SUB → MATHS
CLASS → IX
2nd PHASE

CH → 4.4

Factorisation of trinomials

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

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8) ii) $(4-x)^2-2x$
$= 16-8x+x^2-2x$
$= x^2-10x+16$
$= x^2-2x-8x+16$
$= x(x-2)-8(x-2)$
$= (x-2)(x-8)$

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13) ii) $(2x-y)^2-11(2x-y)+28$

Let, $2x-y=a$

$\therefore (2x-y)^2-11(2x-y)+28 = a^2-11a+28$
$= a^2-4a-7a+28$
$= a(a-4)-7(a-4)$
$= (a-4)(a-7)$
$= (2x-y-4)(2x-y-7)$

H/W → 14, 15

Ex → 4.5

Total exercise is based on the following identities;

$a^3+b^3 = (a+b)(a^2-ab+b^2)$
$a^3-b^3 = (a-b)(a^2+ab+b^2)$

1) ii) $64x^3 - 125y^3$

$= (4x)^3 - (5y)^3$

$= (4x-5y)\{(4x)^2 + 4x.5y + (5y)^2\}$

$= (4x-5y)(16x^2+20xy+25y^2)$

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6) ii) $a^3 - b^3 - a + b$

$= (a^3-b^3) - (a-b)$

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

$= (a-b)(a^2+ab+b^2-1)$

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10) i) $a^6 - b^6$

$= (a^2)^3 - (b^2)^3$

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

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

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

CHAPTER TEST

4) i) $b(c-d)^2 + a(d-c) + 3c - 3d$

$= b(c-d)^2 - a(c-d) + 3(c-d)$

$= (c-d)\{b(c-d) - a + 3\}$

$= (c-d)(bc - bd - a + 3)$

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10) i) $(x^2-x)(4x^2-4x-5) - 6$

$= (x^2-x)\{4(x^2-x)-5\} - 6$

Let, $x^2 - x = a$

Expression $= a(4a-5) - 6 = 4a^2 - 5a - 6$

$= 4a^2 - 8a + 3a - 6 = 4a(a-2) + 3(a-2)$

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

$= (x^2+x-2x-2)(4x^2 \cancel{+ax} - 4x+3)$

$= \{x(x+1) - 2(x+1)\}(\cancel{2x}\ 4x^2-4x+3)$

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

[H/W: → 4.5 → 11, 12, 13 and 7, 13, 14 from chapter test]

CH → 5

Simultaneous linear equations

Let us consider two linear equations in two variables,

$$a_1x + b_1y + c_1 = 0$$
$$a_2x + b_2y + c_2 = 0$$

These two equations are said to form a system of simultaneous linear equations.

The various methods of solving a pair or a system of linear equations are ;—

(i) Substitution method.

(ii) Elimination method.

(iii) Cross multiplication method.

Here we will take one system of linear equations and we will solve by three different methods,

Solve :→ $3x - 5y = 4$ — (i)

$9x - 2y = 7$ — (ii)

Substitution method

From equation (i) we get, $3x = 5y + 4$

or, $x = \dfrac{5y+4}{3}$

Substituting the value of x in equation (ii)

$$\cancel{9}^{3}\left(\frac{5y+4}{\cancel{3}}\right) - 2y = 7$$

or, $15y + 12 - 2y = 7$

or, $13y = -12 + 7$

or, $13y = -5$

$\therefore y = -\dfrac{5}{13}$

$$\therefore x = \frac{5\times -\frac{5}{13} + 4}{3} = \frac{\frac{-25}{13} + 4}{3} = \frac{-25 + 52}{39} = \frac{\cancel{27}^{9}}{\cancel{39}_{13}} = \frac{9}{13}$$

$\therefore$ Solution is :- $\left.\begin{aligned} x &= \frac{9}{13} \\ y &= -\frac{5}{13} \end{aligned}\right\}$ Ans

Elimination Method

$$3x - 5y = 4 \quad \text{— (i) —} \times 9$$
$$9x - 2y = 7 \quad \text{— (ii) —} \times 3$$

$$\cancel{27x} - 45y = 36$$
$$\underline{\cancel{27x} - 6y = 21}$$
$$\quad - \quad + \qquad -$$
$$-39y = 15$$

$$\therefore y = -\frac{15^{5}}{39_{13}} = -\frac{5}{13}$$

Substituting the value of y in equation (i)

$$3x + \frac{25}{13} = 4$$

or, $3x = 4 - \frac{25}{13} = \frac{52-25}{13} = \frac{27}{13}$

$$\therefore x = \frac{27^{9}}{3 \times 13} = \frac{9}{13}$$

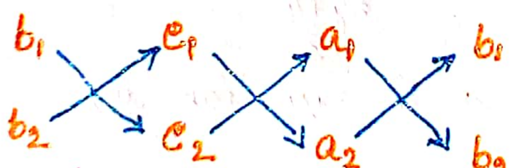
$\therefore$ Solution is :→ $\left.\begin{aligned} x &= \frac{9}{13} \\ y &= -\frac{5}{13} \end{aligned}\right\}$ Ans.

