

fn?kksZRrjh iz'u

$x = -4$ ☐ ☐ ☐ ☐ ☐ $x = 3$

mRrj .: fnysY;k oxZlehdj.kkph eqGs &4 vkf.k 3 gh vkgsr-

Q. 3 iq<hy oxZlehdj.ks vo;o in~/krhus lksMok-

$$\sqrt{2}x^2 + 12x + 20\sqrt{2} = 0$$

jhr :

$$\sqrt{2}x^2 + 12x + 10\sqrt{2} = 0$$

$$\therefore \sqrt{2}x^2 + 10x + 2x + 20\sqrt{2} = 0$$

$$\therefore x(\sqrt{2}x + 10) + \sqrt{2}(\sqrt{2}x + 10) = 0$$

$$\therefore (\sqrt{2}x + 10)(x + \sqrt{2}) = 0$$

$$\therefore \sqrt{2}x + 10 = 0 \quad \square\square\square\square\square \quad (x + \sqrt{2}) = 0$$

$$\therefore x = \frac{-10}{\sqrt{2}} \text{ किंवा } x = -\sqrt{2}$$

mRrj & fnysY;k oxZlehdj.kkph eqGs $\frac{-10}{\sqrt{2}}$ vkf.k

$-\sqrt{2}$ gh vkgsr-

Q. 4 oxZlehdj.kkleksj fnysY;k pykP;k fderh R;k lehdj.kkph eqGs vkgsr dh ukghr rs Bjok-

$$2p^2 - 5p = 0, \left(p = 2, \frac{5}{2} \right)$$

jhr :

$$2p^2 - 5p \text{ ;k cgqinhr } p = 3, \text{ Bsow]}$$

$$\begin{aligned} \text{LHS} &= 2 (3)^2 - 5 (3) \\ &= 2 (9) - 15 \\ &= 18 - 15 \\ &= 3 \end{aligned}$$

$$\therefore \text{LHS} \neq \text{RHS}$$

$\therefore p = 3$;k fderhus fnysY;k lehdj.kkps lek/kku gksr ukgh-

$$\therefore p = 3 \text{ gs } 2p^2 - 5p = 0 \text{ ps eqG ukgh}$$

$$\text{b) } 2p^2 - 5p = 0, \text{ ;k cgqinhr } p = \frac{5}{2} \text{ Bsow---}$$

$$\text{LHS} = 2\left(\frac{5}{2}\right)^2 - 5\left(\frac{5}{2}\right)$$

$$= 2\left(\frac{25}{4}\right) - \frac{25}{2}$$

$$= \frac{25}{2} - \frac{25}{2}$$

$$= 0$$

$$\therefore \text{LHS} = \text{RHS}$$

$\therefore m = \frac{5}{2}$; k fderhus fnysY;k lehdj.kkps lek/kku gksrs.

mRrj : 3 gs ewG ukgh ;rj $\frac{5}{2} 2p^2 - 5p = 0$, ps eqG vkgs-

Q. 5 fnysY;k oxZlehdj.kkaph $ax^2 + bx + c = 0$.

;k lkekU; #ik"kh rqyuk d#u a, b, c P;k fderh fygk.

$$x^2 - 8 = 14$$

jhr :

$$x^2 - 8 = 14$$

$$\therefore x^2 - 8 - 14 = 0$$

$$\therefore x^2 - 22 = 0$$

$$\therefore x^2 + 0x - 22 = 0$$

;k lehdj.kkph $ax^2 + bx + c = 0$ “kh rqyuk d#u

$a = 1$, $b = 0$ vkf.k $c = -22$

mRrj : vko”;d lehdj.k $x^2 + 0x - 22 = 0$, $a = 1$, $b = 0$, $c = -22$

Q. 6 nksu Øekxr le uSlfxZd la[;kP;k oxkZph csjht 16 vkgs rj R;k la[;k “kks/kk-fnysY;k vVhuqlkj

$$\square\square\square\square \times \square\square\square (x+2) \square\square\square\square\square\square \square\square\square\square$$

$$\therefore x^2 + (x + 2)^2 = 16$$

$$\therefore x^2 + x^2 + 4x + 4 = 16$$

$$\therefore x^2 + x^2 + 2x + 4 = 16$$

$$\therefore 2x^2 + 2x - 12 = 0$$

$$\therefore x^2 + x - 6 = 0$$

$$\therefore x^2 - 2x + 3x - 6 = 0$$

$$\therefore x(x - 2) + 3(x - 2) = 0$$

$$\therefore (x + 3)(x - 2) = 0$$

$$\therefore x = -3, \text{ or } x = 2$$

ijarq uSflfxZd la[;k _k ulrs

Eg+.kts $x = 2$

Ans.: ifgyh Øekxr uSflfxZd la[;k $x = 2$ vkf.k

nqljh la[;k $2+2=4$.

Q. 7 □□□□ xf.krkP;k ifgY;k pkp.khr feGkysY;k

xq.kkais{kk nqlÚ;k pkp.khr 6 xq.k vf/kd

feGkys- nqlÚ;k pkp.khrhy xqa.kkph 3 iV gh
 ifgY;k pkp.khrhy xq.kkaP;k oxkZbrdh vkgs- rj
 R;kaps ifgY;k pkp.khrhy xq.k fdrh\

letk] □□□□ yk ifgY;k pkp.khr feGkysys xq.k x
 vkgsr-

∴ R;kyk nqlÚ;k pkp.khr feGkysys xq.k $(x + 10)$

vlrhy-

fnysY;k vVhuqlkj]

ifgY;k pkp.khrhy xq.kkapk oxZ nqlÚ;k
 pkp.khrhy xq.kkaP;k 5 iVh brdk vkgs-

$$x^2 = 3(x + 6)$$

$$\therefore x^2 = 3x + 18$$

$$\therefore x^2 - 3x - 18 = 0$$

$$\therefore x^2 - 6x + 3x - 18 = 0$$

$$\therefore x(x - 6) + 3(x - 6) = 0$$

$$\therefore (x - 6)(x + 3) = 0$$

$$\therefore x = 6 \text{ or } x = -3$$

∴ $\text{ijarq } xq.k _ .k \text{ ulrkr } x = 6$

mRrj : lq;"kyk ifgY;k pkp.khr feGkysys xq.k 6
vkgsr

Q. 8 Jh □□□□ ;kapk ekrhph HkkaMh cuo.;kpk
dqVhj mn~;ksx vkgs- rs njjkst Bjkohd
la[;s,o<h HkkaMh r;kj djrkr- izR;sd HkkaM;kps
fufeZrewY;] r;kj dsysY;k HkkaM;kaP;k la[;sph
10 iV vf/kd ₹ 80 vlrs- tj ,dk fnolkrhy
HkkaM;kaps fufeZrhewY; ₹ 480 vlrsy, rj izR;sd
HkkaM;kps fufeZrewY;]o ,dk fnolkr cuoysY;k
HkkaM;kaPkh la[;k fdrh ?

jhr :

letk] Jh □□□□ njjkst x HkkaMh cuorkr-

izR;sd HkkaM;kph fufeZrh fdaer = ₹ $(10x + 80)$

∴ HkkaM~;kph la[;k m izR;sd HkkaM~;kph

fufeZrh fdaer = ,dq.k mRiknu

$$x(10x + 80) = 480$$

$$\therefore 10x^2 + 80x = 480$$

$$\therefore 10x^2 + 80x - 480 = 0$$

$$\therefore x^2 + 8x - 48 = 0$$

$$\therefore x^2 + 12x - 4x - 48 = 0$$

$$\therefore x(x + 12) - 4(x + 12) = 0$$

$$\therefore (x + 12)(x - 4) = 0$$

$$\therefore (x + 12) = 0 \text{ or } (x - 4) = 0$$

$$\therefore x = -12 \text{ or } x = 4$$

ijarq] HkkaM;kaph la[;k +_.k ulrs-

$$x \neq -12$$

$$x = 4$$

,dk fnolkr cuoY;k tk.kkÚ;k HkkaM~;kaph la[;k

$$x = 4$$

vkf.k izR;sd HkkaM;kps fufeZrhewY; = $10x + 80$

$$= 10(4) + 80$$

$$= 40 + 80 = ₹ 120$$

mRrj : ,dk fnolkr cuoysY;k HkkaM;kph la[;k 4 vkgs
vf.k izR;sd HkkaM;kps fufeZrhewY; ₹ 120

