

Homework

DATE _____

PAGE No. _____

Part A

2) Find the HCF and LCM of:

a) $3a^2b$ and $12a^2b^2$

→ Soln

Here,

$$1^{\text{st}} \text{ exp.} = 3a^2b = 3 \times \underline{a \times a} \times b$$

$$2^{\text{nd}} \text{ exp.} = 12a^2b^2 = 2 \times \underline{a \times a} \times \underline{b \times b}$$

$$\therefore \text{HCF} = a \times a \times b = a^2b$$

$$\therefore \text{LCM} = a \times a \times b \times 3 \times 2 \times b \\ = 6a^2b^2$$

b) $12a^2b^2c$ and $18abc$

→ Soln

Here,

$$1^{\text{st}} \text{ exp.} = 12a^2b^2c = \underline{2 \times 2 \times 3} \times \underline{a \times a} \times \underline{b \times b} \times c$$

$$2^{\text{nd}} \text{ exp.} = 18abc = 3 \times \underline{2 \times 3} \times \underline{a} \times \underline{b} \times c$$

$$\therefore \text{HCF} = 2 \times 3 \times a \times b \times c = 6abc$$

$$\therefore \text{LCM} = \underline{2 \times 3} \times a \times b \times c \times \underline{2 \times a} \times \underline{b} \times 3 = 36a^2b^2c$$

c) $11x^2y^2$ and $20xy$

→ Soln

Here,

$$1^{\text{st}} \text{ exp.} = \cancel{11} \times \cancel{x} \times \cancel{x} \times \cancel{y} \times \cancel{y} = 11x^2y^2$$

$$2^{\text{nd}} \text{ exp.} = 2 \times 2 \times 5 \times \cancel{x} \times \cancel{y} = 20xy$$

$$\therefore \text{HCF} = \cancel{x} \times \cancel{y} = xy$$

$$\therefore \text{LCM} = \cancel{x} \times \cancel{y} \times 11 \times \cancel{x} \times \cancel{y} \times 2 \times 2 \times 5 = 220x^2y^2$$

d) $8a^3b^2c$ and $10a^2bc$

→ Soln

Here,

$$1^{\text{st}} \text{ exp.} = \cancel{8} \times \cancel{2} \times \cancel{2} \times \cancel{2} \times \cancel{a} \times \cancel{a} \times \cancel{a} \times \cancel{b} \times \cancel{b} \times \cancel{c} = 8a^3b^2c$$

$$2^{\text{nd}} \text{ exp.} = \cancel{2} \times 5 \times \cancel{a} \times \cancel{a} \times \cancel{a} \times \cancel{b} \times \cancel{c} = 10a^2bc$$

$$\therefore \text{HCF} = \cancel{2} \times \cancel{a} \times \cancel{a} \times \cancel{b} \times \cancel{c} = 2a^2bc$$

$$\therefore \text{LCM} = \cancel{2} \times \cancel{a} \times \cancel{a} \times \cancel{b} \times \cancel{c} \times 2 \times 2 \times \cancel{a} \times \cancel{b} \times 5 = 40a^3b^2c$$

3) Find the HCF and LCM of;

(a) $x^2 - 4$ and $x^2 + 3x + 2$

→ Soln

Here,

$$\begin{aligned} \text{1st exp.} &= x^2 - 4 \\ &= x^2 - 2^2 \\ &= \underline{(x+2)(x-2)} \end{aligned}$$

$$\begin{aligned} \text{2nd exp.} &= \cancel{x^2 - 5x + 6} x^2 + 3x + 2 \\ &= x^2 + (\cancel{1} + 2)x + 2 \\ &= x^2 + x + 2x + 2 \\ &= x(x+1) + 2(x+1) \\ &= (x+1)\underline{(x+2)} \end{aligned}$$

$$\therefore \text{HCF} = (x+2)$$

$$\begin{aligned} \therefore \text{LCM} &= (x+2) \times (x-2) \times (x+1) \\ &= (x+2)(x-2)(x+1) \end{aligned}$$

