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कक्षा-10वीं राजस्थान बोर्ड 2027

ARJUN BATCH

गणित

प्रश्नावली 2.2
Exercise 2.2

CHAPTER -02 | PART-03

एकदम बेसिक से थ्योरी क्लास!

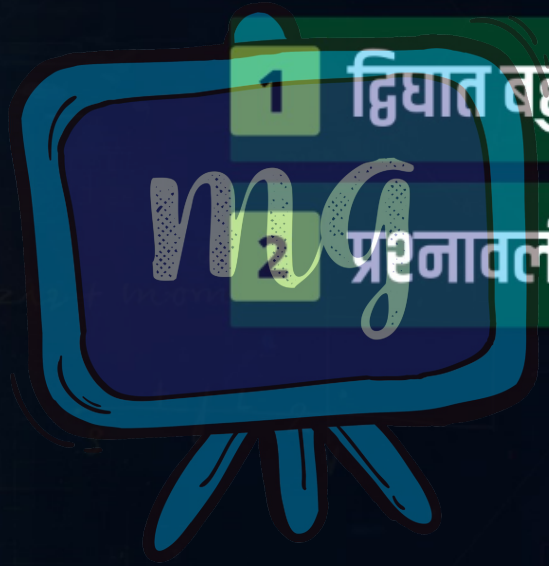


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Aim-100

आज क्या पढेंगे ?



1 द्विघात बहुपद जब शून्यक दिये गये हो

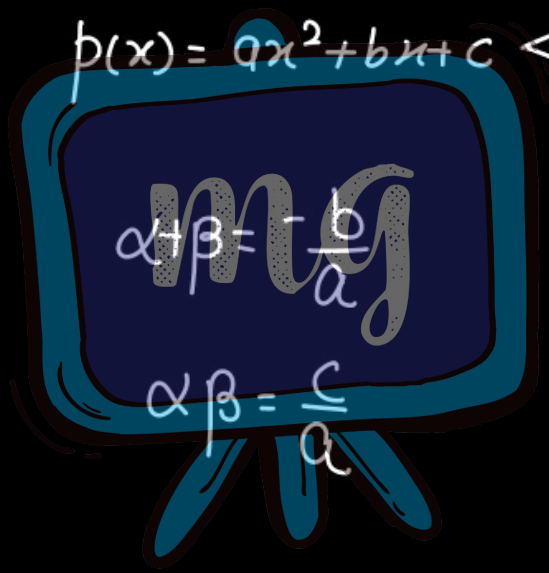
2 प्रश्नावली 2.2

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- : द्विघात बहुपद के शून्यकों और गुणांकों में संबंध : -

$p(x) = ax^2 + bx + c$ → α, β शून्यक



द्विघात बहुपद ज्ञात करना जब शून्यक दिए गए हो।-

$$p(x) = k\left[x^2 - (\text{शून्यकों का योग})x + \text{शून्यकों का गुणा}\right]$$

$$p(x) = k\left[x^2 - (\alpha+\beta)x + \alpha\beta\right]$$

$p(x) = ax^2 + bx + c$

α β ✓

Q. यदि एक द्विघात बहुपद के शून्यक (5) एवं (4) हो, तो द्विघात बहुपद ज्ञात कीजिये

हल:- $\alpha = 5, \beta = 4$

$\alpha + \beta = 5 + 4 = 9$

$\alpha\beta = 5 \times 4 = 20$

$p(x) = k[x^2 - (\alpha+\beta)x + \alpha\beta]$

$p(x) = k[x^2 - 9x + 20]$ ✓

अतः अभीष्ट द्विघात बहुपद

$p(x) = x^2 - 9x + 20$

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$p(x) = x^2 - 9x + 20$

5
4

$p(x) = 2x^2 - 18x + 40$

5
4

$= 2(x^2 - 9x + 20)$

$p(x) = 3x^2 - 27x + 60$

5
4

$= 3(x^2 - 9x + 20)$

$4(x^2 - 9x + 20)$

$5(x^2 - 9x + 20)$

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Q. $\alpha = 4 \quad \beta = -3$