Q. 9 □□□□□□ nksu Øekxr le uSlfxZd la[;kP;k
oXkkZph csjht 244 □□□□ rj R;k la[;k “kks/kk-
jhr :

letk] ighyh le o ygku uSlfxZd la[;k x vkgs-
iq<hy Øekxr nqljh le uSlfxZd la[;k $x + 2$ vlsy-
;k la[;kaP;k oxkZph csjht 244 vkgs- ;k
vVhuqlkj]

$$x^2 + (x + 2)^2 = 244$$

$$\therefore x^2 + x^2 + 2x + 4 = 244$$

$$\therefore x^2 + x^2 + 2x + 4 = 244$$

$$\therefore 2x^2 + 2x - 240 = 0$$

$$\therefore x^2 + 2x - 120 = 0$$

$$\therefore x^2 + 12x - 10x - 120 = 0$$

$$\therefore x(x + 12) - 10(x + 12) = 0$$

$$\therefore (x - 10)(x + 12) = 0$$

$$\therefore x = 10, \text{ or } x = -12$$

ijarq $x = -12$ uSlfxZd la[;k _k ulrs-

$$\therefore x = -12 \text{ fg fdaer vxzkg;}$$

$$\therefore x = 10 \text{ fg fdaer xzkg~;}$$

lkfgyh Øekxr uSlfxZd la[;k = $(x + 2 = 12)$

mRrj : R;k la[;k 10 vkf.k 12

Q. 10

□□□ □□□□□□□□□ 6 o'kkZuh eksBk vlwu

R;kaP;k o;kaP;k xq.kkdkj O;Lrkaph csjht $\frac{1}{6}$

vkgs] rj R;kaph vktpk o;s dk<k.

jhr :

letk] □□□□ vktps o; x o'kZs vkgs-

∴ □□□ vktps o; (y + 6) o'kZ vlsy.

∴ R;kaP;k o;kaps xq.kkdkj O;Lr vuqØes $\frac{1}{x}$ आणि $\frac{1}{x+5}$

fnysY;k vVhuqlkj]

R;kaP;k o;kaP;k xq.kkdkj O;Lrkaph csjht = $\frac{1}{6}$

$$\frac{1}{x} + \frac{1}{x+6} = \frac{1}{6}$$

$$\therefore \frac{x+6+x}{x(x+5)} = \frac{1}{6}$$

$$\therefore 6(2x+6) = x(x+5)$$

$$\therefore 12x+36 = (x^2+5x)$$

$$\therefore x^2+5x-12x-36=0$$

$$\therefore x^2 + 9x - 36 = 0$$

$$\therefore x^2 + 12x - 3x - 36 = 0$$

$$\therefore x(x + 12) - 3(x + 12) = 0$$

$$\therefore (x + 12)(x - 3) = 0$$

$$\therefore (x + 12) = 0 \text{ or } (x - 3) = 0$$

$$\therefore (x + 12) = 0 \text{ or } (x - 3) = 0$$

$$\therefore x = -12 \text{ or } x = 3$$

ijarq o; .k ulrs- $x = 12$ fdaer vxzg;

$\therefore x = 3$ gh fdaer xzkg~;

□□□□ps vktps o; 3 o'ksZ vkf.k

□□□pss vktps o; 9 o'kZs vkgs-

$$y + 6 = 3 + 6 = 9$$

mRrj : □□□□ps vktps o; 3 o'kZs vkf.k

□□□pss vktps o; 9 o'kZ vkgs

Q. 11

iq<hy izR;sd oxZlehdj.kkph eqGs okLro o leku vlrhy] rj k ph fdaer dk<k-

$$1) 3y^2 + ky + 3 = 0$$

jhr :

$$3y^2 + ky + 3 = 0 \dots\dots\dots(\text{fnysys}$$

lehdj.k)

Here $a = 3$, $b = k$, $c = 3$

$$\Delta = b^2 - 4ac$$

$$= k^2 - 4(3)(3)$$

$$= k^2 - 36$$

ijarq] ;k oxZlehdj.kkaph eqGs okLro o leku vkgsr-

----(fnys vkgs)

$$\text{foospu } b^2 - 4ac = 0$$

$$\therefore k^2 - 36 = 0$$

$$\therefore k^2 - 36 = 0$$

(fo/kku 1 o#u foospd fdaer Hk#u)

$$\therefore k^2 - 36 = 0$$

$$\therefore (k - 6)(k + 6) = 0$$

$$\therefore k - 6 = 0 \text{ fdaok } k + 6 = 0$$

$$\therefore k = 6 \text{ or } k = -6$$

mRrj : k ph fderh 6 vkf.k -6

Q. 12 $x^2 - 4ky + k + 6 = 0$;k oxZlehdj.kkP;k

eqGkaph csjht gh R;kaP;k xq.kkdkjkP;k nqliV vkgs] rj k ph fdaer dk<k-

jhr :

$$x^2 - 4kx + k + 6 = 0 \quad \text{..... (fnysys$$

lehdj.k)

$$\text{i.e. } x^2 - 4kx + (k + 6) = 0$$

$$a = 1, b = -4k, c = k + 6$$

$$(ax^2 + bx + c = 0 \quad \text{“kh rqyuk$$

d#u)

If α and β are the roots of the given equation,

$$\alpha + \beta = 2\alpha\beta \text{ given}$$

$$\alpha + \beta = -\frac{b}{a} = -\frac{-4k}{1} = 4k \quad \dots (1)$$

$$\alpha\beta = \frac{c}{a} = \frac{k+6}{1} = k + 6 \quad \dots (2)$$

From (1), & (2)

$$4k = 2(k + 6)$$

$$4k - 2k = 12$$

$$2k = 12$$

$$k = 6$$

Ans.: k ph fdaer 6 vkgs-

Q. 13 iq<hy oxZlfedj.ks Iq=kpk okij d#u IksMok-

$$1) x^2 + 5x + 4 = 0$$

jhr %

$$x^2 + 5x + 4 = 0$$

ph $ax^2 + bx + c = 0$ “kh rqyuk d#u] $a = 1, b = 5,$

$$c = 4$$

$$\therefore b^2 - 4ac = 5^2 - 4(1)(4) = 25 - 16 = 9$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\therefore x = \frac{-5 \pm \sqrt{16}}{(2)(1)}$$

$$\therefore x = \frac{-5 \pm 4}{(2)(1)}$$

$$\therefore x = \frac{-5 + 4}{(2)(1)} \text{ or } x = \frac{-5 - 4}{(2)(1)}$$

$$\therefore x = \frac{-1}{2} \text{ or } x = \frac{-9}{2}$$

$$\therefore x = \frac{-1}{2} \text{ or } x = \frac{-9}{2}$$

$$\text{Ans.: } x = \frac{-1}{2} \text{ or } x = \frac{-9}{2}$$

$$\text{mRrj : } x = \frac{-1}{2} \text{ or } x = \frac{-9}{2}$$

**Q. 14 iq<hy lehdj.ks iw.kZ oxZ in~/krhus
lksMok %**

$$x^2 + x - 20 = 0$$

jhr :

Comparing $x^2 + x$ with $x^2 + 2xy$

$$2xy = x$$

$$\therefore 2y = 1$$

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

$$\therefore y^2 = \frac{1}{4}$$

$x^2 + x + \frac{1}{4}$ is a perfect square trinomial

$$x^2 + x - 20 = 0$$

$$\therefore x^2 + x + \frac{1}{4} - \frac{1}{4} - 20 = 0$$

$$\therefore \left(x + \frac{1}{2}\right)^2 - \left(\frac{1}{4} + 20\right) = 0$$

$$\therefore \left(x + \frac{1}{2}\right)^2 - \left(\frac{1+80}{4}\right) = 0$$

$$\therefore \left(x + \frac{1}{2}\right)^2 - \left(\frac{81}{4}\right) = 0$$

$$\therefore \left(x + \frac{1}{2}\right)^2 - \left(\frac{9}{2}\right)^2 = 0$$

$$\therefore \left(x + \frac{1}{2} + \frac{9}{2}\right) \left(x + \frac{1}{2} - \frac{9}{2}\right) = 0$$

$$\therefore \left(x + \frac{1+9}{2}\right) \left(x + \frac{1-9}{2}\right) = 0$$

$$\therefore \left(x + \frac{10}{2}\right) \left(x - \frac{8}{2}\right) = 0$$

$$\therefore (x + 5)(x - 4) = 0$$

$$\therefore (x + 5) = 0 \text{ or } (x - 4) = 0$$

$$\therefore x = -5 \text{ or } x = 4$$

mRrj : oxZlehdj.kkph eqGs -5 आणि 4

Q. 15 $3m^2 + 2m - 7 = 0$

jhr :

