



$$\text{HCF } [25, 40] = 5$$

$$\text{LCM } [25, 40] = 200$$

Polynomials & HCF/LCM $\Rightarrow$



144. What is the HCF of $(x^6 + 1)$ and $(x^4 - 1)$?

$(x^6 + 1)$ और $(x^4 - 1)$ का महत्तम समापवर्तक (HCF) क्या है?

(SSC CPO 2023)

[A] $(1+x^2)$

[B] $(1+x)$

[C] 1

[D] $(1-x^2)$

$$x^6 + 1 = (x^2)^3 + 1^3 = (x^2 + 1) \cdot (x^4 - x^2 + 1)$$

$$x^4 - 1 = (x^2)^2 - 1^2 = (x^2 + 1) \cdot (x^2 - 1)$$

145. What is the HCF of the polynomials $(x^4 - 1)$, $(x^3 - 3x^2 + 3x - 1)$, $(x^4 - 3x + 2)$ and $(x^3 - 2x^2 + x)$?

बहुपदों $(x^4 - 1)$, $(x^3 - 3x^2 + 3x - 1)$ और $(x^3 - 2x^2 + x)$ का महत्तम समापवर्तक क्या होगा?

(DELHI POLICE 2022)

[A] ~~$(x-4)$~~

[B] ~~$(x-2)$~~

[C] ~~$(x-7)$~~

[D] $(x-1)$

$\rightarrow = (x^2 + 1) \cdot (x+1)(x-1)$

146. If $(x + k)$ is the HCF of $x^2 + 5x + 6$ and $x^2 + 8x + 15$, then what is the value of k ?

यदि $(x + k)$, $x^2 + 5x + 6$ और $x^2 + 8x + 15$ का HCF है, तो k का मान क्या है?

[A] 5

[B] 3 ✓

[C] 2

[D] 1

$$\begin{aligned}x^2 + 5x + 6 &= x^2 + 3x + 2x + 6 \\&= x(x + 3) + 2(x + 3) \\&= (x + 3) \cdot (x + 2)\end{aligned}$$

$$x^2 + 8x + 15 = (x + 3) \cdot (x + 5)$$

$$x + k = x + 3$$

147. If $(x - 5)$ is the HCF of $x^2 - x - p$ and $x^2 - qx - 10$, then what is the value of $(p + q)$?

यदि $x^2 - x - p$ और $x^2 - qx - 10$ का HCF $(x - 5)$ है, तो $(p + q)$ का मान क्या है?

[A] -23

[B] -17

[C] 17

[D] 23

$$\text{put } x - 5 = 0 \\ x = 5$$

Ans.

$$25 - 5 - p = 0 \Rightarrow p = 20$$

$$25 - 5q - 10 = 0 \Rightarrow q = 3$$

148. What is HCF of the polynomial $x^8 + x^4 + 1$ & $x^4 + x^2 + 1$?

बहुपद $x^8 + x^4 + 1$ & $x^4 + x^2 + 1$ का HCF क्या है?

(UPSC CDS-1 2025)

[A] 1

☒ [B] $x^4 + x^2 + 1$

[C] $x^4 - x^2 + 1$ ✗

[D] $x^4 - x^2 - 1$ ✗

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

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

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

149. What is the HCF of the polynomials $(x^3 - 8)$, $(x^3 - 6x^2 + 12x - 8)$ & $(x^3 - 4x^2 + 4x)$?

बहुपद $(x^3 - 8)$, $(x^3 - 6x^2 + 12x - 8)$ & $(x^3 - 4x^2 + 4x)$ का HCF क्या है?

(MTS 2023)

~~[A] $(x-1)$~~

~~[B] $(x-2)$~~

~~[C] $(x-8)$~~

~~[D] $(x-4)$~~

$$x^3 - 2^3 = (x-2) \cdot (x^2 + 2x + 4)$$

$$(x-2)^3$$

$$x \cdot (x-2)^2$$

150. Find the HCF of $(x^2 + 3x - 4)$ and $(x^2 + 5x + 4)$.

$(x^2 + 3x - 4)$ और $(x^2 + 5x + 4)$ का HCF ज्ञात कीजिए।

UP POLICE ASSISTANT OPERATOR 2024

[A] ~~$x - 4$~~

[C] ~~$x + 5$~~

[B] $x + 4$

[D] ~~$x - 1$~~

$(x+1) \cdot (x+4)$

151. What is the HCF of $x^8 - y^8$ & $(x^7 - y^7 + x^5y^2 - x^2y^5)$?

$x^8 - y^8$ & $(x^7 - y^7 + x^5y^2 - x^2y^5)$ का HCF क्या है?