(b) $x^2 - 9x + 20$ and $x^2 - 25$

→ Soln

Here,

$$\text{1st exp.} = x^2 - 9x + 20$$

$$\begin{aligned}
 &= x^2 - (4+5)x + 20 \\
 &= x^2 - 4x - 5x + 20 \\
 &= x(x-4) - 5(x-4) \\
 &= \underline{(x-4)(x-5)}
 \end{aligned}$$

$$\begin{aligned}
 \text{2nd exp.} &= x^2 - 25 \\
 &= (x)^2 - (5)^2 \\
 &= \underline{(x+5)(x-5)}
 \end{aligned}$$

$$\therefore \text{HCF} = (x-5)$$

$$\begin{aligned}
 \therefore \text{LCM} &= (x-5) \times (x-4) \times (x+5) \\
 &= (x-5)(x-4)(x+5)
 \end{aligned}$$

(c) $16a^2b^2 - 25a^2$ and $16a^2b^2 - 40a^2b + 25a^2$

→ Soln

Here,

$$\begin{aligned}
 \text{1st exp.} &= 16a^2b^2 - 25a^2 \\
 &= (4ab)^2 - (5a)^2 \\
 &= \underline{(4ab+5a)(4ab-5a)}
 \end{aligned}$$

$$\begin{aligned}
 2^{\text{nd}} \text{ exp} &= 16a^2b^2 - 40a^2b + 25a^2 \\
 &= (4ab)^2 - 4 \cdot 5 \cdot a^2b + (5a)^2 \\
 &= \cancel{(4ab)^2} - \cancel{40a^2b} + \cancel{(5a)^2} \\
 &= (4ab - 5a)^2 \\
 &= \cancel{(4ab - 5a)} (4ab - 5a)
 \end{aligned}$$

$$\therefore \text{HCF} = (4ab - 5a)$$

$$\begin{aligned}
 \therefore \text{LCM} &= (4ab - 5a) \times (4ab + 5a) \times (4ab - 5a) \\
 &= (4ab - 5a)(4ab + 5a)(4ab - 5a)
 \end{aligned}$$

d) $a^2 + 5ab + 4b^2$ and $a^2 + 11ab + 28b^2$

→ Soln

Here,

$$\begin{aligned}
 1^{\text{st}} \text{ exp.} &= a^2 + 5ab + 4b^2 \\
 &= a^2 + (1+4)ab + 4b^2 \\
 &= a^2 + ab + 4ab + 4b^2 \\
 &= a(a+b) + 4b(a+b) \\
 &= (a+b)(a+4b)
 \end{aligned}$$

$$\begin{aligned}
 2^{\text{nd}} \text{ exp.} &= a^2 + 11ab + 28b^2 \\
 &= a^2 + (4+7)ab + 28b^2 \\
 &= a^2 + 4ab + 7ab + 28b^2 \\
 &= a(a+4b) + 7b(a+4b) \\
 &= (a+4b)(a+7b)
 \end{aligned}$$

$$\therefore \text{HCF} = (a+4b)$$

$$\begin{aligned}
 \therefore \text{LCM} &= (a+4b) \times (a+b) \times (a+7b) \\
 &= (a+4b)(a+b)(a+7b)
 \end{aligned}$$

e) $a^2 - 4a + 3$ and $a^2 - 5a + 6$;
→ soln

Here,

$$\begin{aligned}
 1^{\text{st}} \text{ exp.} &= a^2 - 4a + 3 \\
 &= a^2 - (1+3)a + 3 \\
 &= a^2 - a - 3a + 3 \\
 &= a(a-1) - 3(a-1) \\
 &= (a-1)(a-3)
 \end{aligned}$$

$$= (a-1)(a-3)$$

$$\begin{aligned} 2^{\text{nd}} \text{ exp.} &= a^2 - 5a + 6 \\ &= a^2 - (1+6)a + 6 \\ &= a^2 - 7a + 6 \\ &= a(a-1) - 6(a-1) \\ &= (a-1)(a-6) \end{aligned}$$

$$\therefore \text{HCF} = (a-1)$$

$$\begin{aligned} \therefore \text{LCM} &= (a-1) \times (a-3) \times (a-6) \\ &= (a-1)(a-3)(a-6) \end{aligned}$$

