

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

$$= a^3 + b^3 + c^3 + 3[a^2(b + c) + b^2(c + a) + c^2(a + b) + 2abc]$$

$$= a^3 + b^3 + c^3 + 3a^2(b + c) + 3b^2(c + a) + 3c^2(a + b) + 6abc$$

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



125. If $A = \frac{(0.1)^3 + (0.2)^3 + (0.3)^3 + 3(0.005 + 0.016 + 0.027) + 0.036}{(0.1)^2 + (0.2)^2 + (0.3)^2 + 0.04 + 0.06 + 0.12}$, then the value of $60A$ is:

यदि $A = \frac{(0.1)^3 + (0.2)^3 + (0.3)^3 + 3(0.005 + 0.016 + 0.027) + 0.036}{(0.1)^2 + (0.2)^2 + (0.3)^2 + 0.04 + 0.06 + 0.12}$ है, तब $60A$ का मान है:
= 36

[A] 20

[B] 60

[C] 36 ✓

[D] 30

$$A = \frac{(.1 + .2 + .3)^3}{(.1 + .2 + .3)^2} = .1 + .2 + .3 = .6$$

126. Find the value of $\frac{10.7^3 - 2.4^3 - 3.5^3 - 4.8^3}{5.9 \times 8.3 \times 4.8} = ?$

$\frac{\overset{a+b+c}{10.7^3} - \overset{a}{2.4^3} - \overset{b}{3.5^3} - \overset{c}{4.8^3}}{5.9 \times 8.3 \times 4.8}$ का मान ज्ञात कीजिए।

[A] ✓ 4.5

[B] 21.97

[C] 1

[D] 3

$$= \frac{3 \times 5.9 \times 8.3 \times 7.2}{5.9 \times 8.3 \times 4.8} = 4.5$$

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

124. If $(x+y)^{\frac{1}{3}} + (y+z)^{\frac{1}{3}} = -(z+x)^{\frac{1}{3}}$, then $(x^3 + y^3 + z^3)$ can be expressed as:

यदि $(x+y)^{\frac{1}{3}} + (y+z)^{\frac{1}{3}} = -(z+x)^{\frac{1}{3}}$ है, तो $(x^3 + y^3 + z^3)$ को इस प्रकार व्यक्त किया जा सकता है:

[A] $\frac{1}{8}xyz$

[B] $(x+y)(y+z)(z+x)$

[C] $\frac{3}{8}(x+y)(y+z)(z+x)$

[C] $3xyz$

$= \left(\frac{27}{8} - 3\right)(x+y)(y+z)(z+x)$ (SSC CHSL 2020 PRE)

$(x+y)^{\frac{1}{3}} + (y+z)^{\frac{1}{3}} + (z+x)^{\frac{1}{3}} = 0$

$\Rightarrow (x+y) + (y+z) + (z+x) = 3(x+y)^{\frac{1}{3}}(y+z)^{\frac{1}{3}}(z+x)^{\frac{1}{3}}$

$\Rightarrow (x+y+z)^3 = \frac{27}{8}(x+y)(y+z)(z+x)$

$\Rightarrow x^3 + y^3 + z^3 + 3xyz = \frac{27}{8}xyz$

2 या 3 variables पर based linear equations $\Rightarrow$

$$\begin{array}{r} x + y = 9 \\ 4x - y = 7 \end{array}$$

$$5x = 16$$

$$x = \frac{16}{5}$$



127. Solve the following system of linear equations:
निम्नलिखित रैखिक समीकरणों के निकाय का हल कीजिए।
(RRB NTPC GRADUATE LEVEL CBT-1 2026)

$$\begin{cases} u + v + w = 2 \\ 6u + 4v + 5w = 31 \\ 5u + 2v + 2w = 13 \end{cases}$$

$$\begin{aligned} 2v + 6w &= -19 \\ -36 + 17 &= -19 \end{aligned}$$

- [A] $u = 1, v = 15, w = -14$
[B] $u = 3, v = -15, w = 14$
[C] $u = 1, v = 18, w = -17$
[D] $u = 3, v = -18, w = 17$

