Pre Board : MT-01. (17th November 2025)

Syllabus : Real Numbers, Polynomials, System of linear equations in 2 variables.

Seaction-A

(1) 13 (option-a)

(2) (option-d).

(3) a rational number (option-c)

(4) $x^2 - 5x - 36$ (option-c).

(5) ± 18 (option-d).

(6) . (option-c)

(7) LCM $(a, b) = 150$ (option-c).

(8) 2520 (option-d)

(9) more than 3 (option-d)

(10) (option-a).

Section-E

(19) (i) Khushi can invite 12 guests

(ii) Each guest will get 3 apples & 5 bananas.

(iii) If she decided to add 42 mangoes, she can invite 6 guests.

(OR)

She can invite 23 guests.

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(20) (i) $150x + 250y = 55000$, $x + y = 300$.

(ii) (A) 200 children visited the park that day.
100 adults visited the park that day.

(iii) $150(250) + 250(100)$
$= 57500 + 25000$
$= 82500$
$\therefore$ 82500 Rs. will be collected if 250 children & 100 adults visit the amusement park.

Section-D

(17) $f(x) = 3x^2 - 7x - 6$

$\alpha + \beta = \frac{-b}{a} = \frac{7}{3}$.

$\alpha\beta = \frac{c}{a} = \frac{-6}{3} = -2$.

(i) New zeroes are: α^2 & β^2

sum of zeroes $= \alpha^2 + \beta^2$
$= (\alpha + \beta)^2 - 2\alpha\beta$
$= \left(\frac{7}{3}\right)^2 - 2(-2)$
$= \frac{49}{9} + 4$
$= \frac{49 + 36}{9} = \frac{85}{9}$.

product of zeroes $= \alpha^2\beta^2$
$= (-2)^2$
$= 4.$

$\therefore$ quadratic polynomial is
let $k=9$,
$$9\left(x^2 - \frac{85}{9}x + 4\right)$$
$$\Rightarrow 9x^2 - 85x + 36.$$

(ii) New zeroes are: $3\alpha + 2\beta$ & $2\alpha + 3\beta$

sum of zeroes $= 3\alpha + 2\beta + 2\alpha + 3\beta$
$= 5\alpha + 5\beta$
$= 5(\alpha + \beta)$
$= 5\left(\frac{7}{3}\right)$

$= \frac{35}{3}.$

product of zeroes $= (3\alpha + 2\beta)(2\alpha + 3\beta)$
$= 6\alpha^2 + 9\alpha\beta + 4\alpha\beta + 6\beta^2$
$= 6(\alpha^2 + \beta^2) + 13\alpha\beta$
$= 6\left[(\alpha+\beta)^2 - 2\alpha\beta\right] + 13\alpha\beta$
$= 6\left[\left(\frac{7}{3}\right)^2 - 2(-2)\right] + 13(-2)$
$= \cancel{6}^{2}\left[\frac{49+36}{\cancel{9}\,3}\right] - 26$
$= \left[2 \times \frac{85}{3}\right] - 26$
$= \frac{170 - 78}{3} = \frac{92}{3}.$

$\therefore$ quadratic polynomial is, let $k=3$.
$$3\left(x^2 - \frac{35}{3}x + \frac{92}{3}\right) \Rightarrow 3x^2 - 35x + 92.$$

(18) let speed of train be x
& time taken y.
$\therefore$ distance = speed × time = xy

A.T.Q

$$(x+6)(y-4) = xy$$
$$\cancel{xy} - 4x + 6y - 24 = \cancel{xy}$$
$$-4x + 6y = 24 \quad \text{——} \ (1)$$

$$\cancel{(x-6)(y+4) = xy}$$
$$\cancel{xy + 4x - 6y - 24 = xy}$$
$$\cancel{4x - 6y = 24}$$

$$(x-6)(y+6) = xy$$
$$\cancel{xy} + 6x - 6y - 36 = \cancel{xy}$$
$$6x - 6y = 36 \quad \text{——} \ (2)$$

Eliminating (1) & (2)

$$-4x + \cancel{6y} = 24$$
$$6x - \cancel{6y} = 36$$
$$2x = 60$$
$$x = 30$$

putting $x = 30$ in (1)

$$-4(30) + 6y = 24$$
$$6y = 24 + 120$$
$$6y = 144$$
$$y = \frac{\cancel{144}\ 24}{\cancel{6}\ 1}$$

$\therefore$ length of journey is 30×24
i.e. 720 km.

