$1. 625 \quad 2. 623 \quad 3. 529 \quad 4. 527$$

$$\text{EX: If } x - \frac{1}{x} = 7, \text{ then value of } x^4 + \frac{1}{x^4} \text{ is :}$$

$$\text{यदि } x - \frac{1}{x} = 7, \text{ तो } x^4 + \frac{1}{x^4} \text{ का मान है :}$$

$$1. 2603 \quad 2. 2597 \quad 3. 2599 \quad 4. 2601$$

$$\text{EX: If } x + \frac{1}{x} = 4, \text{ then value of } x^5 + \frac{1}{x^5} \text{ is :}$$

$$\text{यदि } x + \frac{1}{x} = 4, \text{ तो } x^5 + \frac{1}{x^5} \text{ का मान है :}$$

$$1. 728 \quad 2. 724 \quad 3. 720 \quad 4. 714$$

$$\text{EX: If } x + \frac{1}{x} = \sqrt{29}, \text{ then value of } x - \frac{1}{x} \text{ is :}$$

$$\text{यदि } x + \frac{1}{x} = \sqrt{29}, \text{ तो } x - \frac{1}{x} \text{ का मान है :}$$

$$1. 5 \quad 2. 6 \quad 3. 7 \quad 4. 8$$

$$\text{EX: If } x^{51} + \frac{1}{x^{51}} = \sqrt{229}, \text{ then value of } x^{51} - \frac{1}{x^{51}} \text{ is :}$$

$$\text{यदि } x^{51} + \frac{1}{x^{51}} = \sqrt{229}, \text{ तो } x^{51} - \frac{1}{x^{51}} \text{ का मान है :}$$

$$1. 15 \quad 2. 16 \quad 3. 17 \quad 4. 18$$

$$\text{EX: If } x^{11} - \frac{1}{x^{11}} = 2\sqrt{15}, \text{ then value of } x^{11} + \frac{1}{x^{11}} \text{ is :}$$

$$\text{यदि } x^{11} - \frac{1}{x^{11}} = 2\sqrt{15}, \text{ तो } x^{11} + \frac{1}{x^{11}} \text{ का मान है :}$$

$$1. 5 \quad 2. 6 \quad 3. 7 \quad 4. 8$$

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