8. If $x^3 + 2x^2 - ax - b$ is exactly divisible by $(x^2 - 1)$, then the values of a and b are:

अगर $x^3 + 2x^2 - ax - b$, $(x^2 - 1)$, से पूरी तरह से विभाज्य है, तो a और b के मान हैं:

a) $a = -1$, and $b = 2$

b) $a = 1$ and $b = -2$

c) $a = 1$ and $b = 2$

d) $a = 2$ and $b = 2$

Rem = 0

$(x^2 - 1^2) = (x+1)(x-1) = 0$

$x + 1 = 0$

$\Rightarrow x = -1$

$x = 1$

$-1 + 2 + a - b = 0 \Rightarrow a - b = -1$

$1 + 2 - a - b = 0 \Rightarrow +a + b = +3$

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9. If $x^{40} + 30$ is divided by $x^4 + 1$, find the remainder

यदि $x^{40} + 30$ को $x^4 + 1$ से विभाजित किया जाए, तो शेषफल ज्ञात कीजिए |

a) 30 b) 31 c) 29 d) 0

$x^4 + 1 = 0$

$\Rightarrow x^4 = -1$

$(x^4)^{10} + 30$

$= (-1)^{10} + 30$

$= 1 + 30 = 31$

10. $x^{35} + 3$ is divided by $x^5 + 1$, find remainder.

$x^{35} + 3$ को $x^5 + 1$ से विभाजित किया जाता है, शेषफल ज्ञात करो |

a) 4 b) -4 c) 2 d) -2

$x^5 = -1$

$(x^5)^7 + 3$

$= (-1)^7 + 3$

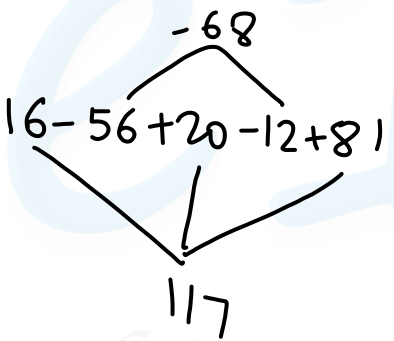
$= 2$

11. One of the factors of the polynomial $x^4 - 7x^3 + 5x^2 - 6x + 81$ is

बहुपद $x^4 - 7x^3 + 5x^2 - 6x + 81$ के गुणनखंडों में से एक है :

a) $x + 2 = 0$ b) $x - 2 = 0$ c) $x + 3 = 0$ d) $x - 3$

$x = -2$ $x = 2$ $x = -3$



12. The expression $x^3q^2 - x^3pt + 4x^2pt - 4x^2q^2 + 3xq^2 - 3xpt$ is divisible by

समीकरण $x^3q^2 - x^3pt + 4x^2pt - 4x^2q^2 + 3xq^2 - 3xpt$ किससे विभाजित होगा ?

a) Only $(x - 1)$
b) Only $(x - 3)$
c) Both a or b
d) Neither a nor b

$x - 1 = 0$

$\Rightarrow x = 1$

$q^2 - pt + 4pt - 4q^2 + 3q^2 - 3pt = 0$

$x - 3 = 0$

$\Rightarrow x = 3$

$27q^2 - 27pt + 36pt - 36q^2 + 9q^2 - 9pt = 0$

13. If $x^3 + 5x^2 + 10k$ leaves remainder $-2x$ when divided by $x^2 + 2$, then the value of k is:

$x^2 = -2$

यदि $x^3 + 5x^2 + 10k$ को $x^2 + 2$ से भाग करें तो, $-2x$ शेष रह जाता है तो k का मान क्या होगा:

a) -2 b) -1 c) 1 d) 2

$x \cdot x^2$

$-2x - 10 + 10k = -2x$

$10k = 10$

$k = 1$

14. Factor of $x^{29} - x^{26} - x^{23} + 1$.

(HW) $x^{29} - x^{26} - x^{23} + 1$ के गुणनखंड ज्ञात करो |

a) $(x-1)$ but not $(x+1)$

b) $(x+1)$ but not $(x-1)$

c) Both $(x+1)$ and $(x-1)$

d) Neither $(x+1)$ nor $(x-1)$

$x-1=0 \Rightarrow x=1$, put in polynomial.