7) $2a^2 + 7a - 4$ and $a^2 + 9a + 20$

→ Solⁿ

Here,

$$\begin{aligned} 1^{\text{st}} \text{ exp.} &= 2a^2 + 7a - 4 \\ &= 2a^2 + (8-1)a - 4 \\ &= 2a^2 + 8a - a - 4 \\ &= 2a^2 - a + 8a - 4 \\ &= a(2a-1) + 4(2a-1) \\ &= (2a-1)(a+4) \end{aligned}$$

$$2^{\text{nd}} \text{ exp.} = a^2 + 9a + 20$$

$$\begin{aligned}
 &= a^2 + (4+5)a + 20 \\
 &= a^2 + 4a + 5a + 20 \\
 &= a(a+4) + 5(a+4) \\
 &= \underline{(a+4)(a+5)}
 \end{aligned}$$

$$\therefore \text{HCF} = (a+4)$$

$$\begin{aligned}
 \therefore \text{LCM} &= (a+4) \times (2a-1) \times (a+5) \\
 &= (a+4)(2a-1)(a+5)
 \end{aligned}$$

g) $x^2 + 7x + 12$ and $x^2 + x - 12$

→ Solⁿ

Here,

$$\begin{aligned}
 \text{1st exp.} &= x^2 + 7x + 12 \\
 &= x^2 + (3+4)x + 12 \\
 &= x^2 + 3x + 4x + 12 \\
 &= x(x+3) + 4(x+3) \\
 &= \underline{(x+3)(x+4)}
 \end{aligned}$$

$$\begin{aligned}
 \text{2nd exp.} &= x^2 + x - 12 \\
 &= x^2 + (4-3)x - 12 \\
 &= x^2 + 4x - 3x - 12 \\
 &= x(x+4) - 3(x+4) \\
 &= \underline{(x+4)(x-3)}
 \end{aligned}$$

$$\therefore \text{HCF} = (x+4)$$

$$\therefore \text{LCM} = (x+4) \times (x+3) \times (x-3) \\ = (x+4)(x+3)(x-3)$$

h) $x^2 + 4x + 3$ and $x^2 + 3x + 2$

→ Solⁿ

Here,

$$\begin{aligned} \text{1st exp.} &= x^2 + 4x + 3 \\ &= x^2 + (1+3)x + 3 \\ &= x^2 + x + 3x + 3 \\ &= x(x+1) + 3(x+1) \\ &= \underline{(x+1)(x+3)} \end{aligned}$$

$$\begin{aligned} \text{2nd exp.} &= x^2 + 3x + 2 \\ &= x^2 + (1+2)x + 2 \\ &= x^2 + x + 2x + 2 \\ &= x(x+1) + 2(x+1) \\ &= \underline{(x+1)(x+2)} \end{aligned}$$

$$\therefore \text{HCF} = (x+1)$$

$$\therefore \text{LCM} = (x+1) \times (x+3) \times (x+2) \\ = (x+1)(x+3)(x+2)$$

Part-B

4) Find the HCF and LCM of:

a) $a^2 - b^2$, $(a-b)^2$ & $2a^2 - 3ab + b^2$

→ Solⁿ

Here,

$$\begin{aligned} 1^{\text{st}} \text{ exp.} &= a^2 - b^2 \\ &= (a+b)(a-b) \end{aligned}$$

$$\begin{aligned} 2^{\text{nd}} \text{ exp.} &= (a-b)^2 \\ &= (a-b)(a-b) \end{aligned}$$

$$\begin{aligned} 3^{\text{rd}} \text{ exp.} &= 2a^2 - 3ab + b^2 \\ &= 2a^2 - (2+1)ab + b^2 \\ &= 2a^2 - 2ab - ab + b^2 \\ &= 2a(a-b) - b(a-b) \\ &= (a-b)(2a-b) \end{aligned}$$

$$\therefore \text{HCF} = (a-b)$$

$$\begin{aligned} \therefore \text{LCM} &= (a-b) \times (a+b)(a-b) \times (2a-b) \\ &= (a-b)(a+b)(a-b)(2a-b) \end{aligned}$$

DATE _____
PAGE No. _____

(b) $a^2 - 25b^2$, $a^2 + 10ab + 25b^2$ and $a^2 + 2ab - 15b^2$

→ Soln
Here,

$$\begin{aligned} 1^{\text{st}} \text{ exp.} &= a^2 - 25b^2 \\ &= (a)^2 - (5b)^2 \\ &= (a+5b)(a-5b) \end{aligned}$$

$$\begin{aligned} 2^{\text{nd}} \text{ exp.} &= a^2 + 10ab + 25b^2 \\ &= a^2 + (5+5)ab + 25b^2 \\ &= a^2 + 5ab + 5ab + 25b^2 \\ &= a(a+5b) + 5b(a+5b) \\ &= (a+5b)(a+5b) \end{aligned}$$

