HOMEWORK -2 MCQS - POLYNOMIALS

1. If one zero of the polynomial $(a^2+9)x^2+13x+6a$ is a reciprocal of the other, then a is
   a) 1 b) 3 c) 12 d) 19
2. If 2 and 3 are the zeros of the quadratic polynomials $x^2+(a+1)x+b,$ then the value of a+b is
   a) -5 b) 0 c) 6 d) -6
3. A quadratic polynomial whose zeros are reciprocals of the zeroes of the polynomial: $f(x)=ax^2+bx+c; a\neq 0, c\neq 0$
   a) $\frac{1}{c}(cx^2+bx+a)$ b) $\frac{1}{c}(cx^2-bx+c)$ c) $\frac{1}{c}(cx^2-bx-a)$ d) $\frac{1}{c}(-cx^2+bx+a)$
4. If p and q are the zeroes of $ax^2-bx+c, a\neq 0$, then the value of $p+q$ is
   a) $\frac{b}{a}$ b) $\frac{c}{a}$ c) $\frac{d}{a}$ d) $\frac{-b}{a}$
5. The zeroes of the quadratic polynomial $x^2+7x+10$ are
   a) $-2,-5$ b) 2, 5 c) $-3,-8$ d) 3, 8
6. Zeroes the polynomial $4x^2-9$ are
   a) $\pm\frac{2}{3}$ b) $\pm\frac{3}{2}$ c) $\pm\frac{5}{2}$ d) none of these
7. The value of k such that the polynomial $x^2-(k+6)x+2(2k-1)$ has sum of its zeros equal to half of their product is
   a) 3 b) 5 c) 7 d) none of these
8. The value of k, if -4 is a zero of polynomial $x^2-x-(2k+2)$ is
   a) 5 b) 6 c) 7 d) 9
9. If α and β are the zeroes of polynomial $2x^2-3x+1$, then find a quadratic polynomial whose zeros are 3α and 3β is
   a) $\frac{k}{2}(3x^2+5x-5)$ b) $\frac{k}{2}(3x^2-5x+5)$ c) $\frac{k}{2}(2x^2+9x+9)$ d) $\frac{k}{2}(2x^2-9x+9)$
10. If the degree of polynomial *p(x)* in *n*, then the maximum number of zeroes it can have is:
    a)n b) n^2 c) n^3 d) none of these
11. If α and β are zeroes of polynomial x^2+6x+9, then a polynomial whose zeroes are $-\alpha$ and $-\beta$ is
    a) x^2-6x+9 b) x^2+6x-9 c) x^2+5x+4 d) none of these
12. If α, β are the zeros of x^2-6x+k, then the value of k when $\frac{1}{\alpha}+\frac{1}{\beta}-2\alpha\beta$ is:
    a) 13 b) -14 c)15 d) -16

13. If α and β are the zeroes of the polynomial $5x^2-7x-2$, the sum of the reciprocals of zeros is

a) $\frac{7}{2}$ b) $-\frac{7}{2}$ c) $\frac{5}{9}$ d) $-\frac{5}{9}$

14. If the sum and the product of the zeroes of the polynomial $p(x)=4x^2-27x+3k^2$ are equal, then the value of k is

a) ± 2 b) ± 3 c) ± 5 d) ± 1

15. If α, β are the zeroes of the polynomial x^2-4x+3, a quadratic polynomial whose zeroes are 3α and 3β is

a) $x^2+8x+17$ b) $x^2+12x+27$ c) $x^2-12x+27$ d) $x^2-8x+17$

16. The value of k such that $3x^2+2kx-k-5$ has the sum of the zeroes as half of their product is:

a) $\frac{2}{3}$ b) $\frac{5}{3}$ c) $\frac{7}{3}$ d) $\frac{8}{3}$

17. If α and β are the zeroes of the polynomial $4x^2+3x+7$, the value of $\frac{1}{\alpha}+\frac{1}{\beta}$ is

a) $-\frac{1}{2}$ b) $\frac{-5}{2}$ c) $\frac{-3}{7}$ d) $\frac{3}{7}$

18. If α and β are the zeroes of the polynomial $p(x)=2x^2+5x+k$, satisfying the relation $\alpha^2+\beta^2+\alpha\beta=\frac{21}{4}$, then the value of k is