$1-1-1+1=0$, so $(x-1)$ is a factor

$x+1=0 \Rightarrow x=-1$, put in polynomial.

$-1-1+1+1=0$, so $(x+1)$ is a factor.

15. If $3x^3 - 2x^2y - 13xy^2 + 10y^3$ is divided by $x - 2y$, then what is the remainder?

HW

यदि $3x^3 - 2x^2y - 13xy^2 + 10y^3$ को $x - 2y$ से विभाजित किया जाता है, तो शेषफल क्या बचेगा ?

a) 0 b) x c) $y + 5$ d) $x - 3$

$x=2y$

let $x-2y=0 \Rightarrow x=2y$, put in polynomial

$24y^3 - 8y^3 - 26y^3 + 10y^3 = 0$

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16. Let $p(x)$ be the HCF of the Polynomials $f(x) = 6(x^3 + 3x^2)(x^2 - 16)(x^2 + 9x + 18)$ and $g(x) = 8(x^4 + 4x^3)(x^2 + 6x + 9)^2$, find $p(-2)$.

माना $p(x)$, $f(x) = 6(x^3 + 3x^2)(x^2 - 16)(x^2 + 9x + 18)$ और $g(x) = 8(x^4 + 4x^3)(x^2 + 6x + 9)^2$ बहुपद का म.स. है तो $p(-2)$ का पता लगाएं |

a) -2 b) 0 c) 16 d) 8

$f(x) = 6x^2(x+3)(x+4)(x-4)(x+6)(x+3)$

$g(x) = 8x^3(x+4)(x+3)^2$

$P(x) = HCF = 2x^2(x+3)^2(x+4)$

$P(-2) = 2 \times 4 \times 1 \times 2 = 16$

$2^3 \times 3^1, 2^2 \times 3^1 \times 5$

HCF $2^2 \times 3^1$

LCM $= 2^3 \times 3^1 \times 5$

HCF $4 \times 3 = 12$

LCM $= 12 \times 2 \times 5 = 120$

17. Find the remainder when LCM of the polynomials $f(x) = 4(x-1)(x^2+6x+8)$ and $g(x) = 10(x-1)(x+2)(x^2+7x+10)$ is divided by $(x+3)$

$f(x) = 4(x-1)(x^2+6x+8)$ और $g(x) = 10(x-1)(x+2)(x^2+7x+10)$ बहुपद के ल.स. को $(x+3)$ से भाग देने पर शेषफल क्या होगा ?

a) -320 b) 320 c) -160 d) 160

$x+3=0$

$x=-3$

$f(x) = 4(x-1)(x+4)(x+2)$

$g(x) = 10(x-1)(x+2)(x+2)(x+5)$

LCM $= 20(x-1)(x+4)(x+2)^2(x+5)$

Rem $= 20 \times -4 \times 1 \times 1 \times 2 = -160$

Synthetic and long division:

$$x-1 \overline{)\, x^3 - 2x^2 - 5x + 6}$$

$$x^2 - x - 6$$

$$-x^3 \mp x^2$$

$$-x^2 - 5x$$

$$\mp x^2 \pm x$$

$$-6x + 6$$

$$\mp 6x \pm 6$$

$$0$$

$x - 1 = 0$

$\Rightarrow x = 1$

1	1	−2	−5	6
	0	1	−1	−6
	1	−1	−6	0

$x^2 - x - 6$

12. If two factors of $a^4 - 2a^3 - 9a^2 + 2a + 8$ are $(a+1)$ and $(a-1)$, then what are the other two factors?

यदि $(a+1)$ और $(a-1)$, $a^4 - 2a^3 - 9a^2 + 2a + 8$ के गुणनखंड हैं, तो दो अन्य गुणनखंड क्या होंगे ?