$$\begin{aligned} 3^{\text{rd}} \text{ exp.} &= a^2 + 2ab - 15b^2 \\ &= a^2 + (5-3)ab - 15b^2 \\ &= a^2 + 5ab - 3ab - 15b^2 \\ &= a^2 - 3ab + 5ab - 15b^2 \\ &= a(a-3b) + 5b(a-3b) \\ &= (a-3b)(a+5b) \end{aligned}$$

$$\therefore \text{HCF} = (a+5b)$$

$$\begin{aligned} \therefore \text{LCM} &= (a+5b) \times (a-5b) \times (a+5b) \times (a-3b) \\ &= (a+5b)(a-5b)(a+5b)(a-3b) \end{aligned}$$

(c) a^2+4a+3 , a^2+5a+6 and a^2+3a+2

→ Soln

Here

$$\begin{aligned} \text{1st exp.} &= a^2+4a+3 \\ &= a^2+(1+3)a+3 \\ &= a^2+a+3a+3 \\ &= a(a+1)+3(a+1) \\ &= (a+1)(a+3) \end{aligned}$$

$$\begin{aligned} \text{2nd exp.} &= a^2+5a+6 \\ &= a^2+(2+3)a+6 \\ &= a^2+a+4a+6 \\ &= a(a+1)+4(a+1) \\ &= (a+1)(a+4) \end{aligned}$$

$$\begin{aligned} \text{3rd exp.} &= a^2+3a+2 \\ &= a^2+(1+2)a+2 \\ &= a^2+a+2a+2 \\ &= a(a+1)+2(a+1) \\ &= (a+1)(a+2) \end{aligned}$$

∴ HCF = 1 [∵ no common]

DATE _____
PAGE No. _____

$$\therefore \text{LCM} = 1 \times (a+3) \times (a+2) \times (a+1) \times$$

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

d) $x^2 - 14x + 40$, $x^2 - 7x - 30$ and $x^2 - 100$.

→ Solⁿ

Here,

$$\begin{aligned} \text{1st exp.} &= x^2 - 14x + 40 \\ &= x^2 - (4+10)x + 40 \\ &= x^2 - 4x - 10x + 40 \\ &= x(x-4) - 10(x-4) \\ &= (x-4)(x-10) \end{aligned}$$

$$\begin{aligned} \text{2nd exp.} &= x^2 - 7x - 30 \\ &= x^2 - (10-3)x - 30 \\ &= x^2 - 10x + 3x - 30 \\ &= x(x-10) + 3(x-10) \\ &= (x-10)(x+3) \end{aligned}$$

$$\begin{aligned} \text{3rd exp.} &= x^2 - 100 \\ &= x^2 - (10)^2 \\ &= (x+10)(x-10) \end{aligned}$$

$$\therefore \text{HCF} = (x-10)$$

$$\therefore \text{LCM} = (x-10) \times (x-4) \times (x+3) \times (x+10)$$

$$= (x-10)(x-4)(x+3)(x+10)$$

e) $36x^2-1$, $36x^2-12x+1$ and $6x-1$

→ Soln

Here,

$$\begin{aligned} 1^{\text{st}} \text{ exp.} &= 36x^2-1 \\ &= (6x)^2 - (1)^2 \\ &= (6x+1)(6x-1) \end{aligned}$$

$$\begin{aligned} 2^{\text{nd}} \text{ exp.} &= 36x^2-12x+1 \\ &= 36x^2 - (6+6)x + 1 \\ &= 36x^2 - 6x - 6x + 1 \\ &= 6x(6x-1) - 1(6x-1) \\ &= (6x-1)(6x-1) \end{aligned}$$

$$3^{\text{rd}} \text{ exp.} = \underline{(6x-1)}$$

$$\therefore \text{HCF} = (6x-1)$$

$$\begin{aligned} \therefore \text{LCM} &= (6x-1) \times (6x+1) \times (6x-1) \\ &= (6x-1)(6x+1)(6x-1) \end{aligned}$$

f) $x^2-11x+10$, $x^2+9x-10$ and x^2-1

→ Solⁿ

Here,

$$\begin{aligned}1^{\text{st}} \text{ exp.} &= x^2 - 11x + 10 \\&= x^2 - (1+10)x + 10 \\&= x^2 - x - 10x + 10 \\&= x(x-1) - 10(x-1) \\&= (x-1)(x-10)\end{aligned}$$

