

Exercise 6.3

Q1. Use factorization to find the square root of the following expressions.

$$\begin{aligned} \text{i)} \quad & 4x^2 - 12xy + 9y^2 \\ &= (2x)^2 - 2(2x)(3y) + (3y)^2 \\ &= (2x - 3y)^2 \end{aligned}$$

$$\begin{aligned} \text{Hence } & \sqrt{4x^2 - 12xy + 9y^2} \\ &= \sqrt{(2x - 3y)^2} \\ &= \pm(2x - 3y) \end{aligned}$$

$$\begin{aligned} \text{ii)} \quad & x^2 - 1 + \frac{1}{4x^2} \\ &= (x)^2 - 2(x)\left(\frac{1}{2x}\right) + \left(\frac{1}{2x}\right)^2 \end{aligned}$$

$$\begin{aligned} \text{Hence } & \sqrt{x^2 - 1 + \frac{1}{4x^2}} \\ &= \sqrt{\left(x - \frac{1}{2x}\right)^2} \\ &= \pm\left(x - \frac{1}{2x}\right) \end{aligned}$$

$$\begin{aligned} \text{iii)} \quad & \frac{1}{16}x^2 - \frac{1}{12}xy + \frac{1}{36}y^2 \\ &= \left(\frac{1}{4}x\right)^2 - 2\left(\frac{1}{4}x\right)\left(\frac{1}{6}y\right) + \left(\frac{1}{6}y\right)^2 \end{aligned}$$

$$= \left(\frac{1}{4}x - \frac{1}{6}y\right)^2$$

$$\begin{aligned} \text{Hence } & \sqrt{\frac{1}{16}x^2 - \frac{1}{12}xy + \frac{1}{36}y^2} \\ &= \sqrt{\left(\frac{1}{4}x - \frac{1}{6}y\right)^2} \\ &= \pm\left(\frac{1}{4}x - \frac{1}{6}y\right) \end{aligned}$$

$$\begin{aligned} \text{iv)} \quad & 4(a+b)^2 - 12(a^2 - b^2) + 9(a-b)^2 \\ &= [2(a+b)]^2 - 2 \times 2(a+b) \times 3(a-b) + [3(a-b)]^2 \\ &= [2(a+b) - 3(a-b)]^2 \\ &= (-a + 5b)^2 \\ &= (5b - a)^2 \end{aligned}$$

$$\begin{aligned} \text{Hence } & \sqrt{4(a+b)^2 - 12(a^2 - b^2) + 9(a-b)^2} \\ &= \sqrt{(5b - a)^2} \\ &= \pm(5b - a) \end{aligned}$$

$$\begin{aligned} \text{v)} \quad & \frac{4x^6 - 12x^3y^3 + 9y^6}{9x^4 + 24x^2y^2 + 16y^4} \\ &= \frac{(2x^3)^2 - 2(2x^3)(3y^3) + (3y^3)^2}{(3x^2)^2 + 2(3x^2)(4y^2) + (4y^2)^2} \end{aligned}$$

$$= \frac{(2x^3 - 3y^3)^2}{(3x^2 + 4y^2)^2}$$

$$\begin{aligned} \text{Hence } \sqrt{\frac{4x^6 - 12x^3y^3 + 9y^6}{9x^4 + 24x^2y^2 + 16y^4}} \\ = \sqrt{\frac{(2x^3 - 3y^3)^2}{(3x^2 + 4y^2)^2}} \\ = \pm \left(\frac{2x^3 - 3y^3}{3x^2 + 4y^2} \right) \end{aligned}$$

$$\begin{aligned} \text{vi) } \left(x + \frac{1}{x}\right)^2 - 4\left(x - \frac{1}{x}\right) \quad (x \neq 0) \\ = (x)^2 + \left(\frac{1}{x}\right)^2 + 2\left(\cancel{x}\right)\left(\cancel{\frac{1}{x}}\right) - 4\left(x - \frac{1}{x}\right) \\ = x^2 + \frac{1}{x^2} + 2 - 4\left(x - \frac{1}{x}\right) \dots\dots(i) \end{aligned}$$

$$\text{Let } x - \frac{1}{x} = a$$

$$\text{Squaring } \left(x - \frac{1}{x}\right)^2 = (a)^2$$

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

$$x^2 + \frac{1}{x^2} = a^2 + 2$$

So expression (i) becomes

$$= a^2 + 2 + 2 - 4a$$

$$= a^2 - 4a + 4$$

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

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

Putting value of 'a'