[A] $(x^2 + y^2)$ ✗

[B] $(x^2 - y^2)$ ✗

✓ [C] $(x^3 - y^3 - x^2y + xy^2)$

[D] $(x^3 - y^3 + x^2y - xy^2)$ ✗

$$\begin{aligned} & x^5(x^2 + y^2) - y^5(x^2 + y^2) \\ &= (x^2 + y^2) \cdot (x^5 - y^5) \\ & \quad \downarrow \\ & \quad (x - y) \end{aligned}$$

$$x^8 - y^8 = (x^4 + y^4) \cdot (x^2 + y^2) \cdot (x + y) \cdot (x - y)$$

$$\text{HCF} = (x^2 + y^2) \cdot (x - y)$$

$$a^n - b^n \xrightarrow{\text{H-factor}} (a-b)$$

$n \in \text{odd}$



152. What is the HCF of $x^3 - 19x + 30$ and $x^2 - 5x + 6$?

$x^3 - 19x + 30$ और $x^2 - 5x + 6$ का HCF क्या है?

$8 - 38 + 30 = 0$
(CDS 2022)

$$= (x-2) \cdot (x-3)$$

[A] ~~$(x+2)(x-3)$~~

[B] ~~$(x-2)(x+3)$~~

[C] ~~$(x+2)(x-1)$~~

[D] $(x-3)(x-2)$ ✓

$$x-2=0$$

$$x=2$$

153. What is the HCF of the polynomials $x^6 - 3x^4 + 3x^2 - 1$ and $x^3 + 3x^2 + 3x + 1$?

बहुपदों $(x^2 - 1)^3$ और $(x + 1)^3$ का HCF क्या है?

[A] $(x + 1)$

[C] $x^2 + 1$

[B] $(x + 1)^2$

[D] $(x + 1)^3$

$$\begin{aligned} & (x^2 - 1)^3 \\ &= (x - 1)^3 \cdot (x + 1)^3 \end{aligned}$$

$$(x + 1)^3$$

154. LCM of $x^2 - 8x + 15$ & $x^2 - 5x + 6$ is?

$x^2 - 8x + 15$ & $x^2 - 5x + 6$ का LCM ----- है?)?

(SSC MAINS 2022) (SSC CPO 2023)

- ~~[A] $(x+6)(x+1)(x-3)$~~
- ~~[B] $(x-2)(x-3)(x-5)$~~
- ~~[C] $(x-6)^2(x+1)(x-3)$~~
- ~~[D] $(x-6)(x+1)(x-3)$~~

$$(x-3) \cdot (x-5)$$

$$(x-2) \cdot (x-3)$$



155. The LCM of $x^3 - 27, x^2 - x - 6, x + 2$ is?

$x^3 - 27, x^2 - x - 6, x + 2$ का LCM है?

(SSC MTS 2024)

[A] $(x - 3)(x + 2)(x^2 - 3x + 9)$

[B] $(x + 3)(x + 2)(x^2 - 3x + 9)$

[C] $(x - 3)(x + 2)(x^2 + 3x - 9)$

[D] $(x - 3)(x + 2)(x^2 + 3x + 9)$

$$\begin{aligned} x^3 - 27 \\ = (x - 3)(x^2 + 3x + 9) \end{aligned}$$

156. What is the HCF of $a^4 + 2a^3 + 3a^2 + 2a + 1$ & $a^6 - 2a^3 + 1$?

$(a^4 + 2a^3 + 3a^2 + 2a + 1)^2$ & $(a^6 - 2a^3 + 1)^2$ का HCF क्या है?

(UPSC CDS-2 2024)

[A] $a^3 + 3a^2 + 2a + 1$

[B] $a^3 + a^2 + a + 1$

[C] $(a^2 + a + 1)^2$

[D] $(a^2 - a + 1)^2$

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

$(a^2 + a + 1)^2$
 $a^4 + a^3 + 1 + 2a^3 + 2a + 2a^2$

157. What is the LCM of $x^3 + 8$, $x^2 + 5x + 6$ and $x^3 + 4x^2 + 4x$?

$x^3 + 8$, $x^2 + 5x + 6$ और $x^3 + 4x^2 + 4x$ का LCM क्या है?

- [A] $x(x+2)^2(x+3)(x^2-2x+4)$
- [B] $x(x-2)^2(x-3)(x^2+2x+4)$
- [C] $x(x+2)^2(x-3)(x^2-2x+4)$
- [D] $x(x+2)^2(x-3)(x^2-2x+4)$

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

158. What is the HCF of $x^8 - y^8$ & $(x^7 - y^7 + x^5y^2 - x^2y^5)$?

$x^8 - y^8$ & $(x^7 - y^7 + x^5y^2 - x^2y^5)$ का HCF क्या है?

