X Test-15 (Polynomials)

1) $\alpha+\beta = -3+4 = 1$
$\alpha\beta = -3\times 4 = -12$
∴ The required polynomial is $x^2 - x - 12$
or $\frac{x^2}{2} - \frac{x}{2} - 6$ (c)

2) both negative (b)

3) c and a have the same sign (c)

4) $\alpha+\beta = -p$
$\alpha\beta = q$

Sum of zeroes $= \frac{1}{\alpha}+\frac{1}{\beta} = \frac{\beta+\alpha}{\alpha\beta} = \frac{-p}{q}$

product of zeroes $= \frac{1}{\alpha}\times\frac{1}{\beta} = \frac{1}{\alpha\beta} = \frac{1}{q}$

∴ The required polynomial is $x^2 - (\text{Sum of zeroes})x + \text{product of zeroes}$

$= x^2 + \frac{p}{q}x + \frac{1}{q}$ (d)

5) $\alpha+\beta = \frac{-b}{a} = 5$

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

$(\alpha-\beta)^2 = (\alpha+\beta)^2 - 4\alpha\beta$

$\Rightarrow 1 = 25 - 4b$

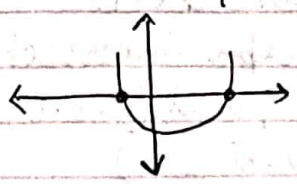
$\Rightarrow 1-25 = -4b$

$b = \frac{-24}{-4} = 6$ (b)

6) $\alpha+\beta = \frac{-b}{a} = 5$; $\alpha\beta = \frac{c}{a} = 4$

$\frac{1}{\alpha}+\frac{1}{\beta} - 2\alpha\beta = \frac{\beta+\alpha}{\alpha\beta} - 2\alpha\beta = \frac{5}{4} - 8 = \frac{5-32}{4} = \frac{-27}{4}$ (b)

7) exactly two zeroes (c)



8) Since the graph intersects the x-axis only at one point, the no. of zeroes = 1 (c)

9) Sum of zeroes $= \frac{3}{5} - \frac{1}{2} = \frac{6-5}{10} = \frac{1}{10}$

product of zeroes $= \frac{3}{5} \times -\frac{1}{2} = -\frac{3}{10}$

∴ The required quadratic polynomial

$= x^2 - \frac{1}{10}x - \frac{3}{10}$ or $10x^2 - x - 3$ (d)

10) $\alpha + \beta = -\frac{b}{a} = \frac{3}{2}$; let α be 3.

$\Rightarrow 3 + \beta = \frac{3}{2} \Rightarrow \beta = \frac{3}{2} - 3 = -\frac{3}{2}$ (a)

Case-study I

11) $x^2 - 2x - 8$ S P -4
$(x-4)(x+2)$ -2 -8 $<$
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∴ Zeroes are (4, −2) (ii)

12) intersects x-axis (i)

13) parabola (iii)

14) $\alpha + \beta = 0$; let α be 6

$6 + \beta = 0 \Rightarrow \beta = -6$. Then $\alpha\beta = 6 \times -6 = -36$

∴ The required polynomial is

$x^2 - 36$ (ii)

15) $f(x) = (x-2)^2 + 4 = x^2 - 4x + 4 + 4$

$= x^2 - 4x + 8$

$b^2 - 4ac = 16 - 4 \times 1 \times 8 = 16 - 32 = -16 < 0$

Hence no. of zeroes = 0 (iii)

16) Since the graph intersects the x-axis at 3 points, no. of zeroes = 3 (iii)

17) Since the graph intersects the x-axis at (−2, 0), (2, 0) and (−5.5, 0), the zeroes are −2, 2, −5.5 (iii)

18) Sum of zeroes $= 3 + -4 = -1$

product of zeroes $= 3 \times -4 = -12$

$\therefore$ The required polynomial is $x^2 + x - 12$ (ii)

19) Since no. of zeroes = 3, cubic (ii)

20) $\alpha + \beta = -\frac{b}{a} = 2$

$-4 + \beta = 2$

$\beta = 6$ (i)