a) 1 b) 2 c) 3 d) 4

19. A quadratic polynomial whose zeroes are $5-3\sqrt{2}$ and $5+3\sqrt{2}$ is

a) $x^2-10x+7$ b) $x^2+10x+7$ c) x^2-5x+9 d) x^2+5x-9

20. If α and β are the zeroes of the quadratic polynomial x^2-5x+k, such that $\alpha-\beta=1$, then k =

a) 2 b) 3 c) 4 d) 6

21. What should be added to x^2-5x+4 so that 3 is a zero of the resulting polynomial

a) 2 b) -2 c) 8 d) -8

22. If α and β are the zeroes of the polynomial ax^2+bx+c, then the value of $\alpha^2+\beta^2$ is

a) $\frac{b^2-ca}{a^2}$ b) $\frac{b^2-2ca}{a^2}$ c) $\frac{b^2+ca}{a^2}$ d) $\frac{b^2+2ca}{a^2}$

23. If α and β are the zeroes of the quadratic polynomial $p(x)=ax^2+bx+c$, then $\alpha^3\beta^2+\alpha^2\beta^3$ = ...

a) $\frac{-bc}{a^3}$ b) $\frac{-bc^2}{a^3}$ c) $\frac{-ac}{b^3}$ d) $\frac{-a^2c}{b^3}$

24. A quadratic polynomial, whose sum of zeroes is 2 and product is -8 is

a) x^2-3x-3 b) x^2+2x+8 c) x^2+3x+3 d) x^2-2x-8 \

25. If α and β are the zeroes of quadratic polynomial $p(x)=ax^2+bx+c$, then $\frac{1}{\alpha}+\frac{1}{\beta}-2\alpha\beta$ is

a) $\frac{-ab-2c^2}{ac}$ b) $\frac{ab+2c^2}{ac}$ c) $\frac{ab+b^2}{2c}$ d) $\frac{-c^2+ab}{2ac}$

26. If sum of the zeroes of the quadratic polynomial $3x^2-kx+6$ is, 3, then the value of k is

a) 3 b)6 c) 9 d) 0

27. If α and β are the zeroes of quadratic polynomial $p(x)=ax^2+bx+c$, then $\frac{1}{\alpha}+\frac{1}{\beta}$ is

a) $\frac{-b}{a}$ b) $\frac{b}{c}$ c) $\frac{-b}{c}$ d) $\frac{-a}{b}$

28. A quadratic polynomial, the sum and product of whose zeroes are (-3) and 2 respectively is

a) x^2+3x+2 b) $-x^2-3x+2$ c) x^2+3x-2 d) None of these

29. If α,β are the zeroes of a polynomial such that $\alpha+\beta=6$ and $\alpha\beta=4$, then the polynomial is

a) x^2-6x+4 b) $-x^2+6x-4$ c) x^2-6x-4 d) none of these

30. If one zero of the quadratic polynomial $2x^2-3x+p$ is 3, then its other zero is

a) $-3/2$ b) $3/2$ c) $1/2$ d) $-1/2$

31. If 1 is a zero of the polynomial $p(x)=ax^2-3(a-1)$, then the value of a is

a) 3 b) 2 c) $\frac{-2}{3}$ d) $\frac{3}{2}$

32. If α , β are the zeroes of the polynomial $2y^2+7y+5$, the value of $\alpha+\beta+\alpha\beta$ is

a) 0 b) 1 c) -1 d) 2

33. If one zero of the quadratic polynomial x^2-5x-6 is 6, the other zero is

a) 0 b) 1 c) -1 d) 2

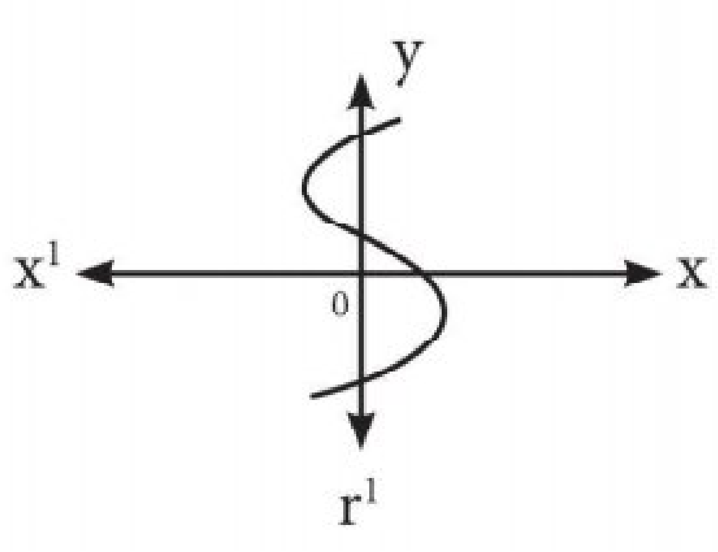
34. Quadratic polynomial having zeroes α and β is