a) $(a-2)$ and $(a+4)$ b) $(a+2)$ and $(a+4)$

c) $(a+2)$ and $(a-4)$ d) $(a-2)$ and $(a-4)$

$a+1=0$

$a=-1$

$a-1=0$

$a=1$

-1	1	-2	-9	2	8
	0	-1	3	6	-8
1	1	-3	-6	8	0
	0	1	-2	-8	
	1	-2	-8	0	

$a^2-2a-8 = (a-4)(a+2)$

$$
\begin{array}{r|l}
 & a^2-2a-8 \\
\hline
a^2-1 & a^4-2a^3-9a^2+2a+8 \\
 & -a^4 \mp a^2 \\
\hline
 & -2a^3-8a^2 \\
 & \mp 2a^3 \pm 2a \\
\hline
 & -8a^2+8 \\
 & \mp 8a^2 \pm 8 \\
\hline
 & 0
\end{array}
$$

a^2-1 ← -4, 2

$(a-1)(a+1)=a^2-1$

$(a-4)(a+2)$

Higher degree equations' SoR & PoR:

relevant

i) α, β $\quad x^2-(\alpha+\beta)x+\alpha\beta=0$

ii) α, β, γ $\quad x^3-(\alpha+\beta+\gamma)x^2+(\alpha\beta+\beta\gamma+\gamma\alpha)x-\alpha\beta\gamma$

not relevant

iii) $\alpha, \beta, \gamma, \delta$ $\quad x^4-(\alpha+\beta+\gamma+\delta)x^3+(\alpha\beta+\alpha\gamma+\alpha\delta+\beta\gamma+\beta\delta+\gamma\delta)x^2-(\beta\gamma\delta+\alpha\gamma\delta+\alpha\beta\delta+\alpha\beta\gamma)x+\alpha\beta\gamma\delta$

i) ax^2+bx+c (α, β)

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

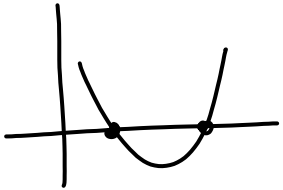
ii) $ax^3+bx^2+cx+d=0$ (α, β, γ)

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

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

$\alpha\beta\gamma=-\frac{d}{a}$

Representation on graph:



$$x^3 - 2x^2 - 5x + 6$$

$\alpha+\beta+\gamma = 2$

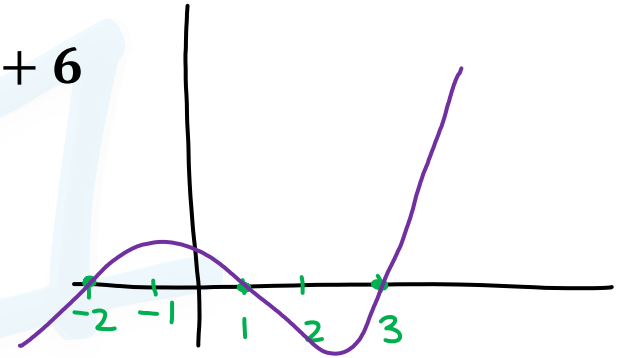
$\alpha\beta+\beta\gamma+\gamma\alpha = -5$

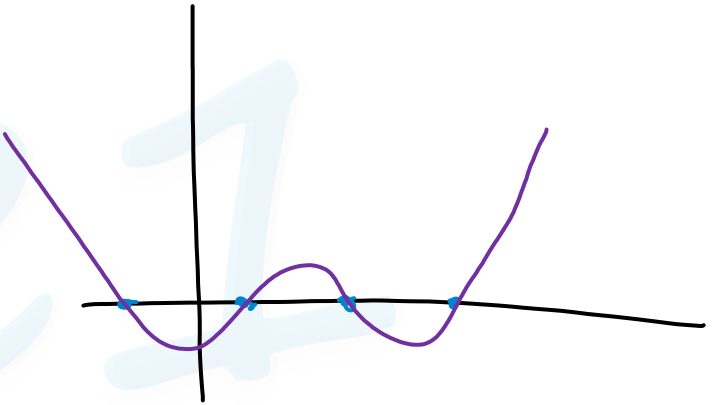
$\alpha\beta\gamma = -6$

$-6, 1, 1$ X

$3, -2, 1$ ✓

-6
-2
3
-5





[redacted]

19. What is $(x-a)(x-b)(x-c)$ equal to?

$(x-a)(x-b)(x-c)$ किसके बराबर है ?