$$= \left(x - \frac{1}{x} - 2\right)^2$$

$$\text{Hence } = \sqrt{\left(x - \frac{1}{x} - 2\right)^2}$$

$$= \pm \left(x - \frac{1}{x} - 2\right)$$

$$\text{vii) } \left(x^2 + \frac{1}{x^2}\right)^2 - 4\left(x + \frac{1}{x}\right)^2 + 12 \dots(i)$$

$$\text{Let } x + \frac{1}{x} = a$$

$$\text{Squaring } \left(x + \frac{1}{x}\right)^2 = (a)^2$$

$$x^2 + \frac{1}{x^2} + 2 = a^2$$

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

So expression (i) becomes

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

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

$$= a^4 - 4a^2 + 4 - 4a^2 + 12$$

$$= a^4 - 8a^2 + 16$$

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

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

Putting values of a^2

$$= \left(x^2 + \frac{1}{x^2} + 2 - 4\right)^2$$

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

$$\text{Hence } = \sqrt{\left(x^2 + \frac{1}{x^2}\right)^2 - 4\left(x + \frac{1}{x}\right)^2 + 12}$$

$$= \sqrt{\left(x^2 + \frac{1}{x^2} - 2\right)^2}$$

$$= \pm \left(x^2 + \frac{1}{x^2} - 2 \right)$$

$$\begin{aligned} \text{viii)} \quad & (x^2 + 3x + 2)(x^2 + 4x + 3)(x^2 + 5x + 6) \\ &= (x^2 + x + 2x + 2)(x^2 + x + 3x + 3)(x^2 + 2x + 3x + 6) \\ &= [x(x+1) + 2(x+1)][x(x+1) + 3(x+1)][x(x+2) + 3(x+2)] \\ &= (x+1)(x+2)(x+1)(x+3)(x+2)(x+3) \\ &= (x+1)^2(x+2)^2(x+3)^2 \end{aligned}$$

Hence

$$\begin{aligned} & \sqrt{(x^2 + 3x + 2)(x^2 + 4x + 3)(x^2 + 5x + 6)} \\ &= \sqrt{(x+1)^2(x+2)^2(x+3)^2} \\ &= \pm (x+1)(x+2)(x+3) \end{aligned}$$

$$\begin{aligned} \text{ix)} \quad & (x^2 + 8x + 7)(2x^2 - x - 3)(2x^2 + 11x - 21) \\ &= (x^2 + x + 7x + 7)(2x^2 + 2x - 3x - 3)(2x^2 + 14x - 3x - 21) \\ &= [x(x+1) + 7(x+1)][2x(x+1) - 3(x+1)] \\ & \quad [2x(x+7) - 3(x+7)] \\ &= (x+1)(x+7)(x+1)(2x-3)(x+7)(2x-3) \\ &= (x+1)^2(x+7)^2(2x-3)^2 \end{aligned}$$

Hence

$$\begin{aligned} & \sqrt{(x^2 + 8x + 7)(2x^2 - x - 3)(2x^2 + 11x - 21)} \\ &= \sqrt{(x+1)^2(x+7)^2(2x-3)^2} \\ &= \pm (x+1)(x+7)(2x-3) \end{aligned}$$

Q2. Use division method to find the square root of the following expressions.

i) $4x^2 + 12xy + 9y^2 + 16x + 24y + 16$

	$2x + 3y + 4$
$2x$	$4x^2 + 12xy + 9y^2 + 16x + 24y + 16$ $\underline{4x^2}$
$4x + 3y$	$12xy + 9y^2 + 16x + 24y + 16$ $\underline{12xy + 9y^2}$
$4x + 6y + 4$	$16x + 24y + 16$ $\underline{16x + 24y + 16}$
	0

Hence the square root of given expression is

$$\pm (2x + 3y + 4)$$

ii) $x^4 - 10x^3 + 37x^2 - 60x + 36$

	$x^2 - 5x + 6$
x^2	$x^4 - 10x^3 + 37x^2 - 60x + 36$ $\underline{-x^4}$
$2x^2 - 5x$	$-10x^3 + 37x^2 - 60x + 36$ $\underline{+10x^3 - 25x^2}$
$2x^2 - 10x + 6$	$-12x^2 - 60x + 36$ $\underline{-12x^2 + 60x - 36}$
	0

