EASY AND SCORING QUESTIONS FOR SLOW BLOOMERS

CHAPTER- POLYNOMIAL

Level 1 (1 mark)

1. The number of zeroes, the polynomial $f(x) = (x - 3)^2 + 1$ can have is :
(a) 0 (b) 1 (c) 2 (d) 3
Ans: c

2. The graph of the polynomial $p(x)$ cuts the x-axis 5 times and touches it 3 times. The number of zeroes of $p(x)$ is : (a) 5 (b) 3 (c) 8 (d) 2
Ans: c

3. If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and –3, then :
(a) $a = -7, b = -1$ (b) $a = 5, b = -1$
(c) $a = 2, b = -6$ (d) $a = 0, b = -6$
Ans :d

4 . The zeroes of the quadratic polynomial $x^2 + 89x + 720$ are :
(a) both are negative
(b) both are positive
(c) one is positive and one is negative
(d) both are equal
Ans:a

Level 2 (2marks)

Q.5 If α and β are zeros of the Polynomial $3x^2+5x+2$, Find the value of $\frac{1}{\alpha}+\frac{1}{\beta}$

Ans: $3x^2+5x+2$

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

$$\alpha\beta=\frac{2}{3}$$

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

Q.6 Find the zeros of the quadratic polynomial $6x^2 - 7x - 3$ and verify the relationship between the zeros and the coefficients.

Ans: $P(x) = 6x^2 - 7x - 3$

$= 6x^2 - 9x + 2x - 3$

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

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

$x = 3/2$, $x = -1/3$ (1Marks)

Now sum of zeroes = $3/2 - 1/3 = 7/6$ (1 Marks)

Also sum of zeroes = $-b/a = -(-7)/6 = 7/6$

Product . of zeroes = $3/2 \times -1/3 = -1/2$

also product . of zeroes = $c/a = -3/6 = -1/2$

Q.7 Write the zeroes of the polynomial $x^2 - x - 6$.

Ans: $x^2 - x - 6$

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

$= (x-3)(x+2)$, now zeroes of $x^2 - x - 6$ are $x-3 = 0$ and $x+2 = 0$

or $x = 3$, $x = -2$

Q8 Find a quadratic polynomial with sum of zeroes = ¼ and product of zeroes 1/4.

Ans:A quadratic polynomial with sum of zeroes=S and product of zeroes=P is

$= x^2 - Sx + p$

$= x^2 - x/4 + 1/4$

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

Therefore, quadratic polynomial whose S= ¼, P=1/4 is $4x^2 - x + 1$

Level 3 (3 marks)

Q.9. Find the zeroes of quadratic x^2-2x-8 and verify the relationship between the zeroes and their co-efficient.

Ans: . We have $f(x) = x^2 - 2x - 8$

$= x^2 - 4x + 2x - 8$

$= x(x - 4) + 2(x - 4)$

= (x -4)(x +2)

Zeroes of f(x) is f(x) = 0

(x + 2) and (x – 4)=0
X + 2 = 0 and x – 4 = 0
X = -2 and x = 4
Therefore Zeroes of f(x) is $\alpha = -2$, $\beta = 4$

Sum of zeroes = $\alpha + \beta$ = -2 + 4 = 2

And $\frac{cofficient of x}{cofficient of x2}$ = $\frac{-(-2)}{1}$ = 2

Product of zeroes = $\alpha\beta$ = (-2)4 = -8

And $\frac{constant term}{cofficient\ of\ x2}$ = $\frac{-8}{1}$ = -8

Q.10 Obtain all other zeroes of $3x^4+6x^3-2x^2-10x-5$, if two of its zeros are √5/3 and - √5/3

. Ans: Since $\sqrt{\frac{5}{3}}$ and -$\sqrt{\frac{5}{3}}$ are two zeroes of f(x)

$\therefore \left(x - \sqrt{\frac{5}{3}}\right)(x + \sqrt{\frac{5}{3}}) = x^2 - \frac{5}{3}$ is a factor of

$\Rightarrow 3x^2 - 5$ is a factor of p(x)

3x+6x-2x-10x-5 = (x+$\sqrt{\frac{5}{3}}$) (n-$\sqrt{\frac{5}{3}}$) (n+1)(n+1) ∴ $zeroes of p(x) are$

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

Q.11Find the zeros of the polynomial $4\sqrt{3}x^2 + 5x - 2\sqrt{3}$.

