HCF, LCM

HCF → heighest common factor
GCD → greatest common divisor
LCM → least common multiplier

1. i) $4a^2b^2,\ 20ab^2$

4, 20
4 = 4×1
20 = 4×5

$HCF = 4ab^2$

ii) $5p^2q^2,\ 10p^2q^2,\ 25p^4q^3$

5 = 5×1
10 = 5×2
25 = 5×5

$GCD = 5p^2q^2$

p^2, p^5
$p^2 = p \times p$
$p^5 = p \times p \times p \times p \times p$

iii) $7y^3z^6,\ 21y^4,\ 14z^2$

$GCD = 7$

iv) $3a^2b^2c,\ 12a^2b^4c^2,\ 9a^5b^4$

$GCD = 3a^2b^2$

2. i) $2x^2y^3,\ 10x^3y$

2 | 2, 10
1, 5

$2 \times 5 = 10$

$LCM = 10x^3y^3$

ii) $7p^2q^3,\ 35p^3q,\ 42pq^4$

$LCM = 210p^3q^4$

7 | 7, 35, 42
1, 5, 6
$7 \times 5 \times 6 = 210$

(iii) $5a^5b,\ 15ab^2c,\ 25a^2b^2c^2$

$LCM = 75a^5b^2c^2$

5 | 5, 15, 25
1, 3, 5
LCM = 75

(iv) $11a^2bc^2,\ 33a^2b^2c,\ 55a^2bc^2$

$LCM = 165a^2b^2c^2$

11 | 11, 33, 55
1, 3, 5

5 / 165

3. i) $5x(x+y)$

$x^3 - xy^2 = x(x^2 - y^2) = x(x+y)(x-y)$

$\therefore GCD = x(x+y)$
$LCM = 5x(x+y)(x-y)$

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

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

$\therefore HCF = x-3y$
$LCM = x^2(x-3y)(x+3y)$

(iii) $2ax(a-x)^2 = 2 \cdot a \cdot x \cdot (a-x)(a-x)$

$4a^2x(a-x)^3 = 2 \times a \times a \times x \times (a-x)(a-x)(a-x)$

$\therefore HCF = 2ax(a-x)^2$

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

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

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

$\therefore HCF = x-1$

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

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

$a^2+a-2 = a^2+2a-a-2$

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

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

$\therefore$ HCF $= a-1$

(vii) $x^2+xy = x(x+y)$

$xz+yz = z(x+y)$

$x^2+2xy+y^2 = (x+y)^2 = (x+y)(x+y)$

$\therefore$ HCF $= (x+y)$

(viii) $8(x^2-4) = 2\times2\times2(x-2)(x+2)$

$12(x^3+8) = 2\times2\times3(x+2)(x^2-2x+4)$

$36(x^2-3x-10) = 2\times2\times3\times3\{x^2-5x+2x-10\}$

$= 2\times2\times3\times3\{x(x-5)+2(x-5)\}$

$= 2\times2\times3\times3(x-5)(x+2)$

GCD $= 2\times2(x+2) = 4(x+2)$

(ix) $a^2-b^2-c^2+2bc = a^2-(b^2-2bc+c^2)$

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

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

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

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

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

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

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

GCD $= 1$

(x) $x^3-16x = x(x^2-4^2)$

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

$2x^3+9x^2+4x = x(2x^2+9x+4)$

$= x\{2x^2+8x+x+4\}$

$= x\{2x(x+4)+(x+4)\}$

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

$2x^3+x^2-28x = x(2x^2+x-28)$

$= x(2x^2+8x-7x-28)$

$= x\{2x(x+4)-7(x+4)\}$

$= x(x+4)(2x-7)$

2 | 2,28

2 | 28

2 | 14

7

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2. Chapter : (i) Rule of three }

HCF and LCM

1. Find the HCF and LCM of

(i) $9x^2, 6xy$

(ii) $\frac{a}{b}, \frac{a}{b^2}, \frac{a^2}{b^2}$

(iii) $40x, 50x^2y$

(iii) $144x^2, 180xy, 192xy^2$

(iv) $a^3+2a^2-3a, 2a^3+5a^2-3a$

(v) $4u^2-9v^2, 2u^2-3uv$.

(vi) $4u^2-25v^2, 6u^2+15uv$.

(vii) $k^2+2k-15, k^2+(26/5)k+1$

(viii) $p^2+8p+12, p^2+2p-24, p^2+15p+54$.

(ix) $d^2+15d+56, d^2+5d-24, d^2+8d$

(x) $a^2-5a+6, a^2-4, a^3-3a-2$

2. Find the LCM of $xy(k^2+1)+k(x^2+y^2)$ and $xy(k^2-1)+k(x^2-y^2)$

3. HCF of 2/3, 4/5, 6/7 is _____.