Hence $\sqrt{x^4 - 10x^3 + 37x^2 - 60x + 36}$
 $= \pm (x^2 - 5x + 6)$

iii) $9x^4 - 6x^3 + 7x^2 - 2x + 1$

$$\begin{array}{r}
 3x^2 - x + 1 \\
 3x^2 \overline{) 9x^4 - 6x^3 + 7x^2 - 2x + 1} \\
 \underline{-9x^4} \\
 6x^2 - x \\
 \underline{-6x^2 + 7x^2 - 2x + 1} \\
 7x^2 - 2x + 1 \\
 \underline{-7x^2 + 7x^2 - 2x + 1} \\
 0
 \end{array}$$

Hence $\sqrt{9x^4 - 6x^3 + 7x^2 - 2x + 1}$
 $= \pm(3x^2 - x + 1)$

iv) $4 + 25x^2 - 12x - 24x^3 + 16x^4$
 In descending order
 $= 16x^4 - 24x^3 + 25x^2 - 12x + 4$

$$\begin{array}{r}
 4x^2 - 3x + 2 \\
 4x^2 \overline{) 16x^4 - 24x^3 + 25x^2 - 12x + 4} \\
 \underline{-16x^4} \\
 8x^2 - 3x \\
 \underline{-8x^2 + 24x^3 - 12x + 4} \\
 24x^3 - 9x^2 \\
 \underline{-24x^3 + 9x^2} \\
 16x^2 - 12x + 4 \\
 \underline{-16x^2 + 12x - 4} \\
 0
 \end{array}$$

Hence $\sqrt{16x^4 - 24x^3 + 25x^2 - 12x + 4}$
 $= \pm(4x^2 - 3x + 2)$

v) $\frac{x^2}{y^2} - 10\frac{x}{y} + 27 - 10\frac{y}{x} + \frac{y^2}{x^2}$
 $(x \neq 0, y \neq 0)$

Hence

$$\begin{array}{r}
 \frac{x}{y} - 5 + \frac{y}{x} \\
 \frac{x}{y} \overline{) \frac{x^2}{y^2} - 10\frac{x}{y} + 27 - 10\frac{y}{x} + \frac{y^2}{x^2}} \\
 \underline{-\frac{x^2}{y^2}} \phantom{- 10\frac{x}{y} + 27 - 10\frac{y}{x} + \frac{y^2}{x^2}} \\
 -10\frac{x}{y} + 27 - 10\frac{y}{x} + \frac{y^2}{x^2} \\
 \underline{+10\frac{x}{y} - 25} \\
 2 - 10\frac{y}{x} + \frac{y^2}{x^2} \\
 \underline{-2 + 10\frac{y}{x} - \frac{y^2}{x^2}} \\
 0
 \end{array}$$

$$\sqrt{\frac{x^2}{y^2} - 10\frac{x}{y} + 27 - 10\frac{y}{x} + \frac{y^2}{x^2}}$$

The required square root

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

Q3. Find the value of 'k' for which the following expression will become a perfect square?

i) $4x^4 - 12x^3 + 37x^2 - 42x + k$

$$\begin{array}{r}
 2x^2 - 3x + 7 \\
 2x^2 \overline{) 4x^4 - 12x^3 + 37x^2 - 42x + k} \\
 \underline{-4x^4} \\
 4x^2 - 3x \\
 \underline{-4x^2 + 12x^3 - 9x^2} \\
 12x^3 - 9x^2 - 42x + k \\
 \underline{-12x^3 + 36x^2 - 42x + 49} \\
 28x^2 - 42x + k - 49 \\
 \underline{-28x^2 + 42x - 49} \\
 k - 49
 \end{array}$$

As given that the given expression is a perfect square, so

$$\text{Remainder} = 0$$

$$k - 49 = 0$$

$$\boxed{k=49}$$

ii) $x^4 - 4x^3 + 10x^2 - kx + 9$

$$\begin{array}{r}
 x^2 - 2x + 3 \\
 x^2 \overline{) x^4 - 4x^3 + 10x^2 - kx + 9} \\
 \underline{-x^4} \\
 2x^2 - 2x \\
 \underline{2x^2 - 4x + 3} \\
 6x^2 - kx + 9 \\
 \underline{-6x^2 + 12x - 9} \\
 (-k+12)x
 \end{array}$$

As given that the given expression is a perfect square, so

$$\text{Remainder} = 0$$

$$(-k+12)x = 0$$

As $x \neq 0$, so $-k+12=0$

$$\Rightarrow \boxed{k=12}$$

Q4. Find the values of 'l' and 'm' for which the following expression will become perfect square.