128. What is the solution to the following system of linear equations?

निम्नलिखित रैखिक समीकरण निकाय का हल क्या होगा?

$$3x - 9y + 4z = 5$$

$$2x + 7y + z = 12$$

$$3x - z = 0 \Rightarrow x = \frac{z}{3}$$

$$\frac{143}{50} - \frac{93}{10} + \frac{4 \times 143}{50} = 5$$

(SSC SELECTION POST XI 2023)

~~[A] $x = \frac{143}{150}, y = \frac{31}{37}, z = \frac{143}{50}$~~

~~[B] $x = \frac{143}{150}, y = \frac{31}{30}, z = \frac{143}{50}$~~

~~[C] $x = \frac{137}{150}, y = \frac{31}{30}, z = \frac{143}{50}$~~

~~[D] $x = \frac{143}{150}, y = \frac{31}{30}, z = \frac{143}{51}$~~

129. Find the solution of the following system of linear equations:

निम्नलिखित रैखिक समीकरणों के निकाय का हल ज्ञात कीजिए।

(RRB NTPC GRADUATE LEVEL CBT-1 2026)

$$2x + y + z = 25$$

$$x - 3y + 2z = 0$$

$$y - z = 6$$

[A] $x = \frac{55}{4}, y = \frac{-17}{4}, z = \frac{7}{4}$ — 6

[B] $x = \frac{-17}{4}, y = \frac{55}{4}, z = \frac{7}{4}$

[C] $x = \frac{7}{4}, y = \frac{55}{4}, z = \frac{-17}{4}$

[D] $x = \frac{55}{4}, y = \frac{7}{4}, z = \frac{-17}{4}$

$\frac{21}{4} = 6$

130. Solve the following system of equations:
निम्नलिखित समीकरणों के निकाय को सरल कीजिए।
(RRB NTPC GRADUATE LEVEL CBT-1 2026)

$$x + 2y + 4z = 14$$

$$\begin{cases} x + 2y + z = 7 \\ 2x + y + 2z = 2 \end{cases}$$

$$3z = 7$$

$$z = \frac{7}{3}$$

$$3y = 12$$

$$y = 4$$

- [A] $x = -\frac{10}{3}, y = 3, z = \frac{7}{3}$
- [B] $x = -\frac{11}{3}, y = 3, z = \frac{7}{3}$
- [C] $x = -\frac{10}{3}, y = 4, z = \frac{8}{3}$
- [D] $x = -\frac{10}{3}, y = 4, z = \frac{7}{3}$

132. Find the value of x, y and z from the following equations:

निम्नलिखित समीकरणों से x, y और z का मान ज्ञात कीजिए।

$$3x + 2y - z = 24, x - 5y + 3z = 16, x + y - 3z = 21$$

(RRB JE 2025)

~~[A] $x = \frac{-229}{42}, y = \frac{-289}{42}, z = \frac{97}{21}$~~

~~[B] $x = \frac{389}{42}, y = \frac{-97}{21}, z = \frac{-229}{42}$~~

~~[C] $x = \frac{289}{42}, y = \frac{97}{21}, z = \frac{229}{42}$~~

~~[D] $x = \frac{-97}{21}, y = \frac{-289}{42}, z = \frac{229}{42}$~~

$$2x - 4y = 37$$

$$x - 2y = \frac{37}{2}$$

$$\frac{389}{42} + \frac{2 \times 97 \times 2}{21 \times 2}$$

~~77~~

~~426~~

$$= \frac{37}{2} \quad \frac{389}{42} + \frac{388}{42}$$

$$\frac{-229}{42} + \frac{578}{42}$$
$$= \frac{349}{42}$$

133. Find the value of Y, if $X - 2Y + 2Z = 16$, $X - Y + Z = 9$ and $2X - 3Y - Z = 9$.

यदि $X - 2Y + 2Z = 16$, $X - Y + Z = 9$ और $2X - 3Y - Z = 9$ है, तो Y का मान ज्ञात कीजिए।

(SSC CGL MAINS 2024)