a) $x^2-(\alpha\beta)x+(\alpha+\beta)$ b) $x^2-(\alpha+\beta)x+\alpha\beta$

c) $x^2-\frac{\alpha x}{\beta}+2\beta$ d) None of these

35. A quadratic polynomial whose zeroes are $\frac{3}{5}$ and $\frac{-1}{2}$ is

a) $10x^2+x+3$ b) $10x^2+x-3$ c) $10x^2-x+3$ d) $10x^2-x-3$

36. 

The graph of $y = p(x)$, where (x) is a polynomial. The number of zeroes of the polynomial $p(x)$ is

a) 3 b) 2 c) 1 d) no zero

37. If one of the zeroes of quadratic polynomial $(k-1)x^2 + kx + 1$ is -3, then k =

a) $\frac{4}{3}$ b) $\frac{-4}{3}$ c) $\frac{2}{3}$ d) $\frac{3}{2}$

38. Sum of the zeroes of the polynomial $x^2 + 7x + 10$ are

a) 7 b) -7 c) 10 d) -10

39. A quadratic polynomial whose product and sum of zeroes are $\frac{-13}{5}$ and $\frac{3}{5}$ respectively

a) $k(x^2 + 12x + 5)$ b) $k(x^2 - 8x - 9)$

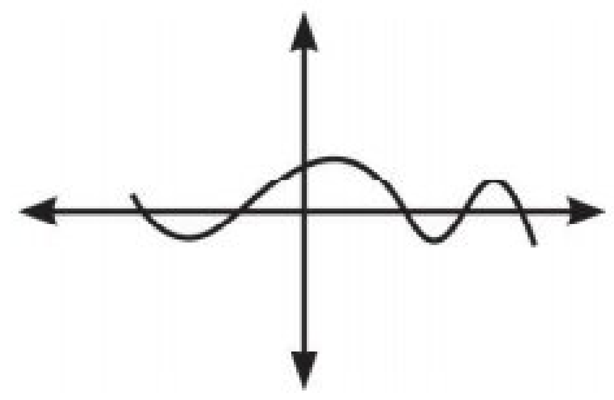
c) $k\left(x^2 - \frac{1}{2}x \frac{-7}{5}\right)$ d) $k\left(x^2 - \frac{3x}{5} + \left(\frac{-13}{5}\right)\right)$

40. If α and β are the zeroes of the polynomial $px^2 - 2x + 3p$ and $\alpha + \beta = \alpha\beta$, then $p =$

a) $\frac{3}{2}$ b) $\frac{2}{3}$ c) 3 d) 2

41. Sum of the zeroes of the polynomial $2x^2 - 8x + 6$ is

a) -3 b) 3 c) -4 d) 4

42. 

The graph $y = p(x)$, where $p(x)$ is a polynomial in variable x, the number of zeroes of $p(x)$ is

a) 2 b) 3 c) 5 d) 0

43. If zeroes of a polynomial $p(x)$ are $\sqrt{2}$ and $-\sqrt{2}$, then the polynomial which is a factor of $p(x)$ is

a) $x^2 + 2$ b) $x^2 - 2$ c) $x - 2$ d) $x + 2$

44. If α and β are the zeroes of the quadratic polynomial $P(x) = x^2 - 5x + 4$,

then $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$ equals.

a) $\frac{27}{4}$ b) $\frac{-27}{4}$ c) $4/27$ d) $-4/27$

45. If α and β are the zeroes of the polynomial $p(x) = x^2 + px + q$, then a polynomial having $\frac{1}{\alpha} + \frac{1}{\beta}$ as its zeroes is :

a) $x^2 + \frac{px}{q} - \frac{1}{q}$ b) $x^2 - \frac{px}{q} + \frac{1}{q}$ c) $x^2 - \frac{px}{q} - \frac{1}{q}$ d) $x^2 + \frac{px}{q} + \frac{1}{q}$

46. If the zeros of the quadratic polynomial $ax^2 + bx + c$; $c \neq 0$ are equal then
a) c and a have opposite sign b) c and b have opposite sign
c) c and a have same sign d) c and b have same sign

47. The zeroes of the quadratic polynomial $x^2 + 99x + 127$ are
a) both positive b) both negative c) one positive and one negative d) both equal