$3m^2 + 2m - 7 = 0$ ph $ax^2 + bx + c = 0$ “kh

rqyuk d#u] $a = 3, b = 2, c = -7$

$\therefore b^2 - 4ac = 2^2 - 4(3)(-7) = 4 + 84 = 88$

lq=ko#u

$$m = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\therefore m = \frac{-2 \pm \sqrt{88}}{(2)(3)}$$

$$\therefore m = \frac{-2 \pm \sqrt{4 \times 22}}{6}$$

$$\therefore m = \frac{-2 \pm 2\sqrt{22}}{6}$$

$$\therefore m = \frac{2(-1 \pm \sqrt{22})}{6}$$

$$\therefore m = \frac{-1 \pm \sqrt{22}}{3}$$

$$\therefore m = \frac{-1 + \sqrt{22}}{3} \quad \text{or} \quad m = \frac{-1 - \sqrt{22}}{3}$$

mRrj : fnysY;k oxZlehdj.kkph eqGs

$$m = \frac{-1 + \sqrt{22}}{3} \quad \text{vkf.k} \quad m = \frac{-1 - \sqrt{22}}{3}$$

Q. 16 $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

jhr:

$$\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$$

$$\therefore \sqrt{2}x^2 + (5x + 2x) + 5\sqrt{2} = 0$$

$$\therefore x(\sqrt{2}x + 5) + \sqrt{2}(\sqrt{2}x + 5) = 0$$

$$\therefore (x + \sqrt{2})(\sqrt{2}x + 5) = 0$$

$$\therefore (x + \sqrt{2}) = 0 \text{ or } (\sqrt{2}x + 5) = 0$$

$$\therefore x = -\sqrt{2} \text{ or } x = \frac{-5}{\sqrt{2}}$$

mRrj : oxZlehdj.kkph eqGs $-\sqrt{2}$ आणि $\frac{-5}{\sqrt{2}}$ fg

vkgsr-

Q. 17 oxZlehdj.kk leksj fnysY;k pykP;k fderh R;k lehdj.kkaph eqGs vkgsr dh ukghr rs Bjok %

$$x^2 + 4x - 5 = 0 \quad x = 1, x = -1$$

jhr :

$$x^2 + 4x - 5 = 0 \text{ ;k cgqinhr } x = 1 \text{ Bsowu]}$$

$$\text{LHS} = 1^2 + 4(1) - 5$$

$$= 1 + 4 - 5$$

$$= 5 - 5$$

$$= 0$$

$$\therefore \text{LHS} = \text{RHS}$$

$x = 1$;k fderhus fnysY;k lehdj.kkps lek/kku

gksrs- $x^2 + 4x - 5 = 0$

$$\text{LHS} = (-1)^2 + 4(-1) - 5$$

$$= 1 - 4 - 5$$

$$= -8$$

$$\neq 0$$

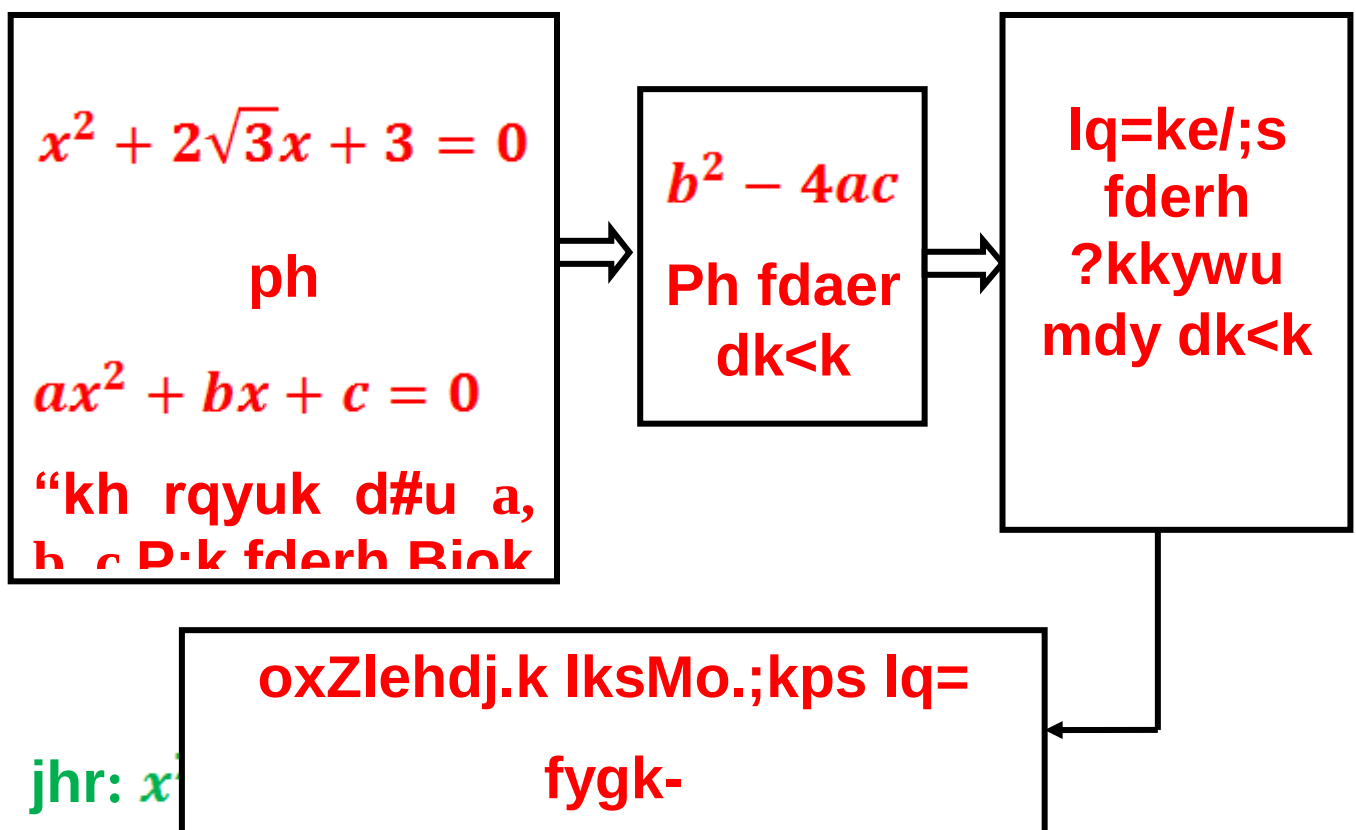
$$\text{LHS} \neq \text{RHS}$$

$x = -1$ ps ewG ukgh-

mRrj $\therefore x = 1$ ps ewG vkgs-

Q. 18

$x^2 + 2\sqrt{3}x + 3 = 0$ gs oxZlehdj.k lq=kpk okij
d# okij d#u iq<hy izokg vkd`rhr fnysY;k
ekfgrhP;k vk/kkjs lksMok %



$$a = 1, b = 2\sqrt{3}, c = 3$$

$$b^2 - 4ac = (2\sqrt{3})^2 - 4 \times 1 \times 3 = 12 - 12 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\therefore x = \frac{-2\sqrt{3} \pm \sqrt{0}}{(2) \times (1)}$$

$$\therefore x = \frac{-2\sqrt{3} \pm \sqrt{0}}{2}$$

$$\therefore x = \frac{-2\sqrt{3}}{2}$$

$$\therefore x = -\sqrt{3}$$

$$\text{mRrj : } x = -\sqrt{3}$$

$$\text{Q. 19 } (2 - 3\sqrt{5}) \text{ vkf.k } (2 + 3\sqrt{5})$$

jhr :

$$\text{letk } \alpha = 2 - 3\sqrt{5} \text{ vkf.k } \beta = 2 + 3\sqrt{5} \text{ b'V lehdj.k}$$

iq<hy lq=kus feGrs-

$$\alpha + \beta = 2 - 3\sqrt{5} + 2 + 3\sqrt{5} = 4$$

$$\alpha\beta = (2 - 3\sqrt{5})(2 + 3\sqrt{5})$$

$$= (2)^2 - (3\sqrt{5})^2$$

$$= 4 - 45$$

$$= -41$$

$$x^2 - (\alpha + \beta)x + \alpha\beta = 0$$

$$\therefore x^2 - (2)x + (-41) = 0$$

$$\therefore x^2 - 2x - 41 = 0$$

mRrj : $x^2 - 2x - 41 = 0$ b'V oxZlehdj.k vkgs.

$$\text{Q. 20 } m^2 - 2m + 1 = 0$$

jhr :

$$m^2 - 2m + 1 = 0 \text{ ph } ax^2 + bx + c = 0 \text{ “kh}$$

rqyuk d#u $a = 1, b = -2, \text{ vkf.k } c = 2,$

$$\Delta = b^2 - 4ac$$

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

$$\Delta = 4 - 8 = -4$$

;sFks foospdph fdaer “kwU; vkgs-

∴ ;k oxZlehdj.kkph nksUgh eqGs okLro vkf.k

leku vkgsr-

mRrj % fnysY;k oxZlehdj.kkph eqGs okLro

vkf.k leku vkgsr-

Q. 21

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

Jhr :

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

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

$$\therefore x^2 - x - 3 = 0$$

ph $ax^2 + bx + c = 0$ “kh rqyuk d#u]

$a = 1, b = -1, c = -3$;k fderh feGrkr-

$$b^2 - 4ac = (-1)^2 - 4(1)(-3) = 1 + 12 = 13$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-1) \pm \sqrt{13}}{2(1)}$$

$$= \frac{1 \pm \sqrt{13}}{2}$$

$$\therefore x = \frac{1 + \sqrt{13}}{2} \text{ or } \frac{1 - \sqrt{13}}{2}$$

mRrj.: oxZlehdj.kkph eqGs $\frac{1 + \sqrt{13}}{2}$, vkf.k $\frac{1 - \sqrt{13}}{2}$

gh vkgsr.