Section-C

(14) (A) Let A be x
& B be y.

A.T.Q

$$x + 30 = 2(y - 30)$$
$$x + 30 = 2y - 60$$
$$x - 2y = -90 \quad \text{--- (1)}$$

$$3(x - 10) = y + 10$$
$$3x - 30 = y + 10$$
$$3x - y = 40 \quad \text{--- (2)}$$

Eliminating (1) & (2)

$$x - 2y = -90$$
$$3x - y = 40 \times 2$$

$$x - 2y = -90$$
$$6x - 2y = 80$$
$$(-) \quad (+) \quad (-)$$
$$-5x = -170$$
$$\boxed{x = 34}$$

putting $x = 34$ in (2)

$$3(34) - y = 40$$

$$-y = 40 - 102$$
$$-y = -62$$
$$\boxed{y = 62.}$$

∴ A has 34 mangoes and B has 62 mangoes.

(OR) 8. We know that, angle sum property of a $\Delta = 180$

In ΔABC

$\Rightarrow \angle A + \angle B + \angle C = 180$

putting the given values

$x^\circ + 3x^\circ + y^\circ = 180^\circ$

$4x^\circ + y = 180^\circ$ —— 1

We already have, $3y - 5x = 30^\circ$ —— 2

$y + 4x = 180^\circ \; (\times 3)$

$3y - 5x = 30^\circ$

$3y + 12x = 540^\circ$ —— 3

On eliminating 3 & 2

$$\begin{aligned} \cancel{3y} - 5x &= 30^\circ \\ \cancel{3y} + 12x &= 540^\circ \\ (-) \quad (-) \quad & \quad (-) \\ \hline 17x &= 510^\circ \end{aligned}$$

$x = \dfrac{\cancel{510}}{\cancel{17}} \; 30$

$\boxed{x = 30}$

putting in 1

$4(30) + y = 180^\circ$

$y = 180^\circ - 120^\circ$

$\boxed{y = 60^\circ}$

$\therefore$ It is a right-angled Δ $\because$ $3x = 3 \times 30 = 90^\circ$, we've one angle as 90°.

Section-C

(15) let us assume, to the contrary that $7-2\sqrt{3}$ is rational.
so, $7-2\sqrt{3}=\frac{p}{q}$ where $q\neq 0$ & p & q are co-prime integers

$$7-2\sqrt{3}=\frac{p}{q}$$

$$-2\sqrt{3}=\frac{p}{q}-7$$

$$-2\sqrt{3}=\frac{p-7q}{q}$$

$$\sqrt{3}=\frac{-(p-7q)}{2q}$$

$$\sqrt{3}=\frac{-p+7q}{2q}$$

As, $\frac{-p+7q}{2q}$ is a rational & $\sqrt{3}$ is an irrational.

Rational $\neq$ Irrational.

This contradiction is due to our wrong assumption that $7-2\sqrt{3}$ is rational.

$\therefore 7-2\sqrt{3}$ is an irrational.

(16) $\frac{-(2a+3)}{a+1}=-1$

$-2a-3=-a-1$

$-a=2$

$\boxed{a=-2}$

$\frac{3a+4}{a+1}$

putting $a=-2$.

$\frac{3(-2)+4}{(-2)+1}$

$\frac{-6+4}{-2+1}$

$\frac{-2}{-1}=2$.

$\therefore$ product of its zeroes is 2.

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Section-B

(11) $\sqrt{5}x^2 - 7x - 6\sqrt{5} = 0$

$\sqrt{5}x^2 - 10x + 3x - 6\sqrt{5} = 0$

$\sqrt{5}x(x - 2\sqrt{5}) + 3(x - 2\sqrt{5}) = 0$

$(\sqrt{5}x + 3)(x - 2\sqrt{5}) = 0$

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

verification.