48. If one of the zeroes of a quadratic polynomial of $x^2 + ax + b$ is the negative of the other, then it
a) has no linear term and the constant term is negative
b) has no linear term and the constant term is positive
c) can have a linear term but the constant term is negative
d) can have a linear term but the constant term is positive

49. The zeroes of the quadratic polynomial $x^2 + kx + x, k \neq 0$
a) cannot both be negative b) cannot both be positive
c) are always unequal d) are always equal

50. A Quadratic polynomial, the sum of whose zeroes is 0 and one zero is 3, is
a) $x^2 - 9$ b) $x^2 + 9$ c) $x^2 + 3$ d) $x^2 - 3$

51. If α, β are the zeroes of the polynomial $f(x) = ax^2 + bx = c$, then $\frac{1}{\alpha^2} + \frac{1}{\beta^2} =$

a) $\frac{b^2 - 2ac}{\alpha^2}$ b) $\frac{b^2 - 2ac}{c^2}$ c) $\frac{b^2 + 2ac}{a^2}$ d) $\frac{b^2 + 2ac}{c^2}$

52. If α , β are the zeroes of the polynomial $f(x) = x^2 - p(x+1) - c$ such that $(\alpha + 1)(\beta + 1) = 0$, then $c =$
a) 1 b) 0 c) -1 d) 2

53. If α , β are the zeroes of the polynomial $f(x) = x^2 - p(x+1) - c$ then $(\alpha + 1)(\beta + 1) =$
a) $c - 1$ b) $1 - c$ c) c d) $1 + c$

54. If α , β are the zeroes of the polynomial $f(x) = x^2 + x + 1$, then $\frac{1}{\alpha} + \frac{1}{\beta} =$

a) 1 b) -1 c) c d) 1+c

55. If α and β are the zeroes of the polynomial $p(x) = 4x^2 + 3x + 7$, then $\frac{1}{\alpha} + \frac{1}{\beta} =$

a) $\frac{7}{3}$ b) $\frac{-7}{3}$ c) $\frac{3}{7}$ d) $\frac{-3}{7}$

56. If one zero of $f(x)=(k^2+4)x^2+13x+4k$ is reciprocal of the other, then $k=$
a) 2 b) -2 c) 1 d) -1

57. The minimum number of polynomials having zeroes as -2 and 5 is
a) 1 b) 2 c)3 d) more than 3

58. If one of the zeroes of $(k-1)x^2+kx+1$ is -3, then the value of k is
a) $4/3$ b) $-4/3$ c) $2/3$ d) $-2/3$

59. If sum of the squares of zeroes of the quadratic polynomial $f(x)=x^2-8x+k$ is 40, find the value of k
a) 12 b) 13 c) 10 d) 11

60. If the squared difference of the zeroes of $f(x)=x^2+px+45$ is equal to 144, find the value of p.
a) ± 18 b) ± 12 c) ± 15 d) 12

X Homework-2 POLYNOMIALS — ANSWERS

1) Let the zeroes be α and $\frac{1}{\alpha}$ and $A = a^2+9; B = 13; C = 6a$

Then, product of zeroes $= \alpha \times \frac{1}{\alpha} = \frac{C}{A}$

$$\Rightarrow 1 = \frac{6a}{a^2+9}$$
$$\Rightarrow a^2+9 = 6a$$
$$\Rightarrow a^2 - 6a + 9 = 0$$
$$\Rightarrow (a-3)^2 = 0 \Rightarrow (a-3)(a-3) = 0$$
$$\therefore a = 3 \text{ (b)}$$

2) Let $p(x) = x^2 + (a+1)x + b$ and $A = 1$, $B = a+1$, $C = b$

Sum of zeroes $= \frac{-B}{A}$

$$\Rightarrow 2 + (-3) = -(a+1)$$
$$\Rightarrow -1 = -a-1$$
$$\Rightarrow -a = 0$$
$$\therefore a = 0$$

Product of zeroes $= \frac{C}{A}$

$$\Rightarrow 2 \times -3 = b$$
$$\therefore b = -6$$

Thus, $a + b = -6$ (d)

3) Let the zeroes of $f(x)$ be α and β.