Q. 22 vjfoan □□□□is{kk ₹ 5 vf/kd vkgsr-
R;kaP;ktoGhy jdekapk xq.kkdkj 1500. rj
izR;sdktoGhy jDde fdrh\

jhr :

letk □□□□toGhy jDde n”kZo.kkjh la[;k x , vkgs-
Eg.kwu vjfoan toGhy jDde n”kZo.kkjh la[;k = ₹
($x + 5$) gksbZy- fnysY;k vVhuqlkj]

(□□□□toGhy jDde) $\times$ (vjfoan toGhy jDde) = 1500

$$x(x + 5) = 1500$$

$$\therefore x^2 + 5x - 1500 = 0$$

$$\therefore x^2 + 15x - 10x - 1500 = 0$$

$$\therefore x(x + 15) - 10(x + 15) = 0$$

$$\therefore (x + 15)(x - 10) = 0$$

$$\therefore x + 15 = 0 \text{ किंवा } x - 10 = 0$$

$$\therefore x = -15 \text{ किंवा } x = 10$$

ijarq] jDde .k ulrs-

$$\therefore x \neq -15$$

∴ □□□□ toGhy jDde = ₹ 10

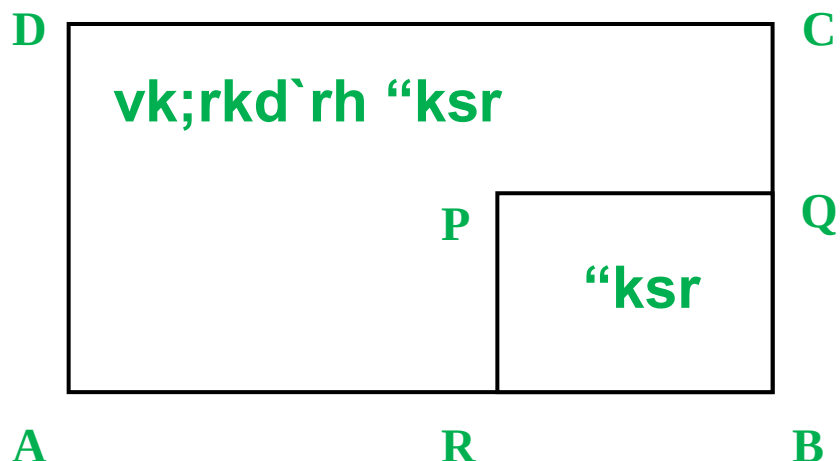
vkf.k vjfoan toGhy jDde = $x + 5 = 10 + 5 = 15$

Ans.: □□□□ toGhy jDde ₹ 10 vkf.k vjfoan toGhy jDde
₹ 15 vkgs-

Q. 23 कोडोलीतील ;sFkhy “ksrdjh Jh- □□□□□
;kaP;k vk;rk d`rh “ksrkph ykach gh #anhP;k
nqiVhis{kk 10 ehVjus vf/kd vkgs- R;kauh R;k
+ 10 ehVjus vf/kd vkgs- R;kauh R;k “ksrkr
ikolkps ik.kh iquhHkZj.kklkBh “ksrkP;k
#anhP;k $\frac{1}{3}$ iV cktw vl.kkÚ;k pkSjld`rh

“ksrrG~;kph fufeZrh dsyh- rsOgk ewG
“ksrkps {ks=QG gs “ksrRkG~;kP;k
{ks=QGkP;k 10 iV gksrs- rj R;k “ksrkph ykach
vkf.k #anh rlsp “ksrrG~;kP;k cktwph ykach
dk<k-

jhr :



letk] vk;rk d`rh “ksrhph #anh x ehVj vkgs,
 Eg.kwu R;k “ksrhph ykach $(2x + 10)$ ehVj
 gksbZy-

$$\begin{aligned}\text{“ksrhps } \{ks=QG &= (\text{yach}) \times (\#anh) \\ &= (2x + 10) \times x \text{ m}^2\end{aligned}$$

pkSjld`rh “ksrrG~;kP;k ,dk cktwph ykach =
 $\frac{1}{3}x$ मीटर

$$\text{“ksrrG;kps } \{ks=QG = (\text{ctw})^2 = \left(\frac{1}{3}x\right)^2 \text{ m}^2$$

fnysY;k vVhuqlkj

$$(2x + 10) \times x = 10 \times \left(\frac{1}{3}x\right)^2$$

$$\therefore 2x^2 + 10x = 10 \times \left(\frac{1}{9}x^2\right)$$

$$\therefore 18x^2 + 90x = 10x^2 \quad \dots \text{nksUgh cktwyk 9}$$

xq.kq---

$$\therefore 10x^2 = 18x^2 + 90x$$

$$\therefore 18x^2 - 10x^2 - 90x = 0$$

$$\therefore 8x^2 - 90x = 0$$

$$\therefore x^2 - 42x = 0 \dots (\text{lehdj.krhy izR;sd inkyk \&2}$$

us Hkkxwu)

$$\therefore x(x - 42) = 0$$

$$\therefore x = 11.25 \text{ or } x = 0$$

ijarq] “ksrkph #anh 0 vlw “kdr ukgh-

$$2x + 10 = 2 \times 11.25 + 10$$

$$= 22.50 + 10$$

$$= 32.50$$

$$\frac{1}{3}x = \frac{1}{3} \times 32.50 = 15 \text{ ehVj}$$

Ans.: “ksrkph ykach 100 eh] #anh 11.25 eh o
 “ksrrG~;kP;k izR;sd cktwph ykach
 32.50/3 eh vkgs-

Q. 24 $p^2 - p + 10 = 0$

jhr

$$p^2 - p + 10 = 0 = 0 \text{ ph } ax^2 + bx + c = 0, a = 1,$$

$$b = -1, c = 10$$

$$\Delta = b^2 - 4ac$$

$$= (-1)^2 - 4(-1)(10)$$

$$= 1 + 40$$

$$= 41$$

Here, $\Delta = 41$

Ans.: $\Delta = 41$

Q. 25 Find the sum and product of the roots of the equation $x^2 - 3x - 10 = 0$.

Sol:

Let $\alpha = 3$, $\beta = -10$

$$\alpha + \beta = 3 + (-10) = 3 - 10 = -7$$

$$\alpha\beta = 3 \times (-10) = -30$$

Therefore, the equation is

$$x^2 - (\alpha + \beta)x + \alpha\beta = 0$$

$$\therefore x^2 - (-7)x + (-30) = 0$$

$$\therefore x^2 + 7x - 30 = 0$$

mRrj.: $x^2 + 3x - 10 = 0$

Q. 26 ,dk oxZlehdj.kkP;k nksu eqGkaph csjht 5 vkf.k R;kP;k ?kukaPkh csjht 35 vkgs- rj rs oxZlehdj.k dks.krs\

jhr :

letk] α vkf.k β gh R;k oxZlehdj.kkph nksu eqGs vkgsr-

mnkgj.kkr fnysY;k ekfgrhuqlkj]

$$\alpha + \beta = 5 \quad \& \quad \alpha^3 + \beta^3 = 35$$

vkrk $(\alpha + \beta)^3 = \alpha^3 + 3\alpha^2\beta + 3\alpha\beta^2 + \beta^3$ (foLrkj

lq=)

$$\therefore (\alpha + \beta)^3 = \alpha^3 + 3\alpha\beta(\alpha + \beta) + \beta^3$$

$$\therefore 5^3 = 35 + 3\alpha\beta(5) \dots\dots (\text{fnysY;k fderh Hk\#u})$$

$$\therefore 125 = 35 + 15\alpha\beta$$

$$\therefore 125 - 35 = 15\alpha\beta$$

$$\therefore 15\alpha\beta = 90$$

$$\therefore \alpha\beta = \frac{90}{15} = 6$$

$$\therefore \text{vkrk] } \alpha \text{ आणि } \beta$$

$$x^2 - (\alpha + \beta)x + \alpha\beta = 0$$

$$\text{mRrj : } x^2 - 5x + 6 = 0 \quad \text{vkgs-}$$

Q. 27

$$x^2 - \frac{3x}{5} - \frac{1}{5} = 0 \quad \text{Nsnkapk ylkfo} = 10$$

jhr :