$$\begin{aligned}2^{\text{nd}} \text{ exp.} &= x^2 + 9x - 10 \\&= x^2 + (10-1)x - 10 \\&= x^2 + 10x - x - 10 \\&= x(x+10) - 1(x+10) \\&= (x+10)(x-1)\end{aligned}$$

$$\begin{aligned}3^{\text{rd}} \text{ exp.} &= x^2 - 1 \\&= (x)^2 - (1)^2 \\&= (x+1)(x-1)\end{aligned}$$

$$\therefore \text{HCF} = (x-1)$$

$$\begin{aligned}\therefore \text{LCM} &= (x-1) \times (x-10) \times (x+10) \times (x+1) \\&= (x-1)(x-10)(x+10)(x+1)\end{aligned}$$

5.) Find the HCF and LCM of:

a) $x^2 - 4$, $x^2 - 3x + 2$ and $x^2 - 4x + 4$

→ Soln

Here,

1st exp. $= x^2 - 4 = (x)^2 - (2)^2 = (x+2)(x-2)$

2nd exp. $= x^2 - 3x + 2$

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

$= x^2 - 2x - 1x + 2$

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

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

3rd exp. $= x^2 - 4x + 4$

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

$= x^2 - 2x - 2x + 4$

$= x(x-2) - 2(x-2)$

$= (x-2)(x-2)$

∴ HCF $= (x-2)$

∴ LCM $= (x-2) \times (x+2) \times (x-1)$

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

b) $x^2 - 1$, $x^2 + 5x + 6$ & $x^2 + 3x - 4$

→ Soln

Here,

$$1^{st} \text{ exp} = x^2 - 1$$

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

$$= \underline{(x+1)} \underline{(x-1)}$$

$$2^{nd} \text{ exp} = x^2 + 5x + 6$$

$$= x^2 + (6-1+5)x + 6$$

$$= x^2 + 1x + 5x + 6$$

$$= x(x+1) + 5(x+1)$$

$$= \underline{(x+1)} \underline{(x+6)}$$

$$3^{rd} \text{ exp} = x^2 + 3x - 4$$

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

$$= x^2 + 4x - x - 4$$

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

$$= \underline{(x+4)} \underline{(x-1)}$$

$$\therefore \text{HCF} = 1$$

$$\therefore \text{LCM} = 1 \times (x+1) \times (x-1) \times (x+6) \times (x+4)$$

$$= (x+1)(x-1)(x+6)(x+4)$$

c) $x^2 - 9$, $x^2 - 4x + 3$ and $x^2 + x - 12$

→ Soln,

Here,

$$1^{\text{st}} \text{ exp.} = x^2 - 9$$

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

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

$$2^{\text{nd}} \text{ exp.} = x^2 - 4x + 3$$

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

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

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

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

$$3^{\text{rd}} \text{ exp.} = x^2 + x - 12$$

$$= x^2 + (4-3)x - 12$$

$$= x^2 + 4x - 3x - 12$$

$$= x(x+4) - 3(x+4)$$

$$= (x+4)(x-3)$$

$$\therefore \text{HCF} = (x-3)$$

$$\therefore \text{LCM} = (x-3) \times (x+3) \times (x-1) \times (x+4) \\ = (x-3)(x+3)(x-1)(x+4)$$

d) $x^2 - 25$, $x^2 + x - 20$ and $x^2 + 9x + 20$.

→ Soln

Here,

$$\begin{aligned} 1^{\text{st}} \text{ exp.} &= x^2 - 25 \\ &= (x)^2 - (5)^2 \\ &= \underline{(x+5)(x-5)} \end{aligned}$$

$$\begin{aligned} 2^{\text{nd}} \text{ exp.} &= x^2 + x - 20 \\ &= x^2 + (5-4)x - 20 \\ &= x^2 + 5x - 4x - 20 \\ &= x(x+5) - 4(x+5) \\ &= \underline{(x+5)(x-4)} \end{aligned}$$

$$\begin{aligned} 3^{\text{rd}} \text{ exp.} &= x^2 + 9x + 20 \\ &= x^2 + (4+5)x + 20 \\ &= x^2 + 4x + 5x + 20 \\ &= x(x+4) + 5(x+4) \\ &= \underline{(x+4)(x+5)} \end{aligned}$$