Cross-multiplication method.

If we write the co-efficients of the pair of linear equations

$$a_1x + b_1y + c_1 = 0$$
$$a_2x + b_2y + c_2 = 0$$

as



The solution is given by :→

$$\boxed{\frac{x}{b_1c_2 - b_2c_1} = \frac{y}{c_1a_2 - c_2a_1} = \frac{1}{a_1b_2 - a_2b_1}}$$

$$3x - 5y - 4 = 0$$
$$9x - 2y - 7 = 0$$

$$\frac{x}{35 - 8} = \frac{y}{-36 + 21} = \frac{1}{-6 + 45}$$

or, $\frac{x}{27} = \frac{y}{-15} = \frac{1}{39}$

$\therefore x = \frac{27^{9}}{39_{13}} = \frac{9}{13}$ and $y = \frac{-15^{5}}{39_{13}} = -\frac{5}{13}$

∴ The solution is :-

$$\left.\begin{aligned} x &= \frac{9}{13} \\ y &= -\frac{5}{13} \end{aligned}\right\} \text{Ans}$$

So, we can see that in all the three cases solution remains same.

[H/W :→ Ex: 5.1 → 2, 4, 5, 6
Ex: 5.2 → 4, 5, 8, 9
Ex: 5.3 → 1, 2]

Ex :- 5.4

1) ii)

$$\frac{3}{2x} + \frac{2}{3y} = 5$$

$$\frac{5}{x} - \frac{3}{y} = 1$$

Let, $\frac{1}{x} = a$ and $\frac{1}{y} = b$

∴ Above equations become

$$\frac{3a}{2} + \frac{2b}{3} = 5 \quad \text{—— (i)} \times 5$$

$$5a - 3b = 1 \quad \text{—— (ii)} \times \frac{3}{2}$$

$$\frac{15a}{2} + \frac{10b}{3} = 25$$

$$\frac{15a}{2} - \frac{9b}{2} = \frac{3}{2}$$

$$- \quad + \quad -$$

$$\frac{10b}{3} + \frac{9b}{2} = 25 - \frac{3}{2}$$

or, $\frac{20b+27b}{6} = \frac{50-3}{2}$

or, $\frac{47b}{6} = \frac{47}{2}$; ∴ $b = 3$

Substituting the value of b in equation (ii)

$$5a - 9 = 1$$

or, $5a = 10$; $a = 2$

∴ $x = \frac{1}{2}$, $y = \frac{1}{3}$ } Ans.

5) ii) $\frac{1}{2(x+2y)} + \frac{5}{3(3x-2y)} = -\frac{3}{2}$

$\frac{5}{4(x+2y)} - \frac{3}{5(3x-2y)} = \frac{61}{60}$

Let, $\frac{1}{x+2y} = a$ and $\frac{1}{3x-2y} = b$

$\therefore \frac{a}{2} + \frac{5b}{3} = -\frac{3}{2}$

or, $\frac{3a+10b}{6} = -\frac{3}{2}$

or, $3a+10b = -\frac{3}{\cancel{2}} \times \cancel{6}^{3} = -9$ —— (i) $\times 25$

and $\frac{5a}{4} - \frac{3b}{5} = \frac{61}{60}$

or, $\frac{25a-12b}{20} = \frac{61}{60_3}$

or, $75a - 36b = 61$ —— (ii) $\times 1$

$$\begin{aligned} \cancel{75a} + 250b &= -225 \\ \cancel{75a} - 36b &= \;\; 61 \\ \hline 286b &= -286 \end{aligned}$$

$\therefore b = -1$

Substituting the value of b in equation (ii)

$75a + 36 = 61$

or, $75a = \cancel{61}\,\cancel{36}$ 25

$\therefore a = \frac{25^1}{75_3}$

$\therefore$ $x + 2y = 3$

$3x - 2y = -1$

$4x = 2$

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

$\therefore 2y = 3 - \frac{1}{2}$

or, $2y = \frac{5}{2}$

$y = \frac{5}{4}$

$\therefore$ The solution is :→ $\left.\begin{aligned} x &= \frac{1}{2} \\ y &= \frac{5}{4} \end{aligned}\right\}$ Ans

[H/W :→ Chapter test :→

2, 4, 6, 7]