(DELHI POLICE 2022)

[A] $(x^2 + y^2)$

[B] $(x^2 - y^2)$

✓ [C] $(x^3 - y^3 - x^2y + xy^2)$

[D] $(x^3 - y^3 + x^2y - xy^2)$

Ans

159. What is the HCF of $x^4 - 13x^2y^2 - 300y^4$ & $x^3 - 4x^2y - 4xy^2 - 5y^3$ & $x^3 - 125y^3$?

$x^4 - 13x^2y^2 - 300y^4$ & $x^3 - 4x^2y - 4xy^2 - 5y^3$ & $x^3 - 125y^3$ का HCF क्या है?

(CDS-1 2024)

[A] $x-5y$

[B] $x+5y$

[C] $x^2 + 5xy + 25y^2$

[D] 1

Rem = $\cancel{625y^4} - \cancel{325y^4} - 300y^4$
= 0

Let $x-5y=0$
 $x=5y$

$x^3 - (5y)^3$
= $(x-5y) \cdot (x^2 + 5xy + 25y^2)$

160. What is the LCM of $x^4 + x^2y^2 + y^4, x^3 + y^3, x^3 - y^3$?

$x^4 + x^2y^2 + y^4, (x^3 + y^3), x^3 - y^3$ का LCM क्या है?

(CDS 2023)

- [A] ~~$(x^2 - y^2)(x^4 + x^2y^2 + y^4)^2$~~
- [B] ~~$(x^2 - y^2)(x^4 + 2x^2y^2 + y^4)$~~
- ✓ [C] ~~$(x^3)^2 - (y^3)^2$~~ $\rightarrow (x^3 + y^3) \cdot (x^3 - y^3)$
- [D] ~~$(x^6 + y^6)$~~

161. The HCF and the LCM of two polynomials are $3x + 1$ and $30x^3 + 7x^2 - 10x - 3$ respectively. If one polynomial is $6x^2 + 5x + 1$, then what is the other polynomial?

दो बहुपदों के HCF और LCM क्रमशः $3x + 1$ और $30x^3 + 7x^2 - 10x - 3$ है। यदि एक बहुपद $6x^2 + 5x + 1$ है तो दूसरा बहुपद क्या है?

HCF

LCM

(CDS 2021)

[A] $15x^2 + 4x + 3$

[C] $15x^2 - 4x + 3$

[B] $15x^2 + 4x - 3$

[D] $15x^2 - 4x - 3 = 8$

$\textcircled{I} \times \textcircled{II} = \text{HCF} \times \text{LCM}$

put $x=1$

$$(6x^2 + 5x + 1) \times ? = (3x + 1) \times (30x^3 + 7x^2 - 10x - 3)$$

$$12 \times ? = 4 \times 24$$

$$? = 8$$

162. If $(x + t)$ is a factor of both $(x^2 + px + q)$ and $(x^2 + lx + m)$, then find the value of t ?
यदि $(x + t)$, $(x^2 + px + q)$ और $(x^2 + lx + m)$ दोनों का गुणनखंड है, तो t का मान ज्ञात कीजिए?

[A] $m - q$

[B] $\frac{l-p}{m-q}$

[C] $l-p$

[D] $\frac{m-q}{l-p}$

Let $x+t=0$

$x = -t$

$t = \frac{m-q}{l-p}$

Rem

$$\begin{array}{r} x^2 - tx + q = 0 \\ x^2 - lx + m = 0 \\ \hline -tx + lx + q - m = 0 \\ t(l-p) = m-q \end{array}$$

Misc.



163. Find the value of $(5^{\frac{1}{4}} - 1)(5^{\frac{3}{4}} + 5^{\frac{1}{2}} + 5^{\frac{1}{4}} + 1)$?

$x = 5^{\frac{1}{4}}$ $(5^{\frac{1}{4}} - 1)(5^{\frac{3}{4}} + 5^{\frac{1}{2}} + 5^{\frac{1}{4}} + 1)$ का मान ज्ञात कीजिये?

[A] 5 $= (5^{\frac{1}{4}})^4 - 1$

[B] 6

[C] 4 $= 5 - 1 = 4$

[D] 49

$$x^4 - 1 = (x^2 - 1) \cdot (x^2 + 1)$$

$$= (x - 1) \cdot (x + 1) \cdot (x^2 + 1)$$

$$x^4 - 1 = (x - 1) \cdot (x^3 + x^2 + x + 1)$$

164. Which one of the following is a factor of $a^2 - b^2 - c^2 + 2bc + a + b - c$?
निम्नलिखित में से कौन सा $a^2 - [b^2 + c^2 - 2bc] + a + b - c$ का गुणनखंड है?

