Review Exercise 6

Q.1 Choose the correct answer.

(i) **H.C.F of** $p^3q - pq^3$ **and** $p^5q^2 - pq^5$ **is** _____

(a) $pq(p^2 - q^2)$ **(b)** $pq(p - q)$

(c) $p^2q^2(p - q)$ **(d)** $pq(p^3 - q^3)$

(ii) **H.C.F of** $5x^2y^2$ *and* $20x^3y^3$ is _____

(a) $5x^2y^2$ **(b)** $20x^3y^3$

(c) $100x^5y^5$ **(d)** $5xy$

(iii) **H.C.F of** $x-2$ **and** x^2+x-6 _____

(a) x^2+x-6 **(b)** $x+3$

(c) $x-2$ **(d)** $x+2$

(iv) **H.C.F of** a^3+b^3 **and** a^2-ab+b^2 _____

(a) $a+b$ **(b)** a^2-ab+b^2

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

(v) **H.C.F of** x^2-5x+6 **and** x^2-x-6 is_____

(a) $x-3$ **(b)** $x+2$

(c) x^2-4 **(d)** $x-2$

(vi) **H.C.F of** a^2-b^2 **and** a^3-b^3 is_____

(a) $a-b$ **(b)** $a+b$

(c) a^2+ab+b^2 **(d)** a^2-ab+b^2

(vii) **H.C.F of** x^2+3x+2, x^2+4x+3 **and** x^2+5x+4 is_____

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

(c) $x+3$ **(d)** $(x+4)(x+1)$

(viii) **L.C.M of** $15x^2, 45xy$ **and** $30xyz$ is_____

(a) $90xyz$ **(b)** $90x^2yz$

(c) $15xyz$ **(d)** $15x^2yz$

(ix) **L.C.M of** a^2+b^2 **and** a^4-b^4 is_____

(a) a^2+b^2 **(b)** a^2-b^2

(c) a^4-b^4 **(d)** $a-b$

(x) **The product of two algebraic expression is equal to the _____ of their H.C.F and L.C.M**

(a) Sum **(b)** Difference

(c) Product **(d)** Quotitent

(xi) **Simplify** $\frac{a}{9a^2-b^2}+\frac{1}{3a-b}$ is_____

(a) $\frac{4a}{9a^2-b^2}$ (b) $\frac{4a-b}{9a^2-b^2}$

(c) $\frac{4a+b}{9a^2-b^2}$ (d) $\frac{b}{9a^2-b^2}$

(xii) **Simplify** $\frac{a^2+5a-14}{a^2-3a-18}\times\frac{a+3}{a-2}=$_____

(a) $\frac{a+7}{a-6}$ (b) $\frac{a+7}{a-2}$

(c) $\frac{a+3}{a-6}$ (d) $\frac{a-2}{a+3}$

(xiii) **Simplify the** $\frac{a^3-b^3}{a^4-b^4}\div\frac{a^2+ab+b^2}{a^2+b^2}=$_____

(a) $\frac{1}{a+b}$ (b) $\frac{1}{a-b}$

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

(xiv) **Simplify** $\left(\frac{2x+y}{x+y}-1\right)\div\left(1-\frac{x}{x+y}\right)=$_____

(a) $\frac{x}{x+y}$ (b) $\frac{y}{x+y}$

(c) $\frac{y}{x}$ (d) $\frac{x}{y}$

(xv) **The square root of** a^2-2a+1 **is** _____

(a) $\pm(a+1)$ (b) $\pm(a-1)$

(c) $a-1$ (d) $a+1$

(xvi) **What should be added to complete the square of** x^4+64 **?**_____

(a) $8x^2$ (b) $-8x^2$

(c) $16x^2$ (d) $4x^2$

(xvii) **The square root to** $x^4+\frac{1}{x^4}+2$ **is**_____

(a) $\pm\left(x+\frac{1}{x}\right)$ (b) $\pm\left(x^2+\frac{1}{x^2}\right)$

(c) $\pm\left(x-\frac{1}{x}\right)$ (d) $\pm\left(x^2-\frac{1}{x^2}\right)$

ANSWER KEYS

1	b	5	a	9	c	13	a	17	b
2	a	6	a	10	c	14	d		
3	c	7	a	11	c	15	b		
4	b	8	b	12	a	16	c		

Q.2 Find the H.C.F of the following by factorization.

$8x^4-128, 12x^3-96$

Solution:

$8x^4-128 = 8\left(x^4-16\right) = 8\left[(x)^2-(4)^2\right]$

$= 2\times 2\times 2\left(x^2+4\right)\left(x^2-4\right)$

$= 2\times 2\times 2\left(x^2+4\right)(x+2)(x-2)$

$12x^3-96 = 12(x^3-8)$

$= \left(12(x^3-2^3)\right)$

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

$2\times 2\times 3(x-2)\left(x^2+2x+4\right)$

H.C.F $= 2\times 2(x-2)$

$= 4(x-2)$

Q.3 Find the H.C.F of the following by division method $y^3+3y^2-3y-9, 3y^2-8y-2y$.

Solution: $y^3+3y^2-3y-9,$

$= y^3+3y^2-3y-9$

$$y^3+3y^2-8y-24 \overline{)\, y^3+3y^2-3y-9} \quad 1$$

$$\pm y^3 \pm 3y^2 \pm 8y \pm 24$$

$$5y+15$$

$5(y+3)$

$$y+3 \overline{)\, y^3+3y-8y-24} \quad y^2-8$$

$$\pm y^3 \pm 3y$$

$$-8y-24$$

$$\pm 8y \pm 24$$

$\times$

H.C.F $= (y+3)$

Q.4 Find the L.C.M of the following by factorization.