$\alpha + \beta =$	$\frac{-b}{a}$
$\frac{-3}{\sqrt{5}} + 2\sqrt{5}$	$\frac{7}{\sqrt{5}}$
$\frac{-3 + 10}{\sqrt{5}}$	
$\frac{7}{\sqrt{5}}$	

$\therefore \alpha + \beta = \frac{-b}{a}$

$\alpha\beta$	$\frac{c}{a}$
$\frac{-3}{\cancel{\sqrt{5}}} \times 2\cancel{\sqrt{5}}$	$\frac{-6\cancel{\sqrt{5}}}{\cancel{\sqrt{5}}}$
-6	

$\therefore \alpha\beta = \frac{c}{a}$

$\therefore$ relation between zeroes & coefficients are verified

(12) (A) $3x^2 + 5x + 7$

sum of zeroes $= \frac{-b}{a}$

$$\alpha + \beta = \frac{5}{3}$$

product of zeroes $= \frac{c}{a}$

$$\alpha\beta = \frac{7}{3}$$

New zeroes are: $\frac{\alpha}{\beta^2}$ and $\frac{\beta}{\alpha^2}$

sum of zeroes $= \frac{\alpha}{\beta^2} + \frac{\beta}{\alpha^2}$

$$= \frac{\alpha^3 + \beta^3}{\alpha^2 \cdot \beta^2}$$

$$= \frac{(\alpha+\beta)^3 - 3\alpha\beta(\alpha+\beta)}{\alpha^2\beta^2}$$

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

$$= \frac{\frac{125}{27} - \frac{35}{3}}{\frac{49}{9}} = \frac{\frac{125 - 315}{27}}{\frac{49}{9}}$$

$$= \frac{-190}{\cancel{27}\,3} \times \frac{\cancel{9}\,1}{49} = \frac{-190}{147}$$

product of zeroes $= \left(\frac{\alpha}{\beta^2}\right)\left(\frac{\beta}{\alpha^2}\right)$

$$= \frac{\alpha\beta}{\alpha^2\beta^2}$$

$$= \frac{\frac{7}{3}}{\frac{49}{9}}$$

$$= \frac{\cancel{7}^{1}}{\cancel{3}} \times \frac{\cancel{9}^{3}}{\cancel{49}_{2}}$$

$$= \frac{3}{2}.$$

$\therefore$ quadratic polynomial is

$$k\left[x^2 + \frac{190x}{147} + \frac{3}{2}\right] \quad [k \neq 0]$$

(12) (OR) (B) $p(x) = ax^2 - 3(a-1)x - 1$

Substituting $x = 1$.

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

$p(1) = a - 3(a-1) - 1$

$p(1) = a - 3a + 3 - 1$

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

$\because$ 1 is a zero of the polynomial $p(x)$

$\Rightarrow -2a + 2 = 0$

$\Rightarrow -2a = -2$

$\boxed{a = 1}$

the quadratic polynomial is

$p(x) = x^2 - 1$ (putting $a = 1$ in $p(x)$)

$p(x) = 0$

$x^2 - 1 = 0$

$x^2 = 1$

$x = \pm 1$

(13) $mx - ny = m^2 + n^2$ —— (1)

$x + y = 2m$ —— (2)

from (2). $y = 2m - x$. (put in (1)) —— (3)

$mx - n(2m - x) = m^2 + n^2$

$mx - 2mn + nx = m^2 + n^2$

$mx + nx = m^2 + n^2 + 2mn$

$mx + nx = (m+n)^2$

$x(m+n) = (m+n)^2$

$x = \frac{(m+n)^{\cancel{2}}}{\cancel{m+n}}$

$\boxed{x = m+n.}$ putting in (3)

$y = 2m - x$

$y = 2m - (m+n)$

$y = 2m - m - n$

$\boxed{y = m - n}$

$\therefore$ values of x & y are $(m+n)$ and $(m-n)$ respectively