हल :- $p(x) = k[x^2 - (\alpha+\beta)x + \alpha\beta]$

$\alpha+\beta = 4+(-3) = 1$

$\alpha\beta = 4(-3) = -12$

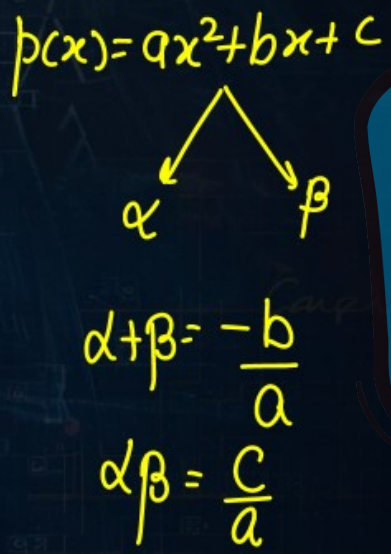
$p(x) = k[x^2 - 1 \cdot x + (-12)]$

$= k[x^2 - x - 12]$

$p(x) = x^2 - x - 12$

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प्रश्नावली 2.2 :

Q.1 निम्न द्विघात बहुपदों के शून्यक ज्ञात कीजिए और शून्यकों तथा गुणांकों के बीच के संबंध की सत्यता की जाँच कीजिए :

(i) $x^2 - 2x - 8$

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जाँच

$p(x) = x^2 - 2x - 8$ के लिए

$a = 1, b = -2, c = -8$

$\alpha + \beta = \frac{-b}{a}$

$4 + (-2) = \frac{-(-2)}{1}$

$2 = 2$

$\alpha\beta = \frac{c}{a}$

$4(-2) = -8$

$-8 = -8$

$p(x) = x^2 - 2x - 8$

$p(x) = x^2 - 4x + 2x - 8$

$p(x) = x(x-4) + 2(x-4)$

$p(x) = (x-4)(x+2)$

शून्यक के लिए

$p(x) = 0$

$(x-4)(x+2) = 0$

$(x-4) = 0$ | $x+2 = 0$

$x = 4$ | $x = -2$

प्रश्नावली 2.2

$4 \times 1 = 4$

$-2 \quad -2$

$-4s = -2s - 2s$

(ii) $4s^2 - 4s + 1$

Sol:- $p(s) = 4s^2 - 4s + 1$

$p(s) = 4s^2 - 2s - 2s + 1$

$= 2s(2s-1) + 1(-2s+1)$

$= 2s(2s-1) - 1(2s-1)$

$= (2s-1)(2s-1)$

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प्रश्नावली 2.2

$6x - 3 = -18$

$-9 \quad 2$

$-7x = -9x + 2x$

(iii) $6x^2 - 3 - 7x$

हल :- $p(x) = 6x^2 - 3 - 7x$

$= 6x^2 - 7x - 3$

$= 6x^2 - 9x + 2x - 3$

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

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

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प्रश्नावली 2.2

(iv) $4\mu^2 + 8\mu$

$p(\mu) = 4\mu^2 + 8\mu$

$= 4\mu(\mu + 2)$

$p(\mu) = 0$

$4\mu(\mu+2) = 0$

$4\mu = 0 \quad | \quad \mu + 2 = 0$

$\mu = 0 \quad , \quad \mu = -2$

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प्रश्नावली 2.2

(v) $t^2 - 15$

हल :- $p(t) = t^2 - 15$

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

$p(t) = t^2 - (\sqrt{15})^2$

$= (t + \sqrt{15})(t - \sqrt{15})$

शून्यक के लिए

$p(t) = 0$

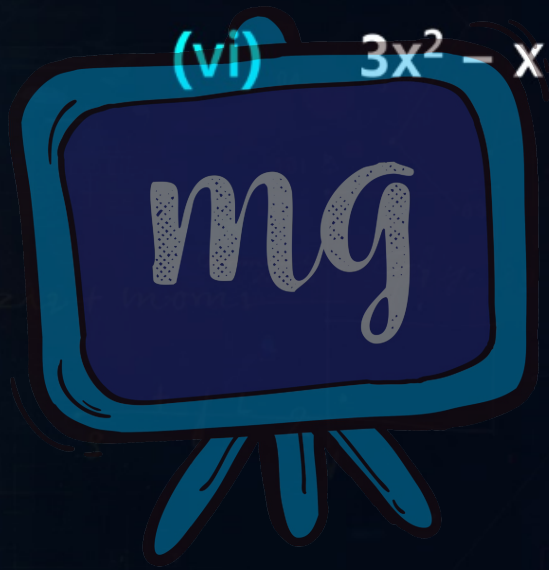
$(t + \sqrt{15})(t - \sqrt{15}) = 0$

$t + \sqrt{15} = 0$	$t - \sqrt{15} = 0$
$t = -\sqrt{15}$	$t = \sqrt{15}$

H.W.