$$\therefore \text{HCF} = (x+5)$$

$$\begin{aligned} \therefore \text{LCM} &= (x+5)(x-5)(x-4)(x+4) \\ &= (x+5)(x-5)(x-4)(x+4) \end{aligned}$$

e) $4x^2 - 1$, $2x^2 - 3x + 1$ and $2x^2 + 3x + 1$

→ Soln

Here,

$$\begin{aligned} 1^{\text{st}} \text{ exp.} &= 4x^2 - 1 \\ &= (2x)^2 - (1)^2 \\ &= \underline{(2x+1)} \underline{(2x-1)} \end{aligned}$$

$$\begin{aligned} 2^{\text{nd}} \text{ exp.} &= 2x^2 - 3x + 1 \\ &= 2x^2 - (2+1)x + 1 \\ &= 2x^2 - 2x - x + 1 \\ &= 2x(x-1) - 1(x-1) \\ &= \underline{(x-1)} \underline{(2x-1)} \end{aligned}$$

$$\begin{aligned} 3^{\text{rd}} \text{ exp.} &= 2x^2 + 3x + 1 \\ &= 2x^2 + (2+1)x + 1 \\ &= 2x^2 + 2x + x + 1 \\ &= 2x(x+1) + 1(x+1) \\ &= \underline{(x+1)} \underline{(2x+1)} \end{aligned}$$

$$\therefore \text{HCF} = 1$$

$$\begin{aligned} \therefore \text{LCM} &= 1 \times (2x-1) \times (2x+1) \times (x-1) \times \\ &\quad (x+1) \\ &= \underline{(2x-1)(2x+1)(x-1)(x+1)} \end{aligned}$$

$$8) \quad 1 - 9x^2, 1 - 2x - 3x^2 \text{ and } 4 - 13x + 3x^2$$

→ Solⁿ
Here,

$$\begin{aligned} 1^{\text{st}} \text{ exp.} &= 1 - 9x^2 \\ &= (1)^2 - (3x)^2 \end{aligned}$$

$$\begin{aligned} 2^{\text{nd}} \text{ exp.} &= \frac{(1+3x)(1-3x)}{1-2x-3x^2} \\ &= 1 - (3-1)x - 3x^2 \\ &= 1 - 3x + x - 3x^2 \\ &= 1(1-3x) + x(1-3x) \\ &= (1-3x)(1+x) \end{aligned}$$

$$\begin{aligned} 3^{\text{rd}} \text{ exp.} &= 4 - 13x + 3x^2 \\ &= 4 - (1+12)x + 3x^2 \\ &= 4 - x - 12x + 3x^2 \\ &= 1(4-x) - 3x(4-x) \\ &= (4-x)(1-3x) \end{aligned}$$

$$\therefore \text{HCF} = (1-3x)$$

$$\begin{aligned} \therefore \text{LCM} &= (1-3x) \times (1+3x) \times (1+x) \times (4-x) \\ &= (1-3x)(1+3x)(1+x)(4-x) \end{aligned}$$

g) $4x^2 - x - 3$, $8x^2 + 10x + 3$ and $12x^2 + 5x - 3$

→ Soln

Here,

$$\begin{aligned}1^{\text{st}} \text{ exp.} &= 4x^2 - x - 3 \\&= 4x^2 - (4-3)x - 3 \\&= 4x^2 - 4x + 3x - 3 \\&= 4x(x-1) + 3(x-1) \\&= (x-1)(4x+3)\end{aligned}$$

$$\begin{aligned}2^{\text{nd}} \text{ exp.} &= 8x^2 + 10x + 3 \\&= 8x^2 + (6+4)x + 3 \\&= 8x^2 + 6x + 4x + 3 \\&= 2x(4x+3) + 1(4x+3) \\&= (4x+3)(2x+1)\end{aligned}$$

$$\begin{aligned}3^{\text{rd}} \text{ exp.} &= 12x^2 + 5x - 3 \\&= 12x^2 + (9-4)x - 3 \\&= 12x^2 + 9x - 4x - 3 \\&= 3x(4x+3) - 1(4x+3) \\&= (4x+3)(3x-1)\end{aligned}$$

$$\therefore \text{HCF} = (4x+1)$$

$$\begin{aligned}\therefore \text{LCM} &= (4x+1) \times (x-1) \times (2x+1) \times (3x-1) \\&= (4x+1)(x-1)(2x+1)(3x-1)\end{aligned}$$