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

For new polynomial :- let the zeroes be $\frac{1}{\alpha}$ and $\frac{1}{\beta}$

Sum of zeroes $= \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\beta+\alpha}{\alpha\beta} = \frac{\frac{-b}{a}}{\frac{c}{a}} = \frac{-b}{c}$

Product of zeroes $= \frac{1}{\alpha} \times \frac{1}{\beta} = \frac{1}{\alpha\beta} = \frac{1}{c/a} = \frac{a}{c}$

$\therefore$ the required polynomial is

$x^2 - (\text{Sum of zeroes})x + \text{product of zeroes}$

$= x^2 + \frac{b}{c}x + \frac{a}{c} = \frac{1}{c}(cx^2 + bx + a)$ (a)

4) Sum of zeroes $= p+q = \frac{b}{a}$ (a)

5) $p(x) = x^2+7x+10$ | S 7 | P $10 < {5 \atop 2}$

$= (x+5)(x+2)$

$\therefore x = -5, -2$ (a)

6) $p(x) = 4x^2-9=0$

$\Rightarrow 4x^2 = 9$

$\Rightarrow x^2 = \frac{9}{4}$

$\therefore x = \pm \frac{3}{2}$ (b)

7) $A=1, B=-(k+6), C=2(2k-1)$

$\alpha+\beta = \frac{1}{2} \times \alpha\beta$

$\Rightarrow \frac{-B}{A} = \frac{1}{2} \times \frac{C}{A}$

$\Rightarrow k+6 = \frac{1}{\cancel{2}_1} \times \cancel{2}^1(2k-1)$

$\Rightarrow k-2k = -1-6$

$\Rightarrow -k = -7$

$\therefore k = 7$ (c)

8) $p(-4) = 0$

$\Rightarrow (-4)^2-(-4)-2k-2 = 0$

$\Rightarrow 16+4-2-2k = 0$

$\Rightarrow 18-2k = 0$

$-2k = -18$

$k = 9$ (d)

9) $A=2, B=-3, C=1$

$\alpha+\beta = -\frac{B}{A} = \frac{3}{2}$

$\alpha\beta = \frac{C}{A} = \frac{1}{2}$

Sum of zeroes $= 3\alpha+3\beta = 3(\alpha+\beta) = 3\times\frac{3}{2} = \frac{9}{2}$

product of zeroes $= 3\alpha \times 3\beta = 9(\alpha\beta)$

$= 9 \times \frac{1}{2} = \frac{9}{2}$

$\therefore$ The required polynomial $= k[x^2 - (\text{sum of zeroes})x + \text{product of zeroes}]$

$= k[x^2 - \frac{9}{2}x + \frac{9}{2}] = \frac{k}{2}(2x^2-9x+9)$ (d)

10) n (a)

11) $a=1, b=6, c=9$

$\alpha+\beta=-\frac{b}{a}=-6$

$\alpha\beta=\frac{c}{a}=9$

Sum of zeroes $=(-\alpha)+(-\beta)=-\alpha-\beta=-(\alpha+\beta)=6$

product of zeroes $=-\alpha\times-\beta=\alpha\beta=9$

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

$=x^2-6x+9$ (a)

12) $a=1, b=-6, c=k$

$\alpha+\beta=-\frac{b}{a}=6$

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

Given, $3\alpha+2\beta=20$

$\Rightarrow \alpha+2\alpha+2\beta=20$

$\Rightarrow \alpha+2(\alpha+\beta)=20$

$\Rightarrow \alpha+2\times6=20$

$\Rightarrow \alpha=20-12$

$\therefore \alpha=8$

$\beta=-2$

Then $k=\alpha\beta=-8\times2=-16$ (d)

13) $a=5, b=-7, c=-2$

$\alpha+\beta=-\frac{b}{a}=\frac{7}{5}$

$\alpha\beta=\frac{c}{a}=\frac{-2}{5}$

$\therefore$ Sum of reciprocals of zeroes $=\frac{1^{\times\beta}}{\alpha\times\beta}+\frac{1^{\times\alpha}}{\beta\times\alpha}=\frac{\beta+\alpha}{\alpha\beta}$

$=\frac{7}{5}\div\frac{-2}{5}=\frac{7}{5}\times-\frac{5}{2}=\frac{-7}{2}$ (b)

14) $a=4, b=-27, c=3k^2$

$\alpha+\beta=-\frac{b}{a}=\frac{27}{4}$

$\alpha\beta=\frac{c}{a}=\frac{3k^2}{4}$

Given, $\alpha+\beta=\alpha\beta$

$\Rightarrow \frac{27}{\cancel{4}}=\frac{3k^2}{\cancel{4}}$

$3k^2=27$

$k^2=9$

$k=\pm3$ (b)