[A] 2

[C] -4

[B] -3

[D] 4

$$\begin{cases} X - 2Y + 2Z = 16 \\ 2X - 3Y + Z = 18 \\ 2X - 3Y - Z = 9 \end{cases}$$

$$\begin{aligned} 2X - 4Y &= 18 \Rightarrow 6 - 4Y = 18 \\ -2X &= -2 \Rightarrow X = 1 \\ -4Y &= 12 \end{aligned}$$

134. How many solutions for given three unknowns are possible to satisfy all these equations?

दिए गए तीन अज्ञातों के लिए कितने हल संभव हैं जो इन सभी समीकरणों को संतुष्ट करते हैं?

$$\begin{cases} -3\alpha + 2\beta + (-5\gamma) = -14 \\ 2\alpha - 3\beta + 4\gamma = 10 \\ \alpha + \beta + \gamma = 4 \end{cases}$$

$$-\alpha - \beta - \gamma = -4$$

$$\alpha + \beta + \gamma = 4$$

(RRB NTPC GRADUATE LEVEL CBT-1 2026)

[A] Unique solution

[B] Infinite solutions

[C] No solution

[D] Two solutions

$$\alpha + \gamma = 7$$

1	6
2	5
7	0
-3	10

$$\begin{cases} x + y + z = 8 \\ x + 3y + 4z = 20 \\ * \quad x + 4y + 5z = 28 \end{cases}$$

सं. x, y, z

135. If $x = \alpha$ & $y = \beta$ satisfy the equations $5x + 9y = 37xy$ and $4x - 7y = -13xy$, $x \neq 0, y \neq 0$, then what is the value of $\alpha^{-2} + \beta^{-2} - (\alpha\beta)^{-1}$?

यदि $x=\alpha$ और $y=\beta$ समीकरणों $5x + 9y = 37xy$ और $4x - 7y = -13xy$, $x \neq 0, y \neq 0$ को संतुष्ट करें, तो $\alpha^{-2} + \beta^{-2} - (\alpha\beta)^{-1}$ का मान क्या है?

(ICAR Assistant 2022)

[A] 5

[B] 7

[C] 9

[D] 11

Algebra का Remainder Theorem Based Concept:-

$$f(x) = ax^3 + bx^2 + cx + d$$

↓
Polynomial
(बहुपद)

$$\frac{f(a)}{x-a} = \text{Rem } f(a)$$

$$\begin{array}{r} 5 \overline{) 234} \\ \underline{20} \\ 34 \\ \underline{30} \\ 4 \end{array}$$

3 Rem

$$23 = 5 \times 4 + 3$$

अगर किसी Polynomial (बहुपद) को $(x-a)$ से भाग देते हैं तो Remainder (r) आता है

$$(x-a) \overset{\text{माना}}{f(x)} (Q)$$

$$\underline{r} = \text{Rem}$$

$$f(x) = (x-a)Q + r$$

put $x=a$

Put, $x = a$

$$f(a) = \cancel{(a-a)}Q + r$$

$$f(a) = r$$



136. Find the remainder on dividing $(5x^3 + 4x^2 - 10x + 1)$ by $(2x - 4)$.

$f(x) = (5x^3 + 4x^2 - 10x + 1)$ को $(2x - 4)$ से भाग देने पर शेषफल ज्ञात कीजिए।

SSC CHSL PRE 2025

[A] 45

[C] 11

☒ [B] 37

[D] 78

$$\text{put } 2x - 4 = 0$$

$$x = 2$$

$$\begin{aligned} \text{Ans} \\ f(2) &= 40 + 16 - 20 + 1 \\ &= 37 \end{aligned}$$

137. When $f(m) = m^5 + 5m^4 - 3m + 7$ is divided by $(m-2)$, then the remainder is ____?

जब $f(m) = m^5 + 5m^4 - 3m + 7$ को $(m-2)$ से विभाजित किया जाता है, तो शेषफल ____ होता है?