$$x^2 - \frac{3x}{5} - \frac{1}{5} = 0$$

$$\therefore 5x^2 - 3x - 1 = 0$$

gs lehdj.k vo;o in~/krhus lksMow-

$$\therefore 5x^2 - 3x - 1 = 0$$

$$\therefore 5x^2 - 5x + 2x - 1 = 0$$

$$\therefore 5x(x - 1) + 1(2x - 1) = 0$$

$$\therefore (x - 1)(5x - 1) = 0$$

$$\therefore (x - 1) = 0 \text{ or } (5x - 1) = 0$$

$$\therefore x = 1 \text{ or } 5x = 1$$

$$\therefore x = 1 \text{ or } x = \frac{1}{5}$$

Ans : oxZlehdj.kkph eqGs 1, आणि $\frac{1}{5}$ gh vkgsr-

Q. 28 Jh- e/kqlqnu ;kaP;k la=kckxsr vkMO;k
 jkaxsrhy >kMkaph la[;k] mH;k jkaxsrhy
 >kMkaP;k la[;sis{kk 5 us vf/kd vkgs- tj
 la=kckxsr ,dw.k 150 >kMs vlrhy] rj vkMO;k
 rlsp mH;k jkaxsrhy >kMkaph la[;k fdrh \

mdy %

jhr :-letk] mH;k jkaxsrhy >kMkaph la[;k x

vkgs-

vkMO;k jkaxsr $x + 5$ >kMs vlrhy-

,dq.k >kMs = mH;k jkaxsrhy >kMs x vkMO;k

jkaxsrhy >kMs

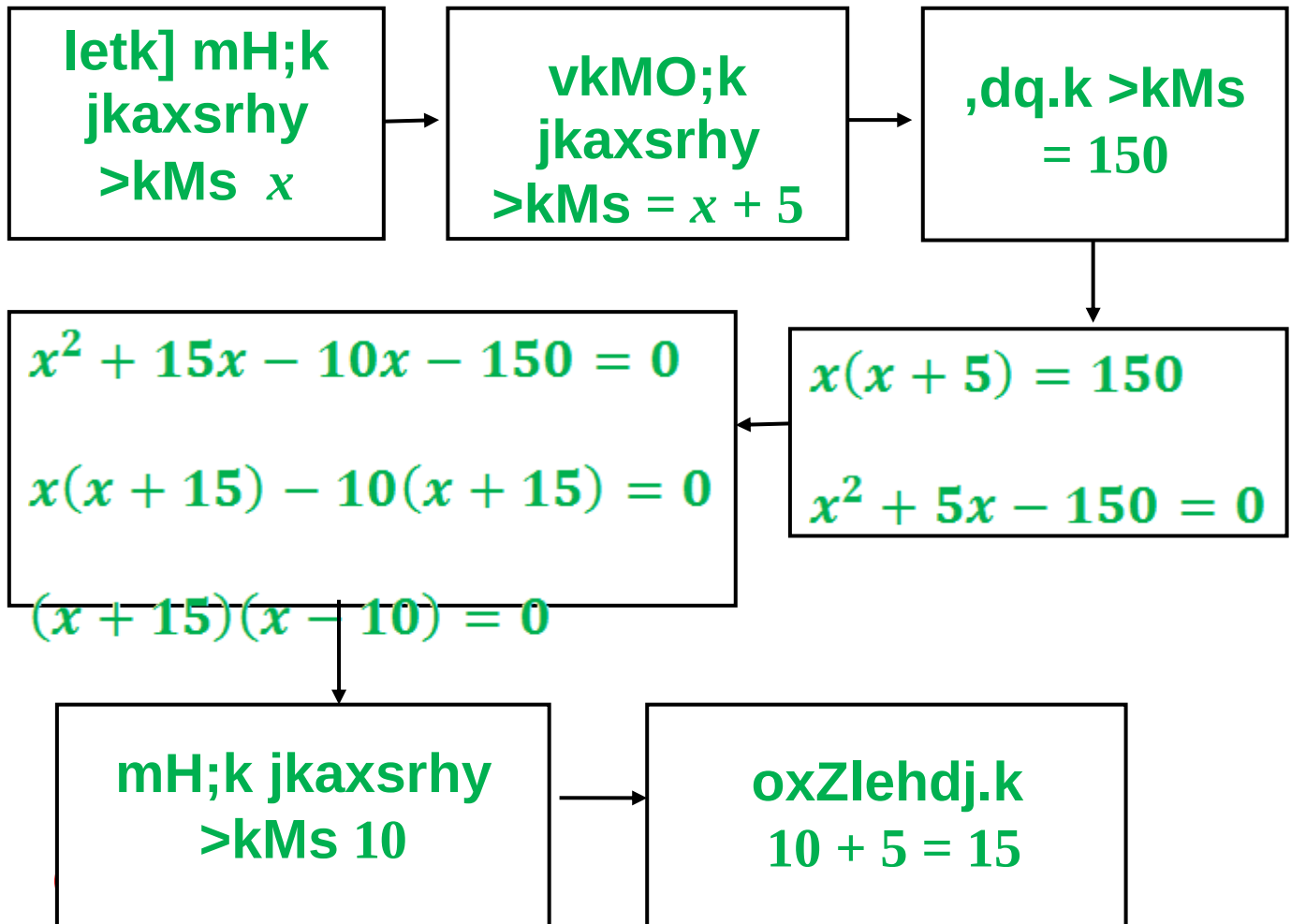
fnysY;k ekfgrhuqlkj] ,dq.k >kMs = 150

$$x(x + 5) = 150$$

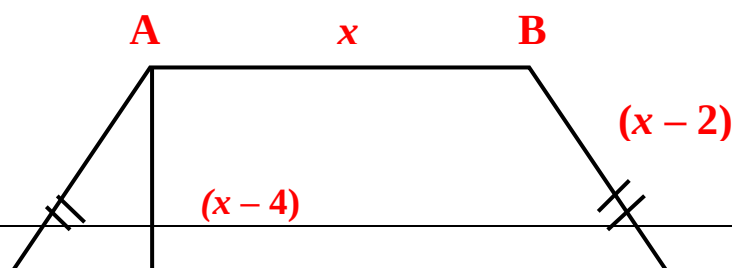
$$x^2 + 5x = 150$$

$$x^2 + 5x - 150 = 0$$

$$x^2 + 15x - 10x - 150 = 0$$



iq<s fnysY;k leyac □ ABCD e/s AB || CD vlqu
 R;kps {ks=QG 33 pkSlseh vkgs- rj vkd`rhrhy fnysY;k
 ekfgrho#u pkSdksukP;k pkjgh cktwaph ykach dk<k- AB
 = x, BC = x - 2, AM = x - 4 and DC = 2x - 1



jhr :

□ ABCD leyac pkSdku vkgs- vkf.k AB || CD

$$A (\square ABCD) = \frac{1}{2} (AB + CD) \times AM$$

$$\therefore 33 = \frac{1}{2} (x + 2x + 1) \times (x - 4)$$

$$\therefore 66 = (3x + 1) \times (x - 4)$$

$$\therefore 3x^2 - 12x + x - 4 = 66$$

$$\therefore \boxed{3x^2 - 11x - 70 = 0}$$

$$\therefore 3x(x - 7) + 10(x - 7) = 0$$

$$\therefore (3x + 10)(x - 7) = 0$$

$$\therefore (3x + 10) = 0 \text{ OR } \boxed{(x - 7) = 0}$$

$$\therefore x = -\frac{10}{3} \text{ or } x = 7$$

Q. 30 The sum of the ages of a father and his son is 460 years. Five years ago, the father's age was six times the son's age. Find their present ages.