15) $a = 1, b = -4, c = 3$

$\alpha+\beta = -\frac{b}{a} = 4$

$\alpha\beta = \frac{c}{a} = 3$

For new polynomial:-

Sum of zeroes $= 3\alpha+3\beta = 3(\alpha+\beta) = 3\times4 = \underline{12}$

product of zeroes $= 3\alpha\times3\beta = 9\alpha\beta = 9\times3 = \underline{27}$

$\therefore$ The required polynomial $= x^2-(\text{sum of zeroes})x + \text{product of zeroes}$

$= x^2-12x+27$ (c)

16) $a = 3, b = 2k, c = -k-5$

$\alpha+\beta = \frac{-b}{a} = \frac{-2k}{3}$

$\alpha\beta = \frac{c}{a} = \frac{-k-5}{3}$

Given, $\alpha+\beta = \frac{1}{2}\times\alpha\beta$

$\Rightarrow \frac{\cancel{-}2k}{\cancel{3}} = \frac{1}{2}\times\frac{\cancel{-}(k+5)}{\cancel{3}}$

$\Rightarrow 4k = k+5$

$\Rightarrow 3k = 5$

$k = \frac{5}{3}$ (b)

17) $a = 4, b = 3, c = 7$

$\alpha+\beta = -\frac{b}{a} = \frac{-3}{4}$

$\alpha\beta = \frac{c}{a} = \frac{7}{4}$

$\therefore \frac{1}{\alpha}+\frac{1}{\beta} = \frac{\beta+\alpha}{\alpha\beta} = -\frac{3}{4}\div\frac{7}{4} = \frac{-3}{4}\times\frac{4}{7} = -\frac{3}{7}$ (c)

18) $a = 2, b = 5, c = k$

$\alpha+\beta = -\frac{b}{a} = -\frac{5}{2}$

$\alpha\beta = \frac{c}{a} = \frac{k}{2}$

$\alpha^2+\beta^2+\alpha\beta = \frac{21}{4}$

$\Rightarrow (\alpha+\beta)^2-2\alpha\beta+\alpha\beta = \frac{21}{4}$ $[a^2+b^2 = (a+b)^2-2ab]$

$\Rightarrow \frac{25}{4}-\frac{k}{2} = \frac{21}{4}$

$\frac{k}{2} = \frac{25}{4}-\frac{21}{4}$

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

$\therefore k = 2$ (b)

19) Let $\alpha = 5-3\sqrt{2}$ and $\beta = 5+3\sqrt{2}$

Then, $\alpha+\beta = 5-\cancel{3\sqrt{2}}+5+\cancel{3\sqrt{2}} = 5+5 = 10$

$\alpha\beta = (5-3\sqrt{2})(5+3\sqrt{2}) = 25-18 = 7$

$\therefore$ the required polynomial is $x^2-(\alpha+\beta)x+\alpha\beta$

$= x^2-10x+7$ (a)

20) $a=1, b=-5, c=k$

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

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

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

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

$\Rightarrow 1 = 25-4k$

$\Rightarrow 4k = 25-1$

$k = \frac{24}{4} = 6$ (d)

21) $3^2-5\times3+4 = 9-15+4 = 13-15 = -2$ $\therefore$ 2 should be added (a)

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

$\alpha^2+\beta^2 = (\alpha+\beta)^2-2\alpha\beta = \left(\frac{-b}{a}\right)^2-2\times\frac{c}{a} = \frac{b^2}{a^2}-\frac{2c\times a}{a\times a}$

$= \frac{b^2-2ac}{a^2}$ (b)

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

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

$\alpha^3\beta^2+\alpha^2\beta^3 = \alpha^2\beta^2(\alpha+\beta) = \left(\frac{c}{a}\right)^2\times-\frac{b}{a} = \frac{c^2}{a^2}\times-\frac{b}{a} = \frac{-c^2b}{a^3}$ (b)

24) $\alpha+\beta = 2$; $\alpha\beta = -8$

$\therefore$ the required quadratic polynomial $= x^2-(\alpha+\beta)x+\alpha\beta$

$= x^2-2x-8$ (d)

25) $\alpha+\beta = -\frac{b}{a}$; $\alpha\beta = \frac{c}{a}$

$\frac{1\times\beta}{\alpha\times\beta}+\frac{1\times\alpha}{\beta\times\alpha}-2\alpha\beta = \frac{\beta+\alpha}{\alpha\beta}-2\alpha\beta = -\frac{b}{a}\times\frac{a}{c}-2\times\frac{c\times c}{a\times c}$