SSC CGL Pre 2024

[A] 78

[C] 110

[B] 95

[D] 113

$$\text{Let } m-2=0$$

$$m=2$$

$$\begin{aligned}\text{Rem} &= 32 + 80 - 6 + 7 \\ &= 113\end{aligned}$$

138. The remainder when $3x^3 - 2x^2y - 13xy^2 + 10y^3$ is divided by $(x - 2y)$ is equal to
 $3x^3 - 2x^2y - 13xy^2 + 10y^3$ को $(x - 2y)$ से विभाजित करने पर शेषफल है

[A] 0

[B] y

[C] $y - 5$

[D] $y + 3$

$$\text{put } x - 2y = 0$$

$$x = 2y$$

$$\begin{aligned} \text{Rem} &= 24y^3 - 8y^3 - 26y^3 + 10y^3 \\ &= 0 \end{aligned}$$

139. If dividing $2x^m + x^3 - 3x^2 - 26$ by $x - 2$ leaves remainder 994, then find the value of 'm'.
यदि $2x^m + x^3 - 3x^2 - 26$ को $x-2$ से विभाजित करने पर शेष 994 बचता है, तो 'm' का मान ज्ञात कीजिए।

RRB RPF Constable – 20/01/2019 (Shift-II)

[A] 10

[C] 11

[B] 9

[D] 8

$$\text{put } x-2=0 \\ x=2$$

$$m=9$$

$$\text{Ans} \\ 2 \times 2^m + 8 - 12 - 26 = 994$$

$$2^{m+1} = 994 + 30$$

$$2^{m+1} = 2^{10}$$

140. If the polynomial $ax^3 + 4x^2 + 3x - 4$ and $x^3 - 7x + a$ leaves the same remainder, when divided by $(x - 2)$, then find the value of a .

यदि बहुपद $ax^3 + 4x^2 + 3x - 4$ और $x^3 - 7x + a$ को $(x - 2)$ से विभाजित करने पर समान शेषफल प्राप्त होता है, तो a का मान ज्ञात कीजिए।

(RRB NTPC GRADUATE LEVEL 2025 CBT-1)

[A] $\frac{-17}{5}$
[C] $\frac{-36}{5}$

[B] $\frac{-24}{7}$
[D] $\frac{-21}{8}$

put $x=2=0$
 $x=2$

Rem

$$8a + 16 + 2 = 8 - 14 + a$$

$$7a = -6 - 18$$

$$a = \frac{-24}{7}$$

141. What must be added to $(x^3 - 3x^2 + 4x - 75)$ to obtain a polynomial that is exactly divisible by $(x - 5)$?

एक बहुपद प्राप्त करने के लिए $(x^3 - 3x^2 + 4x - 75)$ में क्या जोड़ा जाना चाहिए जो $(x - 5)$ से बिल्कुल विभाज्य है?

SSC CPO 2024

[A] 5

[C] 4

[B] 6

[D] 2

$$\frac{21}{7} = \text{Rem } 0$$

$$\begin{aligned} \text{Let } x-5 &= 0 \\ x &= 5 \end{aligned}$$

$$\begin{aligned} \text{Rem} &= 125 - 75 + 20 - 75 \\ &= -5 + 5 \end{aligned}$$

142. If $(x + 3)$ is a factor of $x^3 + 3x^2 + 4x + k$, then what is the value of k ?

यदि $(x + 3)$, $x^3 + 3x^2 + 4x + k$ का एक गुणनखंड है, तो k का मान क्या है?

put $x = -3$
[A] 12 ✓
[C] 36

[B] 24
[D] 72

$$(-27 + 27 - 12 + k) = 0 \quad \text{Rem}$$

$$k = 12$$

143. If $x^3 - 6x^2 + ax + b$ is divisible by $(x^2 - 3x + 2)$, then the values of a and b are:

यदि $x^3 - 6x^2 + ax + b$, $(x^2 - 3x + 2)$ से विभाज्य है, तो a और b के मान हैं:

(SSC CHSL 2020)

~~[A] $a = -1$ and $b = 6$~~

~~[B] $a = -6$ and $b = -11$~~

☒ [C] $a = 1$ and $b = -6$

~~[D] $a = 6$ and $b = 11$~~

$$x^2 - 3x + 2 = (x-1)(x-2)$$

$$\text{Rem} = 0$$

$$1 - 6 + a + b = 0$$

$$a + b = 5$$

~~but $x=1$~~

~~but $x=2$~~

~~$8 - 24 + 2a + b = 0$~~

~~$a + b = 16$~~