i) $x^4 + 4x^3 + 16x^2 + lx + m$

$$\begin{array}{r}
 x^2 + 2x + 6 \\
 x^2 \overline{) x^4 + 4x^3 + 16x^2 + lx + m} \\
 \underline{-x^4} \\
 2x^2 + 2x \\
 \underline{2x^2 + 4x + 6} \\
 12x^2 + lx + m \\
 \underline{-12x^2 + 24x + 36} \\
 (l-24)x + (m-36)
 \end{array}$$

As the given expression is to be a perfect square, so

$$\text{Remainder} = 0$$

$$(l-24)x + (m-36) = 0$$

As $x \neq 0$, so $l-24=0$ and $m-36=0$

$$\Rightarrow \boxed{l=24} \text{ and } \boxed{m=36}$$

ii) $49x^4 - 70x^3 + 109x^2 + lx - m$

$$\begin{array}{r}
 7x^2 - 5x + 6 \\
 7x^2 \overline{) 49x^4 - 70x^3 + 109x^2 + lx - m} \\
 \underline{-49x^4} \\
 14x^2 - 5x \\
 \underline{14x^2 - 10x + 6} \\
 84x^2 + lx - m \\
 \underline{-84x^2 + 60x + 36} \\
 (l+60)x - m - 36
 \end{array}$$

As the given expression is to be a perfect square, so

$$(l+60)x - m - 36 = 0$$

As $x \neq 0$, so $l+60=0$ and $-m-36=0$

$$\Rightarrow \boxed{l=-60} \text{ and } \boxed{m=-36}$$

Q5. To make the expression

$9x^4 - 12x^3 + 22x^2 - 13x + 12$ a perfect square.

i) What should be added to it?

ii) What should be subtracted from it?

iii) What should be the value of 'x'?

$$\begin{array}{r}
 3x^2 - 2x + 3 \\
 3x^2 \overline{) 9x^4 - 12x^3 + 22x^2 - 13x + 12} \\
 \underline{-9x^4} \\
 6x^2 - 2x \\
 \underline{-6x^2 + 12x + 9} \\
 18x^2 - 13x + 12 \\
 \underline{-18x^2 + 36x + 27} \\
 -x + 3
 \end{array}$$

To make the given expression a complete square

i) $x-3$ should be added

ii) $-x+3$ should be subtracted

iii) For value of 'x'

$$\text{Remainder} = 0$$

$$-x + 3 = 0$$

$$\boxed{x = 3}$$

Q6. Find H.C.F of following by factorization

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

Solution:

$$\begin{aligned} 8x^4 - 128 &= 8(x^4 - 16) \\ &= 8((x^2)^2 - (4)^2) \\ &= 8(x^2 + 4)(x^2 - 4) \\ &= 8(x^2 + 4)(x + 2)(x - 2) \\ 12x^3 - 96 &= 12(x^3 - 8) \\ &= 12(x^3 - 2^3) \\ &= 12(x - 2)(x^2 + 2x + 4) \end{aligned}$$

$$\text{Common factor} = 4(x - 2)$$

$$\text{H.C.F} = 4(x - 2)$$

Q7. Find H.C.F of following by division method.

$$y^3 + 3y^2 - 3y - 9, y^3 + 3y^2 - 8y - 24$$

Solution:

$$\begin{array}{r} 1 \\ y^3 + 3y^2 - 3y - 9 \quad y^3 + 3y^2 - 8y - 24 \\ \hline -y^3 + 3y^2 + 3y + 9 \\ -5y - 15 \\ -5(y + 3) \\ \hline y^2 - 3 \\ (y + 3) \quad y^3 + 3y^2 - 3y - 9 \\ \hline -y^3 + 3y^2 \\ -3y - 9 \\ +3y + 9 \\ \hline x \end{array}$$

$$\text{H.C.F} = y + 3$$

Q8. Find L.C.M of following by factorization.