$= \frac{-ab-2c^2}{ac}$ (a)

26) $a=3, b=-k, c=6$

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

$\Rightarrow \frac{k}{3} = 3$

$\therefore k = 9$ (c)

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

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

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

28) $\alpha+\beta = -3$

$\alpha\beta = 2$

$\therefore$ the required polynomial is $x^2-(\alpha+\beta)x+\alpha\beta$
$= x^2+3x+2$ (a)

29) $x^2-(\alpha+\beta)x+\alpha\beta = x^2-6x+4$ (a)

30) $a=2, b=-3, c=p$ and $\alpha=3$

$\alpha+\beta = -\frac{b}{a} = \frac{3}{2}$

$\Rightarrow 3+\beta = \frac{3}{2}$

$\therefore \beta = \frac{3}{2}-3 = \frac{3-6}{2} = \frac{-3}{2}$ (a)

31) $p(1)=0$

$\Rightarrow a-3a+3=0$

$\Rightarrow -2a=-3$

$a=\frac{3}{2}$ (d)

32) $a=2, b=7, c=5$

$\alpha+\beta = -\frac{b}{a} = -\frac{7}{2}$

$\alpha\beta = \frac{c}{a} = \frac{5}{2}$

$\therefore (\alpha+\beta)+\alpha\beta = -\frac{7}{2}+\frac{5}{2} = \frac{-2}{2} = -1$ (c)

33) $a=1, b=-5, c=-6$ and $\alpha=6$

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

$\Rightarrow 6+\beta = 5$

$\therefore \beta = 5-6 = -1$ (c)

34) $x^2-(\alpha+\beta)x+\alpha\beta$ (b)

35) $\alpha=\frac{3}{5}$, $\beta=-\frac{1}{2}$

$\alpha+\beta = \frac{3\times2}{5\times2}-\frac{1\times5}{2\times5} = \frac{6-5}{10} = \frac{1}{10}$

$\alpha\beta = \frac{3}{5}\times-\frac{1}{2} = -\frac{3}{10}$

$\therefore$ the required polynomial is

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

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

CamScanner

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

37) $p(-3)=0$

$\Rightarrow 9(k-1)-3k+1=0$

$\Rightarrow 9k-9-3k+1=0$

$\Rightarrow 6k-8=0$

$\Rightarrow 6k=8$

$\therefore k=\frac{8}{6}=\frac{4}{3}$ (a)

38) $a=1, b=7, c=10$

$\alpha+\beta=-\frac{b}{a}=-7$ (b)

39) $\alpha\beta=\frac{-13}{5}$

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

$\therefore$ The required polynomial is

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

$(x^2-\frac{13}{5}x+(\frac{-3}{5}))$ (d)

40) $a=p, b=-2, c=3p$

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

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

$\Rightarrow \frac{2}{\cancel{p}}=\frac{3p}{\cancel{p}}$

$\therefore p=\frac{2}{3}$ (b)

41) $a=2, b=-8, c=6$

$\alpha+\beta=-\frac{b}{a}=\frac{8}{2}=4$ (d)

42) Since the graph intersects the x-axis at 5 points, no. of zeroes = 5 (c)

43) Since $\sqrt{2}$ and $-\sqrt{2}$ are the zeroes of $p(x)$, then $(x-\sqrt{2})(x+\sqrt{2})=x^2-2$ is a factor of $p(x)$ (b)

44) $a=1, b=-5, c=4$

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

$\alpha\beta = \frac{c}{a} = 4$

$\therefore \frac{1\times\beta}{\alpha\times\beta} + \frac{1\times\alpha}{\beta\times\alpha} - 2\alpha\beta = \frac{\beta+\alpha}{\alpha\beta} - 2\alpha\beta = \frac{5}{4} - 2\times 4$

$= \frac{5}{4} - 8 = \frac{5-32}{4} = \frac{-27}{4}$ (b)

45) $A=1, B=p, C=q$

$\alpha+\beta = -\frac{B}{A} = -p$

$\alpha\beta = \frac{C}{A} = q$

$\therefore \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta}$

$= \frac{-p}{q}$

$\frac{1}{\alpha} \times \frac{1}{\beta} = \frac{1}{\alpha\beta} = \frac{1}{q}$

Thus, the required polynomial is $x^2 -$ (sum of zeroes)$x +$ product of zeroes

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

46) Let the zeroes be α and α

Then, product of zeroes $= \alpha^2 = \frac{c}{a} > 0$

$\therefore$ c and a have same sign (c)