Sol :

$$\text{Father's age} = x, \text{ Son's age} = 5x + 6$$

$$\text{Father's age} \times \text{Son's age} + 1 = 460$$

$$(5x + 6)x + 1 = 460$$

$$\therefore 5x^2 + 6x + 1 - 460 = 0$$

$$\therefore 5x^2 + 6x + 459 = 0$$

$$\therefore 5x^2 + 51x - 45x + 459 = 0$$

$$\therefore x(5x + 51) - 9(5x + 51) = 0$$

$$\therefore (5x + 51) = 0 \text{ OR } x - 9 = 0$$

$$\therefore 5x = -51 \text{ OR } x = 9$$

iajrq $x = -\frac{51}{5}$ fg uSlfxZd la[;k ukgh-

$\therefore x = 9$ fg uSlfxZd la[;k vkgs-

$x = 9$ gk Hkktd $5x + 6 = 5 \times 9 + 6 = 51$;k lehdj.kke/;s Bsow-

Ans: Hkkxkdkj = 51 vkf.k Hkktd = 9

Q. 31 iq<hy oxZlehdj.kkaph eqGs fygk-

$$\left(x^2 + \frac{1}{x^2} - 2\right) - 7\left(x + \frac{1}{x}\right) + 14 = 0$$

jhr :

$$\left(x^2 + \frac{1}{x^2} - 2\right) - 7\left(x + \frac{1}{x}\right) + 14 = 0$$

$$\therefore \left(x + \frac{1}{x}\right)^2 - 2 - 7\left(x + \frac{1}{x}\right) + 14 = 0$$

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

$$\therefore a^2 - 2 - 7a + 14 = 0$$

$$\therefore a^2 - 7a + 12 = 0$$

$$\therefore (a - 3)(a - 4) = 0$$

$$\therefore (a - 3) = 0 \text{ किंवा } (a - 4) = 0$$

$$\therefore a = 3 \text{ किंवा } a = 4$$

$a = 3$ fg fdaer Bsow

$$x + \frac{1}{x} = 3$$

$$\therefore x^2 + 1 = 3x$$

$$\therefore x^2 - 3x + 1 = 0$$

$$\therefore a = 1, b = -3, c = 1$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-3) \pm \sqrt{3^2 - 4}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{9 - 4}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{5}}{2}$$

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

$$x = \frac{3 - \sqrt{5}}{2}$$

$a = 4$ fg fdaer Bsow

$$x + \frac{1}{x} = 4$$

$$\therefore x^2 + 1 = 4x$$

$$\therefore x^2 - 4x + 1 = 0$$

$$\therefore a = 1, b = -4, c = 1$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\therefore x = \frac{-(-4) \pm \sqrt{4^2 - 4}}{2(1)}$$

$$\therefore x = \frac{4 \pm \sqrt{16 - 4}}{2(1)}$$

$$\therefore x = \frac{4 \pm \sqrt{12}}{2}$$

$$\therefore x = \frac{4 \pm 2\sqrt{3}}{2}$$

$$\therefore x = \frac{4 - 2\sqrt{3}}{2} \text{ किंवा } x = \frac{4 + 2\sqrt{3}}{2}$$

$$\therefore x = 2 - \sqrt{3} \text{ किंवा } x = 2 + \sqrt{3}$$

$$\text{mRrj : } x = 2 - \sqrt{3} \text{ fdaok } x = 2 + \sqrt{3}$$

Q. 32 (hots 80)

□□□□ P;k 8 o'kkZiwohZP;k o;kps vkf.k 6
o'kkZuarjP;k o;kP;k xq.kkdkj 680 vlsy rj
R;kaps vktps o; fdrh\

jhr :

□□□□ ps vktps o; x letq---

8 o'kkZiwohZ ps lfpu ps o; $x - 8$

6 o'kkZuarj ps lfpups o; $x + 6$

fnysY;k vVhuqlkj,

$$(x - 8)(x + 6) = 680$$

$$\therefore x^2 - 8x + 6x - 48 = 680$$

$$\therefore x^2 - 2x - 680 = 0$$

$$\therefore x^2 - 28x + 26x - 728 = 0$$

$$\therefore x(x - 28) + 26(x - 28) = 0$$

$$\therefore (x - 28)(x + 26) = 0$$

$$\therefore x = 28 \text{ Or } x = -26$$

mRrj.: □□□□ ps vktps o; 28 o'ksZ vkgs-

Q. 33 tj fnysY;k oxZlehdj.kkph

$x^2 - 11x + k = 0$ eqGs ;kaps xq.kksRrj 6%5

vlsy rj k ph fdaer dk<k.

jhr:

fnysys lehdj.k $x^2 - 11x + k = 0$ ph

$$ax^2 + bx + c = 0$$

ph rqyuk d#u $a = 1, b = -11, c = k$

letk α vkf.k β fg lehdj.kkph eqGs vkgsr-

$$\alpha : \beta = 6 : 5$$

$$\text{letk } \frac{\alpha}{\beta} = \frac{6}{5} = p$$

$$\therefore \frac{\alpha}{6} = \frac{\beta}{5} = p$$

$$\therefore \alpha = 6p, \beta = 5p$$

$$\alpha\beta = \frac{c}{a} = \frac{k}{1}$$

$$\alpha\beta = 6p \times 5p$$

$$30p^2 = k$$

$$p^2 = \frac{k}{30} \quad \dots (1)$$

$$\alpha + \beta = \frac{-b}{a} = \frac{-(-11)}{1} = \frac{11}{1}$$

$$6p + 5p = 11p$$

$$11p = 11$$

$$p = 1$$

fg fdaer lehdj.k (1) e/s Bsow

$$1^2 = \frac{k}{30}$$

$$\therefore k = 30$$

Q. 34 iq<hy lehdj.ks iq.kZ oxZ in~/krhus

$$\text{IksMok- } 9B^2 - 12B = 5$$

jhr :

$$9B^2 - 12B = 5$$

9 us Hkkxw,

$$B^2 - \frac{12}{9} B = \frac{5}{9} \quad \dots (1)$$

$$\text{frljh VeZ} = \left[B \text{ चा गुणांक } \frac{1}{2} \text{ आहे} \right]^2$$

$$\text{frljh VeZ} = \left[\frac{1}{2} \left(-\frac{12}{9} \right) \right]^2$$

$$= \frac{36}{81}$$

Lehdj.k (1) P;k nksUgh cktwr $\frac{36}{81}$ feGow-

$$B^2 - \frac{12}{9} B + \frac{36}{81} = \frac{5}{9} - \frac{36}{81}$$

$$\therefore \left(B - \frac{6}{9} \right)^2 = \frac{45 - 36}{81}$$

$$\therefore \left(B - \frac{6}{9} \right)^2 = \frac{9}{81}$$

$$\therefore B - \frac{6}{9} = +\frac{1}{3} \quad \text{fdaok} \quad B - \frac{6}{9} = -\frac{1}{3}$$

$$\therefore B = \frac{6}{9} + \frac{1}{3} \quad \text{fdaok} \quad B = \frac{6}{9} - \frac{1}{3}$$

$$\therefore B = \frac{9}{9} \quad \text{fdaok} \quad B = +\frac{3}{9}$$

$$\therefore B = 1 \quad \text{fdaok} \quad B = \frac{1}{3}$$

Ans.: fnysY;k lehdj.kkph ewGs $B=1$ fdaok $B = \frac{1}{9}$

**Q. 35 ,dk vk;rk d`rh vk;rkph ykach fg R;k aP;k
#anh is{kk 10 eh us tkLr vkgs vkf.k R;kaps
d.kZ gs ykach is{kk 5 eh us tkLr vkgs r- rj R;k
tkxsps {ks=QG fdrh**

jhr :

R;k tkxsph #anh y ehVj ekuw

(ykach) = l, D = d.kZ

fnysY;k ifgY;k vVhuqlkj

$$D = (2y + 15) \text{ m}$$

Ik;FkkxksjIP;k izes;kuqlkj,

$$I^2 + B^2 = D^2$$

$$(2 + y)^2 + y^2 = (2y + 15)^2$$

$$\therefore 4y^2 + 40y + 100 + y^2 = 4y^2 + 60y + 225$$

$$\therefore y^2 - 20y - 125 + y^2 = 0$$

$$\therefore y(y - 25) + 5(y - 25) = 0$$

$$\therefore (y + 5)(y - 25) = 0$$

$$\therefore y = 25$$

$$\therefore \text{\#anh} = 25, \text{ykach} = 2y + 10 = 60$$

$$\text{Tkkxsps \{ks=QG} = \text{ykach} \times \text{\#anh}$$

$$= 25 \times 60$$

$$= 1500 \text{ pkS ehVj}$$

Ans.: R;k tkxsps \{ks=QG 1500 pkS eh vkgs-

**Q. 36 iq<hy oxZlehdj.ks lw=kpk okij d#u
lksMok-**

$$m^2 - 3m - 10 = 0$$

jhr :

$$m^2 - 3m - 10 = 0 \text{ ph ;k lehdj.kkph rqyuk}$$

$$am^2 + bm + c = 0 \text{ “kh d\#-}$$

$$a = 1, b = -3, c = -10$$

$$m = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-10)}}{2 \times 1}$$

$$m = \frac{3 \pm \sqrt{9 + 40}}{2}$$

$$m = \frac{3 \pm \sqrt{49}}{2}$$

$$m = \frac{3 \pm \sqrt{49}}{2}$$

$$m = \frac{3 \pm 7}{2}$$

$$m = \frac{10}{2} \text{ fdaok } m = \frac{-4}{2}$$

$$m = 5 \text{ fdaok } m = -2$$

mRrj : fnysY;k lehdj.kkph eqGs 5, -2

Q. 37 iq<hy oxZlehdj.kkph eqGs okLro o leku vkgsr $4x^2 - 3kx + 1 = 0$ rj rh k ph fdaer dk<k-

jhr :

fnysys lehdj.k $4x^2 - 3kx + 1 = 0$ fnysY;k

lehdj.kkph rqyuk $ax^2 + bx + c = 0$ d#u $a = 4$, b

$$= -3k, c = 1$$

$$\Delta = b^2 - 4ac$$

$$= (-3k)^2 - 4 \times 4 \times 1$$

$$= 9k^2 - 16$$

eqGs okLro o leku vkgsr-

$$\Delta = 0$$

$$\therefore 9k^2 - 16 = 0$$

$$\therefore (3k + 4)(3k - 4) = 0$$

$$\therefore (3k + 4) = 0 \text{ or } (3k - 4) = 0$$

$$\therefore 3k = -4 \quad \text{or } 3k = 4$$

$$\therefore k = \frac{-4}{3} \quad \text{or } k = \frac{4}{3}$$

$$\text{mRrj: } k = \frac{-4}{3} \text{ किंवा } k = \frac{4}{3}$$

Q. 38 tj $kx^2 - 7x + 12 = 0$;k lehdj.kkps ,d ewG $x = 3$ vlsy rj k ph fdaer $dk < k$.

jhr :