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

Solution:

$$\begin{aligned} 12x^2 - 75 &= 3(4x^2 - 25) \\ &= 3((2x)^2 - (5)^2) \\ &= 3(2x + 5)(2x - 5) \\ 6x^2 - 13x - 5 &= 6x^2 - 15x + 2x - 5 \\ &= 3x(2x - 5) + 1(2x - 5) \end{aligned}$$

$$\begin{aligned} &= (3x + 1)(2x - 5) \\ 4x^2 - 20x + 25 &= (2x)^2 + (5)^2 - 2(2x)(5) \\ &= (2x - 5)^2 \\ &= (2x - 5)(2x - 5) \end{aligned}$$

$$\begin{aligned} \text{L.C.M} &= (2x - 5)^2 \times 3(2x + 5)(3x + 1) \\ &= 3(2x - 5)^2(2x + 5)(3x + 1) \end{aligned}$$

Q9. 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 the

Solution:

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

$$\begin{array}{r} x^2 + 5x + 7 \overline{) \begin{array}{l} x^4 + 3x^3 + 5x^2 + 26x + 56 \\ -x^4 + 5x^3 + 7x^2 \\ \hline -2x^3 - 2x^2 + 26x + 56 \\ +2x^3 + 10x^2 + 14x \\ \hline 8x^2 + 40x + 56 \\ -8x^2 + 40x + 56 \\ \hline \times \end{array}} \end{array}$$

L.C.M

$$= (x^2 - 2x + 8)(x^4 + 2x^3 - 4x^2 - x + 28)$$

Q10. Simplify

$$\begin{aligned} \text{(i)} \quad & \frac{3}{x^3 + x^2 + x + 1} - \frac{3}{x^3 - x^2 + x - 1} \\ &= \frac{3}{(x^2 + 1)(x + 1)} - \frac{3}{(x^2 + 1)(x - 1)} \\ &= \frac{3(x - 1) - 3(x + 1)}{(x^2 + 1)(x + 1)(x - 1)} \\ &= \frac{3x - 3 - 3x - 3}{(x^2 + 1)(x + 1)(x - 1)} \\ &= \frac{-6}{(x^2 + 1)(x + 1)(x - 1)} \\ &= \frac{-6}{(x^2 + 1)(x^2 - 1)} \end{aligned}$$

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

$$\begin{aligned} \text{(ii)} \quad & \frac{a+b}{a^2-b^2} \div \frac{a^2-ab}{a^2-2ab+b^2} \\ &= \frac{a+b}{(a-b)(a+b)} \div \frac{a(a-b)}{(a-b)^2} \\ &= \frac{1}{a-b} \div \frac{a}{a-b} \\ &= \frac{1}{\cancel{a-b}} \times \frac{\cancel{a-b}}{a} \\ &= \frac{1}{a} \end{aligned}$$

Q11. Find 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:

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

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

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

$$\text{Let } x + \frac{1}{x} = a$$

$$= a^2 + 10a + 25$$

$$= (a+5)^2$$

Taking square root

$$= \sqrt{[\pm(a+5)]^2}$$

$$= \pm(a+5)$$

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

Q12. Find square root by using division method.

$$\frac{4x^2}{y^2} + \frac{20x}{y} + 13 - \frac{30y}{x} + \frac{9y^2}{x^2} \quad (x, y \neq 0)$$

Solution:

$$\begin{array}{r} \frac{2x}{y} + 5 - \frac{3y}{x} \\ \hline \frac{4x}{y} \overline{) \frac{4x^2}{y^2} + \frac{20x}{y} + 13 - \frac{30y}{x} + \frac{9y^2}{x^2}} \\ \underline{\frac{4x^2}{y^2}} \\ \frac{4x}{y} + 5 \\ \hline \frac{4x}{y} + 5 \overline{) \frac{20}{y}x + 13} \\ \underline{-\frac{20}{y}x + 25} \\ \frac{4x}{y} + 10 - \frac{3y}{x} \\ \hline \frac{4x}{y} + 10 - \frac{3y}{x} \overline{) -12 - \frac{30y}{x} + \frac{9y^2}{x^2}} \\ \underline{+12 + \frac{30y}{x} - \frac{9y^2}{x^2}} \\ \times \end{array}$$

$$\text{Required square root} = \pm\left(\frac{2x}{y} + 5 - \frac{3y}{x}\right)$$