प्रश्नावली 2.2

(vi) $3x^2 - x - 4$



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प्रश्नावली 2.2 :

$p(x) = k[x^2 - (\alpha+\beta)x + \alpha\beta]$

$= k\left[x^2 - \frac{1}{4}x + (-1)\right]$

$= k\left[\frac{x^2}{1} - \frac{x}{4} - \frac{1}{1}\right]$

$= k\left[\frac{4x^2 - x - 4}{4}\right]$

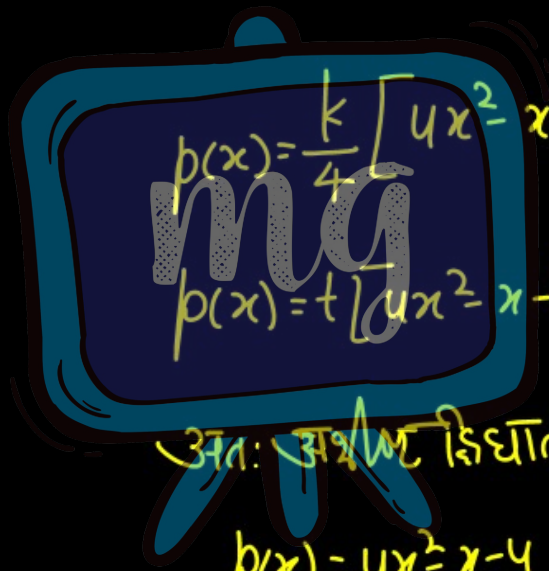
Q.2 एक द्विघात बहुपद ज्ञात कीजिए, जिसके शून्यकों के योग तथा गुणनफल क्रमशः दी गई संख्याएँ हैं:

(i) $\frac{1}{4}, -1$

$\alpha+\beta = \frac{1}{4}$, $\alpha\beta = -1$

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$$p(x) = \frac{k}{4}\left[4x^2 - x - 4\right]$$

$$p(x) = t\left[4x^2 - x - 4\right] \quad \text{जहाँ } t = \frac{k}{4}$$

अतः अभीष्ट द्विघात बहुपद

$$p(x) = 4x^2 - x - 4$$

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प्रश्नावली 2.2

(ii) $\sqrt{2}, \frac{1}{3}$

$\alpha + \beta = \sqrt{2}$

$\alpha\beta = \frac{1}{3}$

$p(x) = \frac{k}{3}[3x^2 - 3\sqrt{2}x + 1]$

अतः अभीष्ट द्विघात बहुपद

$p(x) = 3x^2 - 3\sqrt{2}x + 1$

$p(x) = k[x^2 - (\alpha+\beta)x + \alpha\beta]$

$= k\left[\frac{x^2}{1} - \frac{\sqrt{2}}{1}x + \frac{1}{3}\right]$

$= k\left[\frac{3x^2 - 3\sqrt{2}x + 1}{3}\right]$

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प्रश्नावली 2.2

$p(x) = x^2 + \sqrt{5}$

(iii) $0, \sqrt{5}$

$\alpha + \beta = 0$

$\alpha\beta = \sqrt{5}$

$p(x) = k[x^2 - (\text{शून्यकों का योग})x + \text{शून्यकों का गुणा}]$

$= k[x^2 - 0.x + \sqrt{5}]$

$= k[x^2 + \sqrt{5}]$

H.W.

प्रश्नावली 2.2

(iv) 1, 1

$\alpha + \beta = 1$

$\alpha\beta = 1$

$p(x) =$

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प्रश्नावली 2.2

(v) $-\frac{1}{4}, \frac{1}{4}$

$p(x) = k\left[\frac{4x^2+x+1}{4}\right]$

$p(x) = \frac{k}{4}\left[4x^2+x+1\right]$

अत: अभीष्ट द्विघात बहुपद

$p(x) = 4x^2+x+1$

$\therefore$

$\alpha+\beta = -\frac{1}{4}$, $\alpha\beta = \frac{1}{4}$

$p(x) = k[x^2 - (\alpha+\beta)x + \alpha\beta]$

$p(x) = k\left[x^2 - \left(-\frac{1}{4}\right)x + \frac{1}{4}\right]$

$p(x) = k\left[x^2 + \frac{1}{4}x + \frac{1}{4}\right]$

$\frac{1}{1}$

H.W.

प्रश्नावली 2.2

(vi) 4, 1