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

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

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

d) $x^3+(bc+ca+a)x^2-(a+b+c)x-abc$

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

$\neq 0 \quad \neq 0$

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

20. If α, β and γ are the zeros of the polynomial $f(x) = ax^3 + bx^2 + cx + d$, then $\alpha^2 + \beta^2 + \gamma^2$ is equal to

यदि α, β और γ बहुपद $f(x) = ax^3 + bx^2 + cx + d$ के शून्य हैं, तो $\alpha^2 + \beta^2 + \gamma^2$ बराबर हैं:

a) $\frac{b^2-ac}{a^2}$ b) $\frac{b^2-2ac}{a}$ c) $\frac{b^2+2ac}{b^2}$ d) $\frac{b^2-2ac}{a^2}$

$$\begin{cases} \alpha+\beta+\gamma = \frac{-b}{a} \\ \alpha\beta+\beta\gamma+\gamma\alpha = \frac{c}{a} \end{cases}$$

$$\alpha\beta\gamma = -\frac{d}{a}$$

$$(\alpha+\beta+\gamma)^2 - 2(\alpha\beta+\beta\gamma+\gamma\alpha)$$

$$= \frac{b^2}{a^2} - \frac{2c}{a} \times \frac{a}{a}$$

$$= \frac{b^2-2ac}{a^2}$$

$a^3 + 0 \cdot a^2 - 7a - 6$

21. If x, y, z are the three factors of $a^3 - 7a - 6$, then the value of $x + y + z$ will be
यदि $a^3 - 7a - 6$ के तीन गुणनखंड x, y, z हैं, तो $x + y + z$ का मान होगा ?

a) 3a b) 3 c) 6 d) a

$\alpha + \beta + \gamma = \frac{0}{1} = 0$

Let roots be α, β, γ

$(a-\alpha)(a-\beta)(a-\gamma)$

$x \quad y \quad z$

$x + y + z = 3a - (\alpha + \beta + \gamma)$

$= 3a$

[redacted]

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22. $x^3 + 6x^2 + 11x + 6$ is divisible by
$x^3 + 6x^2 + 11x + 6$ विभाजित है :

a) Only $(x + 1)$ b) Only $(x + 2)$

c) Only $x + 3)$ d) All of these

i) Using option $x+1=0 \Rightarrow x=-1$

ii) $a+b+c=-6$

$ab+bc+ca=11$

$abc=-6$ → $-3,-2,-1$

$6,1,1$

6
2
3
11

$x=-1,-2,-3$

$x=-1$ $x=-2$

$(x+1)=0$ $(x+2)=0$

23. What are the factors of $x^3 + 4x^2 - 11x - 30$?

$x^3 + 4x^2 - 11x - 30$ के गुणनखंड क्या होंगे ?

a) $(x-2), (x+3)$ and $(x+5)$

b) $(x+2), (x+3)$ and $(x-5)$

c) $(x+2), (x-3)$ and $(x+5)$

d) $(x+2), (x-3)$ and $(x-5)$

i) options use

ii)

$a+b+c = -4$

$ab+bc+ca = -11$

$abc = 30$ $-5, 3, -2$

-15
10
-6
-11

$(x+5), (x-3), (x+2)$

24. HCF and LCM of two polynomials are $(x+3)$ and $(x^3-9x^2-x+105)$ respectively. If one of the two polynomials is $x^2-4x-21$, then the other is

दो बहुपदों का म.स. और ल.स. क्रमशः $(x+3)$ और $(x^3-9x^2-x+105)$ है| यदि दोनों में से एक बहुपद $x^2-4x-21$ है तो दूसरा क्या होगा ?

a) $x^2+2x-21$ b) $x^2+2x+15$

c) $x^2-2x-15$ d) x^2-x-15

$-7 \uparrow 3$

$N_1 \times N_2 = HCF \times LCM$

$N_2 = \frac{HCF \times LCM}{N_1}$

$Ans = \frac{(x+3)(x^3-9x^2-x+105)}{(x-7)(x+3)}$

7	1	-9	-1	105
	0	7	-14	-105
	1	-2	-15	0

$x^2-2x-15$

$x-7=0$

$x=7$

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