$x = 3$ gs fnysY;k lehdj.kkps ewG vkgs- Eg.kwu

$x = 3$ fg fdaer lehdj.kkr Bsow-

$$kx^2 - 7x + 12 = 0$$

$$k(3)^2 - 7(3) + 12 = 0$$

$$\therefore 9k - 21 + 12 = 0$$

$$\therefore 9k - 9 = 0$$

$$\therefore 9k = 9$$

$$\therefore k = 1$$

mRrj : k ph fdaer 1

Q. 39 Tkj lehdj.k $3x^2 - 2x + p = 0$ vkf.k $6x^2 - 17x + 12 = 0$;kaps eqGs leku vkgsr rj p ph fdaer fdrh\.

jhr :

$$6x^2 - 17x + 12 = 0$$

$$\therefore 3x(2x - 3) - 4(2x - 3) = 0$$

$$\therefore (3x - 4)(2x - 3) = 0$$

$$\therefore (3x - 4) = 0 \text{ or } (2x - 3) = 0$$

$$\therefore 3x = 4 \text{ fdaok } 2x = 3$$

$$\therefore x = \frac{4}{3} \text{ fdaok } x = \frac{3}{2}$$

tj $x = \frac{4}{3}$ gs ewG leku vlsy rj

$$3x^2 - 2x + p = 0$$

$$\therefore 3\left(\frac{4}{3}\right)^2 - 2\left(\frac{4}{3}\right) + p = 0$$

$$\therefore 3\left(\frac{16}{9}\right) - \left(\frac{8}{3}\right) + p = 0$$

$$\therefore \left(\frac{16}{3}\right) - \left(\frac{8}{3}\right) + p = 0$$

$$\therefore \left(\frac{8}{3}\right) + p = 0$$

$$\therefore p = -\frac{8}{3}$$

tj $x = \frac{3}{2}$ gs ewG leku vlsy rj

$$3x^2 - 2x + p = 0$$

$$\therefore 3\left(\frac{3}{2}\right)^2 - 2\left(\frac{3}{2}\right) + p = 0$$

$$\therefore 3\left(\frac{9}{4}\right) - 2\left(\frac{3}{2}\right) + p = 0$$

$$\therefore \frac{27}{4} + p = 3$$

$$\therefore p = 3 - \frac{27}{4}$$

$$\therefore p = \frac{12 - 27}{4}$$

$$\therefore p = \frac{-15}{4}$$

mRrj : p ची किंमत $-\frac{8}{3}$ fdaok $p = \frac{-15}{4}$

Q. 40 $2p^2 + 5p - 3 = 0$; k oxZlehdj.kkph eqGs 1 vkf.k &3 vkgsr dk rs “kks/kk-jhr :

1) $p = 1$ fg fdaer lehdj.kkr Bsow $2p^2 + 5p - 3 = 0$

$$\text{Mkoh cktw} = 2p^2 + 5p - 3$$

$$= 2(1)^2 + 5(1) - 3$$

$$= 2 + 5 - 3$$

$$\text{Mkoh cktw} = 4$$

$$\text{iajrq Mkoh cktw} = 0$$

$$\therefore \text{Mkoh cktw} \neq \text{mtoh cktw}$$

2) $p = -3$ fg fdaer fnysY;k lehdj.kkr Bsow $2p^2 + 5p - 3 = 0$

$$\begin{aligned}\text{Mkoh cktw} &= 2p^2 + 5p - 3 \\ &= 2(-3)^2 + 5(-3) - 3 \\ &= 2 \times 9 - 15 - 3 \\ &= 18 - 18\end{aligned}$$

Mkoh cktw = 0 = mtoh cktw

Ans.: 1 gs lehdj.kkps ewG ukgh , -3 gs lehdj.kkps ewG vkgs-

Mkoh cktw = mtoh cktw = 0

Q. 41 (target 56)

$9y^2 - 12y + 2 = 0$ lehdj.kkps ewG iwoZ oxZ in~/krhus lksMok-

jhr :

$$9y^2 - 12y + 2 = 0$$

fnysY;k lehdj.kkyk 9 us Hkkxw--

$$y^2 - \frac{12}{9}y + \frac{2}{9} = 0$$

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

$$y^2 - \frac{4}{3}y + k = y^2 + ay + a^2$$

$$-\frac{4}{3} = 2a \text{ ph } k = a^2 \text{ rgyuk dsY;kl vki.kkal}$$

$$a = -\frac{2}{3} \text{ vkf.k } k = a^2 \text{ fg fdaer feGsy-}$$

$$k = \left(-\frac{2}{3}\right)^2 = \frac{4}{9}$$

vkrrk,

$$y^2 - \frac{4}{3}y + \frac{2}{9} = 0$$

$$y^2 - \frac{4}{3}y + \frac{4}{9} - \frac{4}{9} + \frac{2}{9} = 0$$

$$\left(y - \frac{2}{3}\right)^2 - \frac{2}{9} = 0$$

$$\left(y - \frac{2}{3}\right)^2 = \frac{2}{9}$$

nksUgh cktwph oxZewGs ?ksÅ-

$$y - \frac{2}{3} = +/\!-\frac{\sqrt{2}}{3}$$

$$y - \frac{2}{3} = +/\!-\frac{\sqrt{2}}{3}$$

$$\therefore y - \frac{2}{3} = \frac{\sqrt{2}}{3} \text{ किंवा } y - \frac{2}{3} = -\frac{\sqrt{2}}{3}$$

$$\therefore y = \frac{\sqrt{2} + 2}{3} \text{ किंवा } y = \frac{-\sqrt{2} + 2}{3}$$

$$\text{मरज : लेहज.ककस एवग } y = \frac{\sqrt{2}+2}{3} \text{ or } y = \frac{-\sqrt{2}+2}{3}$$

स वकस-

Q. 42 ,d uSlfxZd la[;k vkf.k frpk oxZ ;kaph

csjht gh 42 vkgs] rj R;k la[;k “kks/kk-

jhr :

letk] rh ifgyh uSlfxZd la[;k x vkf.k frpk oxZ x^2

ekuw-

fnysY;k vVhuqlkj

$$x + x^2 = 42$$

$$\therefore x^2 + x = 42$$

$$\therefore x^2 + x - 42 = 0$$

$$\therefore x^2 + 7x - 6x - 42 = 0$$

$$\therefore x(x + 7) - 6(x + 7) = 0$$

$$\therefore (x + 7)(x - 6) = 0$$

$$\therefore x + 7 = 0 \quad \text{or} \quad x - 6 = 0$$

$$\therefore x = -7 \quad \text{or} \quad x = 6$$

iajrq uSlfxZd la[;k fg d/khp _.k ulrs] Eg.ku

$$\therefore x = 6 \text{ vkf.k}$$

$$X^2 = 6^2 = 36$$

mRrj : uSlfxZd la[;k 6 vkf.k 36 vkgsr-

Q. 43 $(m - 12)x^2 + 2(m - 12)x + 2 = 0$;k

**oXkZlehdj.kkph eqGs okLro o leku vlrhy] rj m
ph fdaer dk<k-**

jhr :

$$(m - 12)x^2 + 2(m - 12)x + 2 = 0$$

;k lehdj.kkph $ax^2 + bx + c = 0$ “kh rqyuk d#]