47) both negative (b)

48) Let the zeroes be α and $(-\alpha)$

Then the polynomial is $x^2 - (\alpha-\alpha)x + \alpha\times(-\alpha)$

$= x^2 + 0x - \alpha^2$

has no linear term and the constant term is negative (a)

49) cannot be both positive (b)

50) $\alpha+\beta = 0$

$3+\beta = 0$

$\beta = -3$

$\alpha = 3$

$\alpha\beta = 3\times -3 = -9$

$\therefore$ the required quadratic polynomial is

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

$= x^2 - 0x - 9 = x^2 - 9$ (a)

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

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

$\therefore \frac{1}{\alpha^2}+\frac{1}{\beta^2}=\frac{\beta^2+\alpha^2}{\alpha^2\beta^2}=\frac{(\alpha+\beta)^2-2\alpha\beta}{(\alpha\beta)^2}=\frac{\frac{b^2}{a^2}-\frac{2c^{\times a}}{a\times a}}{\frac{c^2}{a^2}}$

$=\frac{b^2-2ac}{a^2}\times\frac{a^2}{c^2}=\frac{b^2-2ac}{c^2}$ (b)

52) $a=1, b=-p, c=-p-c$
$\alpha+\beta=-b/a=p$; $\alpha\beta=c/a=-p-c$
$(\alpha+1)(\beta+1)=0$
$\Rightarrow \alpha\beta+(\alpha+\beta)+1=0$
$\Rightarrow -\cancel{p}-c+\cancel{p}+1=0$
$-c=-1$
$\therefore c=1$ (a)

53) $a=1, b=-p, c=-p-c$
$\alpha+\beta=-\frac{b}{a}=p$

$\alpha\beta=\frac{c}{a}=-p-c$

$\therefore (\alpha+1)(\beta+1)$
$=\alpha\beta+(\alpha+\beta)+1$
$=-\cancel{p}-c+\cancel{p}+1$
$=1-c$ (b)

54) $a=1, b=1, c=1$
$\alpha+\beta=-\frac{b}{a}=-1$

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

$\therefore \frac{1^{\times\beta}}{\alpha\times\beta}+\frac{1^{\times\alpha}}{\beta\times\alpha}=\frac{\beta+\alpha}{\alpha\beta}=\frac{-1}{1}=-1$ (b)

55) $a=4, b=3, c=7$
$\alpha+\beta=-\frac{b}{a}=-\frac{3}{4}$

$\alpha\beta=\frac{7}{4}$

$\frac{1}{\alpha}+\frac{1}{\beta}=\frac{\beta+\alpha}{\alpha\beta}=-\frac{3}{4}\times\frac{4}{7}=\frac{-3}{7}$ (d)

56) Let the zeroes be α and $\frac{1}{\alpha}$; $a = k^2+4$, $b = 13$, $c = 4k$

Then, product of zeroes $= \alpha \times \frac{1}{\alpha} = \frac{c}{a}$

$$\Rightarrow 1 = \frac{4k}{k^2+4}$$
$$\Rightarrow k^2+4 = 4k$$
$$\Rightarrow k^2-4k+4 = 0$$
$$\Rightarrow (k-2)^2 = 0$$
$$k = 2 \text{ (a)}$$

57) more than 3 (d)

58) $p(-3) = 0$

$$\Rightarrow 9(k-1) - 3k + 1 = 0$$
$$\Rightarrow 9k - 9 - 3k + 1 = 0$$
$$6k - 8 = 0$$
$$k = \frac{8}{6} = \frac{4}{3} \text{ (a)}$$

59) $a = 1$, $b = -8$, $c = k$

$$\alpha + \beta = \frac{-b}{a} = 8$$
$$\alpha\beta = \frac{c}{a} = k$$
$$\alpha^2 + \beta^2 = (\alpha+\beta)^2 - 2\alpha\beta = 40$$
$$\Rightarrow 64 - 2k = 40$$
$$\Rightarrow -2k = -24$$
$$k = 12 \text{ (a)}$$

60) $a = 1$, $b = p$, $c = 45$

$$\alpha + \beta = -\frac{b}{a} = -p$$
$$\alpha\beta = \frac{c}{a} = 45$$
$$(\alpha-\beta)^2 = (\alpha+\beta)^2 - 4\alpha\beta$$
$$144 = p^2 - 4 \times 45$$
$$p^2 = 144 + 180 = 324$$
$$\therefore p = \pm 18 \text{ (a)}$$