Ans: $4\sqrt{3}x^2 + 5x - 2\sqrt{3}$

Product = $4\sqrt{3}$ x $2\sqrt{3}$ = 24
Sum = 5
We have F (x) = $4\sqrt{3}x^2 + 8x - 3x - 2\sqrt{3}$
F (x) = $4x(\sqrt{3x} + 2)$-$\sqrt{3}(\sqrt{3}x + 2)$
F (x) = $(\sqrt{3x} + 2)(4x - \sqrt{3})$

Zeroes of f[x] is given by

If F (x) = 0

$$(\sqrt{3x}+2)(4x-\sqrt{3})=0$$

$$(\sqrt{3x}+2)=0 and 4x-\sqrt{3}=0$$

x = $\frac{-2}{\sqrt{3}}$ x = $\frac{-\sqrt{3}}{4}$

Hence Zeroes of f (x) is α = $\frac{-2}{\sqrt{3}}$ and β = $\frac{\sqrt{3}}{4}$

Q.12 If m and n are the zeros of the polynomial $3x^2$+ 11x- 4, find the value of $\frac{m}{n}+\frac{n}{m}$.

Ans: Since m and n are the zeroes of $3x^2$ + 1 1x – 4

∴ m+n = $-\frac{11}{3}$ and mn = $-\frac{4}{3}$

Now, $\frac{m}{n}+\frac{n}{m}=\frac{m^2+n^2}{mn}=\frac{(m+n)^2-2mn}{mn}$

$$\frac{(-\frac{11}{3})^2-2(-\frac{4}{3})}{-\frac{4}{3}} = -\frac{145}{12}$$

Level 4 (4 marks)

13. If p and q are the zeroes of polynomial ax^2-5x+c, find the values of a and c, if p+q = pq=10

Ans:

Given polynomial is

$f(x)=ax^2-5x+c$

sum of zeroes p+q = $\frac{5}{a}$

Product of zeroes, pq = $\frac{c}{a}$

Given, $p+q=pq=10$

$\frac{5}{a}=10 \Rightarrow a=\frac{1}{2}$ (i)

Also, $\frac{c}{a}=10$

$\Rightarrow \frac{c}{\frac{1}{2}}=10$ [∵ from Eq.(i)]

$\Rightarrow \quad 2c = 10 \Rightarrow c = 5$

Hence, the values of a and c are $\frac{1}{2}$ and 5.

14. If the sum of the squares of zeroes of the polynomial $6x^2+x+k$ is 25/36, find the value of k?

Ans: . a=6 , b=1 , c=k

$\alpha^2+\beta^2=25/36$

$\alpha + \beta = -b/a = -1/6$

$\alpha\beta = c/a = k/6$

Now, $(\alpha+\beta)^2 = \alpha^2 + \beta^2 + 2\alpha\beta$

$(-1/6)^2 = 25/36 + 2xk/6$

$1/36 = 25/36 + 2xk/6$

$2k/6 = 1/36 – 25/36 = -24/36$

$k/3 = -24/36$

k= = $(-\frac{24}{36})$x3 = -2

15. If α and β are two zeroes of the quadratic polynomial $p(x) =2x^2 – 3x+7$, find :-

a) $1/\alpha + 1/\beta$ b) $\alpha^2+\beta^2$

Ans: $2x^2-3x+7$

a = 2 b= -3 c= 7

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

$\alpha\beta = \frac{c}{a} = \frac{7}{2}$

now, $\frac{1}{\alpha}+\frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta}$

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

$= \frac{3}{2} X \ \frac{2}{7}$

$= \frac{3}{7}$

b) $(\alpha+\beta)^2 = \alpha^2 + \beta^2 + 2\alpha\beta$

$(\frac{3}{2})^2 = \alpha^2 + \beta^2 + 2\frac{7}{2}$

$\alpha^2 + \beta^2 = \frac{9}{4} - 7 = -\frac{19}{4}$

16. Find the value a for which polynomial $x^4 + 10x^3 + 25x^2 + 15x + a$ is exactly divisible by x+7

Ans: Let $P(x) = x^4 + 10\,x^3 + 25\,x^2 + 15\,x + a$

and $g(x) = x + 7$

Since, p(x) is exactly divisible by g(x)

$\therefore$ r(x) = 0

$$\begin{array}{r|l} & x^3 + 3x^2 + 4x - 13 \\ \hline x+7 & x^4 + 10x^3 + 25x^2 + 15x + a \\ & x^4 + 7x^3 \\ & - \quad - \\ \hline & 3x^3 + 25x^2 \\ & 3x^3 + 21x^2 \\ & - \quad - \\ \hline & 4x^2 + 15x \\ & 4x^2 + 28x \\ & - \quad - \\ \hline & -13x + a \\ & -13x - 91 \\ & + \quad + \\ \hline & a+91 \end{array}$$

Now,

From Eq. (i) $\therefore$ a+91 = 0 $\Rightarrow$ a = -91