$12x^2-75,\ 6x^2-13x-5,\ 4x^2-20x+25$

Solution:

$$12x^2-75 = 3\left(4x^2-25\right)$$
$$= 3\left[(2x)^2-(5)^2\right]$$
$$= 3(2x-5)(2x+5)$$

$$6x^2-15x+2x-5 = 3x(2x-5)+1(2x-5)$$
$$= (2x-5)(3x+1)$$

$$4x^2-20x+25 = 4x^2-10x-10x+25$$
$$= 2x(2x-5)-5(2x-5)$$
$$= (2x-5)(2x-5)$$

Common factor = $(2x\text{-}5)$

Non common factor $= 3(3x+1)(2x-5)2x+5)$

L.C.M = common factor× non common factor

L.C.M = $(2x-5)3(3x+1)(2x+5)(2x-5)$

L.C.M = $3(2x+5)(2x-5)^2(3x+1)$

Q.5 If H.C.F of $x^4+3x^3+5x^2+26x+56$ and $x^4+2x^3-4x^2-x+28$ is x^2+5x+7 find their L.C.M.

Solution: $p(x)=x^4+3x^3+5x^2+26x+56$ and $q(x)=x^4+2x^3-4x^2-x+28$

$HCF = x^2+5x+7$, LCM=?

$$L.C.M = \frac{P(x)\times q(n)}{H.C.F}$$

$$\text{L.C.M} = \frac{\left(x^4+3x^2+5x^2+26x+56\right)\times\left(x^4+2x^3-4x^2-x+28\right)}{\left(x^2+5x+7\right)}$$

$$x^2+5x+7\overline{)\ x^4+2x^3-4x^2-x+28}\ \ \ x^2-3x+4$$
$$\pm x^4 \pm 5x^3 \pm 7x^2$$
$$-3x^3-11x^2-x+28$$
$$\mp 3x^3 \mp 15x^2 \mp 21x$$
$$+4x^2+20x+28$$
$$\pm 4x^2 \pm 20x \pm 28$$
$$0$$

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

$$L.C.M=\frac{(x^4+3x^3+5x^2+26x+56)(x^4+2x^3-4x^2-x+28)}{(x2+5x+7)}$$

$$L.C.M=(x^4+3x^3+5x^2+26x+56)(x^2-3x+4)$$

Q.6 Simplify:
Solution:

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

Solution: $\frac{3}{x^3+x^2+x+1}-\frac{3}{x^3-x^2+x-1}$

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

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

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

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

$$=\frac{-6}{(x+1)(x-1)(x^2+1)}=\frac{-6}{(x^2-1)(x^2+1)}$$

$$=\frac{-6}{(x^4-1)}$$

$$=\frac{6}{1-x^4}$$

(ii) $\frac{a+b}{a^2-b^2}\div\frac{a^2-ab}{a^2-2ab+b^2}$

Solution: $\frac{a+b}{a^2-b^2}\div\frac{a^2-ab}{a^2-2ab+b^2}$

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

$$=\frac{a+b}{(a-b)(a+b)}\times\frac{(a-b)^2}{a(a-b)}$$

$$= \frac{(a-b)^2}{a(a-b)^2}$$

$$= \frac{1}{a}$$

Q.7 **Find the square root by using factorization.** $\left(x^2+\frac{1}{x^2}\right)+10\left(x+\frac{1}{x}\right)+27 \quad (x \neq 0)$.

Solution: $(x^2+\frac{1}{x^2}+10\left(x+\frac{1}{x}\right)+27$

$$= (x^2+\frac{1}{x^2}+10\left(x+\frac{1}{x}\right)+25+2$$

$$= x^2+\frac{1}{x^2}+2+10\left(x+\frac{1}{x}\right)+25$$

$$= \left(x+\frac{1}{x}\right)^2+2\left(x+\frac{1}{x}\right)\times 5+(5)^2$$

$$= \left[x+\frac{1}{x}+5\right]^2$$

Taking the square root

$$\sqrt{\left(x^2+\frac{1}{x^2}\right)+10\left(x+\frac{1}{x}\right)+27} = \sqrt{\left[x+\frac{1}{x}+5\right]^2}$$

$$= \pm\left(x+\frac{1}{x}+5\right)$$

Q.8 **Find the square roots by using division method.** $\frac{4x^2}{y^2}+\frac{20x}{y}+13-\frac{30y}{x}+\frac{9y^2}{x}$

Solution:

$$\begin{array}{r|l} \frac{2x}{y} & \frac{4x^2}{y^2}+\frac{20x}{4}+13-\frac{30y}{x}+\frac{9y^2}{x^2} \\ & \frac{2x}{y}+5-\frac{3y}{x} \\ & \pm\frac{4x^2}{y^2} \\ \hline \frac{4x}{y}+5 & \frac{20x}{y}+13-\frac{30y}{x}+\frac{9y^2}{x^2} \\ & \pm\frac{20x}{y}\pm 25 \\ \hline \end{array}$$

$$\frac{4x}{y}+10-\frac{3y}{x}\overline{)-12-\frac{30y}{x}+\frac{9y^2}{x^2}}$$

$$\mp 12 \mp \frac{30y}{x} \pm \frac{9y^2}{x^2}$$

Square root $= \pm\left[\frac{2x}{y}+5-\frac{3y}{x}\right]$

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