Objective

1. H.C.F of $p^3q - pq^3$ and $p^5q^2 - p^2q^5$ is ____
 (a) $pq(p^2 - q^2)$ (b) $pq(p - q)$
 (c) $p^2q^2(p - q)$ (d) $pq(p^3 - q^3)$
2. 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) $5xy$
3. H.C.F of $x - 2$ and $x^2 + x - 6$ is ____
 (a) $x^2 + x - 6$ (b) $x + 2$
 (c) $x - 2$ (d) $x + 2$
4. H.C.F of $a^3 + b^3$ and $a^2 - ab + b^2$ is ____
 (a) $a + b$
 (b) $a^2 - ab + b^2$
 (c) $(a - b)^2$ (d) $a^2 + b^2$
5. 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) $x - 2$
6. 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) $a^2 - ab + b^2$
7. H.C.F of $x^2 + 3x + 2$, $x^2 + 4x + 3$, $x^2 + 5x + 4$ is:
 (a) $x + 1$ (b) $(x + 1)(x + 2)$
 (c) $(x + 3)$ (d) $(x + 4)(x + 1)$
8. L.C.M of $15x^2$, $45xy$ and $30xyz$ is ____
 (a) $90xyz$ (b) $90x^2yz$
 (c) $15xyz$ (d) $15x^2yz$
9. 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) $a - b$
10. 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) Quotient
11. Simplify $\frac{a}{9a^2 - b^2} + \frac{1}{3a - b} = \underline{\hspace{2cm}}$
 (a) $\frac{4a}{9a^2 - b^2}$
 (b) $\frac{4a - b}{9a^2 - b^2}$
 (c) $\frac{4a + b}{9a^2 - b^2}$
 (d) $\frac{b}{9a^2 - b^2}$
12. Simplify $\frac{a^2 + 5a - 14}{a^2 - 3a - 18} \times \frac{a + 3}{a - 2} = \underline{\hspace{2cm}}$
 (a) $\frac{a + 7}{a - 6}$ (b) $\frac{a + 7}{a - 2}$
 (c) $\frac{a + 3}{a - 6}$ (d) $\frac{a - 3}{a + 2}$
13. Simplify $\frac{a^3 - b^3}{a^4 - b^4} \div \left(\frac{a^2 + ab + b^2}{a^2 + b^2} \right) = \underline{\hspace{2cm}}$
 (a) $\frac{1}{a + b}$ (b) $\frac{1}{a - b}$
 (c) $\frac{a - b}{a^2 + b^2}$ (d) $\frac{a + b}{a^2 + b^2}$
14. Simplify :
 $\left(\frac{2x + y}{x + y} - 1 \right) \div \left(1 - \frac{x}{x + y} \right)$
 = ____

- (a) $\frac{x}{x+y}$ (b) $\frac{x}{x-y}$
 (c) $\frac{y}{x}$ (d) $\frac{x}{y}$
15. The square root of $a^2 - 2a + 1$ is ____
 (a) $\pm(a+1)$ (b) $\pm(a-1)$
 (c) $a-1$ (d) $a+1$
16. What should be added to complete the square of $x^4 + 64$?
 (a) $8x^2$ (b) $-8x^2$
 (c) $16x^2$ (d) $4x^2$
17. The square root of $x^4 + \frac{1}{x^4} + 2$ 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) $\pm\left(x^2 - \frac{1}{x^2}\right)$
18. The square root of $4x^2 - 12x + 9$ is:
 (a) $\pm(2x - 3)$
 (b) $\pm(2x + 3)$
 (c) $(2x + 3)^2$
 (d) $(2x - 3)^2$
19. L.C.M = ____
 (a) $\frac{p(x) \times q(x)}{\text{H.C.F}}$ (b) $\frac{p(x).q(x)}{\text{L.C.M}}$
 (c) $\frac{p(x)}{q(x) \times \text{H.C.F}}$ (d) $\frac{q(x)}{p(x) \times \text{H.C.F}}$
20. H.C.F. = ____
 (a) $\frac{p(x) \times q(x)}{\text{L.C.M}}$ (b) $\frac{p(x) \times q(x)}{\text{H.C.F}}$
 (c) $\frac{p(x)}{q(x) \times \text{L.C.M}}$ (d) $\frac{\text{L.C.M}}{p(x) \times q(x)}$
21. L.C.M x HCF =
 (a) $p(x) \times q(x)$ (b) $p(x) \times \text{H.C.F}$
 (c) $q(x) \times \text{L.C.M}$ (d) None
22. Any unknown expression may be found if ____ of them are known by using the relation
 $\text{L.C.M} \times \text{H.C.F} = p(x) \times q(x)$
 (a) Two
 (b) Three
 (c) Four
 (d) None

ANSWER KEY

1.	a	2.	a	3.	c	4.	b	5.	a
6.	a	7.	a	8.	b	9.	c	10.	c
11.	c	12.	a	13.	a	14.	d	15.	b
16.	c	17.	b	18.	a	19.	a	20.	a
21.	a	22.	b						