$a = m - 12, b = 2(m - 12), c = 2$;k fderh feGrkr-

$$\Delta = b^2 - 4ac$$

$$\Delta = [2(m - 12)]^2 - 4ac$$

$$= 4(m - 12)^2 - 4(m - 12) \times 2$$

$$= 4(m - 12)(m - 12 - 2)$$

$$= 4(m - 12)(m - 14)$$

;k oxZlehdj.kkph eqGs okLro vkf.k leku vkgsr-

$$\Delta = 0$$

$$[m - 12][m - 14] = 0$$

$$\therefore m - 12 = 0 \text{ किंवा } m - 14 = 0$$

$$\therefore m = 12 \text{ किंवा } m = 14$$

iajrq tj $m = 12$, Δ gs 0 vkgs

Eg.kwu $m \neq 12$ fg ph fdaer vxzkg~;

$$\therefore m = 14$$

mRrj : $m = 14$

Q. 44 oxZlehdj.k r;kj dj.

$$1 - 3\sqrt{5}, 1 + 3\sqrt{5}$$

$$\text{jhr \% } \alpha = 1 - 3\sqrt{5} \text{ आणि } 1 + 3\sqrt{5}$$

b'V oxZlehdj.k iq<hy lw=kus feGrs-

$$\alpha = 1 - 3\sqrt{5}, \beta = 1 + 3\sqrt{5}$$

$$\alpha + \beta = 1 - 3\sqrt{5} + 1 + 3\sqrt{5} = 2$$

$$\alpha\beta = (1 - 3\sqrt{5})(1 + 3\sqrt{5})$$

$$\alpha\beta = 1^2 - (3\sqrt{5})^2$$

$$\alpha\beta = 1 - 45$$

$$\alpha\beta = -44$$

mRrj % b'V oxZlehdj.k

$$x^2 - 2x - 44 = 0$$

Q. 45

$$\sqrt{3}x^2 + \sqrt{2}x - 2\sqrt{3} = 0$$

jhr :

$$\sqrt{3}x^2 + \sqrt{2}x - 2\sqrt{3} = 0 \text{ ph } ax^2 + bx + c = 0 \text{ “kh}$$

$$\text{rqyuk d\#u } a = \sqrt{3}, \quad b = \sqrt{2}, \quad c = -2\sqrt{3}$$

$$\text{foospu } \Delta = b^2 - 4ac$$

$$\Delta = (\sqrt{2})^2 - 4 \times \sqrt{3} \times (-2\sqrt{3})$$

$$= 2 + 24$$

$$= 26$$

$$\Delta > 0$$

mRrj : fnysY;k oxZlehdj.kkph eqGs okLro
vkf.k vleku (fHkUu)

Q. 46 oxZlehdj.k lksMok $x^2 - \frac{3x}{10} - \frac{1}{10} = 0$

jhr %

;sFks $a = 1, b = -\frac{3}{10}$ आणि $c = -\frac{1}{10}$

$$x^2 - \frac{3x}{10} - \frac{1}{10} = 0$$

Multiplying both sides by 10 we get,

$$10x^2 - 3x - 1 = 0$$

$$\therefore 10x^2 - 5x + 2x - 1 = 0$$

$$\therefore 5x(2x - 1) + 1(2x - 1) = 0$$

$$\therefore (2x - 1)(5x + 1) = 0$$

$$\therefore 2x - 1 = 0 \text{ or } 5x + 1 = 0$$

$$\therefore 2x = 1 \text{ किंवा } 5x + 1 = 0$$

$$\therefore x = \frac{1}{2} \text{ किंवा } 5x = -1$$

$$\therefore x = \frac{1}{2} \text{ किंवा } x = \frac{-1}{5}$$

$$\therefore x = 2 + \sqrt{7} \text{ किंवा } x = 2 - \sqrt{7}$$

mRrj : oxZlehdj.kkph eqGs $\frac{1}{2}$ and $\frac{-1}{5}$

Q. 47 □□□□ P;k 2 o'kkZiqohZP;k vkf.k 3
o'kkZuarjP;k o;kapk xq.kkdkj 84 vkgs] rj frps
vktps o; dk<k-

jhr % letk] izxrhps vktps o; x o'kZ vkgs-

∴ तिचे 2 वर्षांपूर्वीचे वय दर्शवणारी संख्या (x
 – 2) वर्षे होती आणि 3 वर्षांनंतरचे वय दर्शवणारी संख्या (x
 + 3) वर्ष असेल.

fnysY;k vVhuqlkj]

(2 o'kkZiwohZps o;) x (3 o'kkZuarjps o;) = 84

($x - 2$)($x + 3$) = 84 -----(b'V lehdj.k)

$x^2 + 3x - 2x - 6 = 84$ ----- (dal lksMowu)

$x^2 + x - 6 = 84$

$x^2 + x - 6 - 84 = 0$

$x^2 + x - 90 = 0$

$x^2 + 10x - 9x - 90 = 0$

$(x + 10) - 9(x + 10) = 0$

$x + 10 = 0$ fdaok $x = 9$

ijarq o; __.k ulrs- ∴ $x = -10$

$$\therefore x = 9$$

mRrj % izxrhps vktps o; 9 o'ksZ vkgs-

Q. 48 oxZlehdj.k lksMok-

$$(2x + 3)^2 = 25$$

jhr :

$$(2x + 3)^2 = 25$$

$$\therefore (2x + 3)^2 - 25 = 0$$

$$\therefore (2x + 3)^2 - (5)^2 = 0$$

$$\therefore (2x + 3 + 5) (2x + 3 - 5) = 0$$

$$\therefore (2x + 8) (2x - 2) = 0$$

$$\therefore 2x + 8 = 0 \text{ किंवा } 2x - 2 = 0$$

$$\therefore 2x = -8 \quad \text{किंवा} \quad 2x = 2$$

$$\therefore x = -4 \quad \text{किंवा} \quad x = 1$$

mRrj : - oxZlehdj.kkph eqGs & 4 vkf.k 1 gh vkgsr-

Q. 49 nksu la[;kaP;k oxkZae/khy Qjd 120 vkgs-ygku la[;spk oxZ gk eksB~;k la[;sP;k nqiVhbrdk vkgs- rj R;k la[;k “kks/kk-jhr :

letk] eksBh la[;k x vkgs-

$\therefore$ मोठया संख्येचा वर्ग = x^2 vkf.k fnysY;k ekfgrhuqlkj]

ygku la[;sP;k oxZ = $2x$

eksB~;k la[;spk oxZ – ygku la[;sP;k oxZ = 120

$$x^2 - 2x = 120 \quad \text{..(b'V$$

lehdj.k)

$$\therefore x^2 - 2x - 120 = 0$$

$$\therefore x^2 - 12x + 10x - 120 = 0$$

$$\therefore x(x - 12) + 10(x - 12) = 0$$

$$\therefore (x + 10)(x - 12) = 0$$

$$\therefore (x + 10) = 0 \quad \text{किंवा} \quad (x - 12) = 0$$

$$\therefore x = -10 \quad \text{किंवा} \quad x = 12$$

ijarq] oxZla[;k _.k vlw “kdr ukgh-

$$x \neq -10$$

$$x = -10$$

fnysY;k vVhuqlkj---

$$x^2 - y^2 = 120$$

$$\therefore (-10)^2 - (y)^2 = 120$$

$$\therefore 100 - y^2 = 120$$

$$\therefore 100 - y^2 = 120$$

$$\therefore -y^2 = 120 - 100$$

$$\therefore -y^2 = 20$$

$$\therefore y^2 = -20$$

oxZ la[;k _.k ulrs

$$\therefore x = 12 \text{ fg la[;k vlsy-}$$

$$(\text{लहान संख्या})^2 = 2x = 2 \times 12 = 24$$

$$\text{लहान संख्या} = \pm\sqrt{24}$$

mRrj : eksBh la[;k 12 vkf.k ygku la[;k $\sqrt{24}$
fdaok $-\sqrt{24}$

Q.50 □□□□ □□□□□□□□□□ □□□□□□ □□□□□
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$$x^2 - 4kx + k + 3 = 0$$

□□□□□□ □□□□□□□□ k □□□□.

$$x^2 - 4kx + k + 3 = 0$$

ph $ax^2 + bx + c = 0$ “kh rqyuk d#u $a = 1, b = -$
 $4kx, c = k + 3$

letk α vkf.k β fg lehdj.kkph eqGs vkgsr-

$$\text{Then } \alpha + \beta = \frac{-b}{a}, \quad \alpha\beta = \frac{c}{a}$$

fnysY;k vVhuqlkj---

$$\alpha + \beta = 2\alpha\beta$$

$$\frac{-b}{a} = \frac{2c}{a}$$

$$\therefore -b = 2c$$

$$\therefore -(-4k) = 2(k + 3)$$

$$\therefore 4k = 2k + 6$$

$$\therefore 4k - 2k = 6$$

$$\therefore 2k = 6$$

$$\therefore k = 3$$

$$\square\square\square\square\square: k = 3$$