(CDS 2023)

[A] $a+b+c+1$

[B] $a-b-c+1$

[C] $a+b+c-1$

[D] $a-b+c+1$

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

$$(a-b+c) \cdot (a+b-c) + (a+b-c)$$

$$= (a+b-c) \times (a-b+c+1)$$

165. If $x=99999$, then $\frac{81x^5-x}{(9x^2-1)(27x^2+3)} = ?$

[A] 11111

[B] 22222

[C] 33333 ✓

[D] 66666

$$\frac{x \cdot (81x^4)}{(9x^2-1) \cdot 3 \cdot (9x^2+1)} = \frac{x}{3}$$

166. If $x = 106$, then find $x^5 - 107x^4 + 107x^3 - 107x^2 + 107x + 25$?

यदि $x = 106$ है, तो $x^5 - 107x^4 + 107x^3 - 107x^2 + 107x + 25$ ज्ञात कीजिये?

[A] 132

[B] 131

[C] 118

[D] -131

$$106 = x$$

$$\Rightarrow 107 = x + 1$$

$$= x^5 - x^5 - x^4 + x^4 + x^3 - x^3 - x^2 + x^2 + x + 25 = 131$$

167. If $\frac{x}{b+c} = \frac{y}{c+a} = \frac{z}{b-a}$ then which one of the following is correct?

यदि $\frac{x}{b+c} = \frac{y}{c+a} = \frac{z}{b-a} \Rightarrow \textcircled{1} \text{ सही}$

में से कौन सा सही है?

[A] $x + y + z = 0$

[C] $x + y - z = 0$

☒ [B] $x - y - z = 0$

[D] $x + 2y + 3z = 0$

$$\begin{cases} x = b+c \\ y = c+a \end{cases}$$

$$z = b-a$$

$$x - y = z$$

168. If $x^2 - 65x = 64\sqrt{x}$, then find $\sqrt{x} - \sqrt{x}$?

(~~x~~) यदि $x^2 - 65x = 64\sqrt{x}$ है, तो $\sqrt{x} - \sqrt{x}$ ज्ञात कीजिये?

[A] 8

[B] 17

[C] 7

[D] 10

$$x^2 - x - 64x = 64x$$

$$x^2 - \sqrt{x}^2 = 64 \cdot (x + \sqrt{x})$$

$$(x - \sqrt{x}) \cdot \cancel{(x + \sqrt{x})} = 64 \cdot \cancel{(x + \sqrt{x})}$$

$$\sqrt{x} - \sqrt{x} = \sqrt{64} = 8$$

169. If $a - (1/a) = b$, $b - (1/b) = c$ and $c - (1/c) = a$, then what is the value of $(1/ab) + (1/bc) + (1/ca)$?

यदि $a - (1/a) = b$, $b - (1/b) = c$ तथा $c - (1/c) = a$ हैं, तो $(1/ab) + (1/bc) + (1/ca)$ का मान क्या है?

~~[A] -3~~

[C] -1

[B] -6

[D] -9

$$\frac{1}{ab} + \frac{1}{bc} + \frac{1}{ca} = ?$$

(CGL MAINS 2017
NTPC 2026)

$$\frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2} = 6$$

$$a - \frac{1}{a} = b \Rightarrow$$

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

$$b - \frac{1}{b} = c \Rightarrow$$

$$b^2 + \frac{1}{b^2} - 2 = c^2$$

$$c - \frac{1}{c} = a \Rightarrow$$

$$c^2 + \frac{1}{c^2} - 2 = a^2$$

$$\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)^2 = 0^2 \Rightarrow$$

$$\frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2} + 2\left(\frac{1}{ab} + \frac{1}{bc} + \frac{1}{ca}\right) = 0$$

170. If $\frac{1}{x} = \frac{1}{p} + \frac{1}{q}$, then what is $\frac{pq}{p^2 - q^2} \left(\frac{x+p}{x-p} - \frac{x+q}{x-q} \right)$ equal to?

यदि $\frac{1}{x} = \frac{1}{p} + \frac{1}{q}$ है, तो $\frac{pq}{p^2 - q^2} \left(\frac{x+p}{x-p} - \frac{x+q}{x-q} \right)$ किसके बराबर होगा?

[A] -2

[C] 1

[B] -1

[D] 2

(CDS 2006)

$$p=2, \quad q=-1$$

$$\frac{1}{x} = \frac{1}{2} - \frac{1}{1} = -\frac{1}{2}$$

$$x = -2$$

$$\frac{-2}{3} \left[0 - \frac{+3}{+1} \right]$$

$$= -\frac{2}{3} \times -3$$
$$= 2$$

Chapter end

10 years

5 sheets ~~सक~~

500g
all PYQ
+ extra

