STD 10 Maths
Polynomials Worksheet -2

Total Marks : 30

*** Choose the right answer from the given options. [1 Marks Each]** [30]

1. If one zero of the quadratic polynomial x^2+3x+k is 2 , then the value of k is
(A) 10 (B) -10 (C) 5 (D) -5

Ans. : B

2. If α, β are the zeros of the polynomial $f(x)=x^2+x-1$, then $\frac{1}{\alpha}+\frac{1}{\beta}=$
(A) 1 (B) -1 (C) 0 (D) none of these

Ans. : A

3. If α, β are the zeros of the polynomial $p(x)=5x^2+3x-7$, then $\frac{1}{\alpha}+\frac{1}{\beta}$ is equal to
(A) $-\frac{3}{7}$ (B) $\frac{3}{5}$ (C) $\frac{3}{7}$ (D) $-\frac{5}{7}$

Ans. : (C) $\frac{3}{7}$

4. The number of polynomials having zeros -3 and 5 is
(A) 1 (B) 2 (C) 3 (D) more than 3

Ans. : D

5. If α, β are the zeros of the polynomial $f(x)=ax^2+bx+c$, then $\frac{1}{\alpha^2}+\frac{1}{\beta^2}=$
(A) $\frac{b^2-2ac}{a^2}$ (B) $\frac{b^2-2ac}{c^2}$ (C) $\frac{b^2+2ac}{a^2}$ (D) $\frac{b^2+2ac}{c^2}$

Ans. : B

6. If α, β are the zeros of polynomial $f(x)=x^2-p(x+1)-c$, then $(\alpha+1)(\beta+1)=$
(A) $c-1$ (B) $1-c$ (C) c (D) $1+c$

Ans. : B

7. What should be subtracted to the polynomial $x^2-16x+30$, so that 15 is the zero of the resulting polynomial?
(A) 30 (B) 14 (C) 15 (D) 16

Ans. : C

8. If $x+2$ is a factor of $x^2+ax+2b$ and $a+b=4$, then
(A) $a=1, b=3$ (B) $a=3, b=1$ (C) $a=-1, b=5$ (D) $a=5, b=-1$

Ans. : B

9. 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

10. If α and β are the zeroes of the polynomial $x^2-(k+6)x+2(2k-1)$ such that $\alpha+\beta=\frac{\alpha\beta}{2}$, then the value of k is
(A) 6 (B) 2 (C) 14 (D) 7

Ans. : (D) 7

11. If α and β are the zeroes of the polynomial x^2-1 , then the value of $(\alpha+\beta)$ is
(A) 2 (B) 1 (C) -1 (D) 0

Ans. : D

12. Which of the following is a quadratic polynomial having zeroes $-\frac{2}{3}$ and $\frac{2}{3}$?
(A) $4x^2-9$ (B) $\frac{4}{9}\left(9x^2+4\right)$ (C) $x^2+\frac{9}{4}$ (D) $5\left(9x^2-4\right)$

Ans. : D

13. If α, β are the zeroes of the polynomial $p(x)=4x^2-3x-7$, then $\frac{1}{\alpha}+\frac{1}{\beta}$ is equal to
(A) $\frac{7}{3}$ (B) $-\frac{7}{3}$ (C) $\frac{3}{7}$ (D) $-\frac{3}{7}$

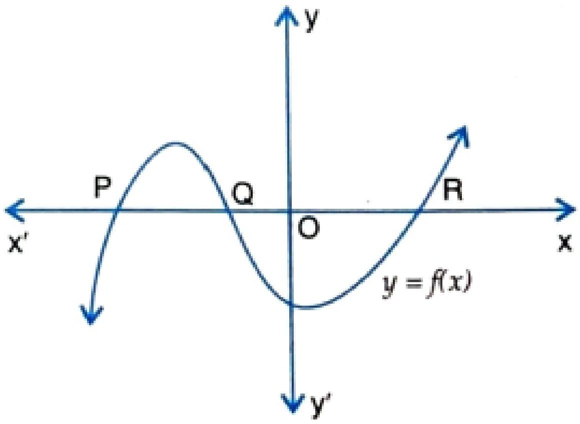
Ans. : D

14. If a polynomial $p(x)$ is given by $p(x)=x^2-5x+6$, then the value of $p(1)+p(4)$ is

(A) 0 (B) 4 (C) 2 (D) -4

Ans. : (B) 4

15. The graph of a polynomial $f(x)$ is shown in Fig. The number of zeroes of $f(x)$ is



(A) 3 (B) 2 (C) 1 (D) 4

Ans. : (A) 3

We observe that the curve $y = f(x)$ crosses x-axis at three distinct points. So, the polynomial $f(x)$ has three zeros.

16. If the sum of the zeroes of the polynomial $p(x) = 2x^2 - k\sqrt{2}x + 1$ is $\sqrt{2}$, then the value of k is

(A) $\sqrt{2}$ (B) 2 (C) $2\sqrt{2}$ (D) $1/2$

Ans. : (B) 2

We find that:

Sum of the zeroes $= -\frac{-k\sqrt{2}}{2} = \frac{k}{\sqrt{2}}$

$\Rightarrow \quad \sqrt{2} = \frac{k}{\sqrt{2}}$ $[\because$ Sum of the zeroes $= \sqrt{2}$ (given) $]$

$\Rightarrow \quad k = 2$

17. If one zero of the polynomial $6x^2 + 37x - (k-2)$ is reciprocal of the other, then what is the value of k ?

(A) -4 (B) -6 (C) 6 (D) 4

Ans. : (A) -4

Let α, β be the zeroes of polynomial $6x^2 + 37x - (k-2)$ such that

$\beta = \frac{1}{\alpha} \Rightarrow \alpha\beta = 1 \Rightarrow \frac{-(k-2)}{6} = 1 \Rightarrow k - 2 = -6 \Rightarrow k = -4$

18. The zeroes of the polynomial $p(x) = x^2 + 4x + 3$ are given by

(A) 1,3 (B) $-1,3$ (C) $1,-3$ (D) $-1,-3$

Ans. : (D) $-1,-3$

We have,

$p(x) = x^2 + 4x + 3 = (x+1)(x+3)$

So, the zeroes of $p(x)$ are given by

$p(x) = 0 \Rightarrow (x+1)(x+3) = 0 \Rightarrow x + 1 = 0 \text{ or, } x + 3 = 0 \Rightarrow x = -1, -3$

19. The zeroes of a polynomial $x^2 + px + q$ are twice the zeroes of the polynomial $4x^2 - 5x - 6$. The value of p is

(A) $-\frac{5}{2}$ (B) $\frac{5}{2}$ (C) -5 (D) 10

Ans. : (A) $-\frac{5}{2}$

Let α, β be the zeroes of $4x^2 - 5x - 6$. Then, $2\alpha, 2\beta$ are zeroes of $x^2 + px + q$.

$\therefore \quad \alpha + \beta = -\frac{-5}{4} \text{ and } 2\alpha + 2\beta = -p$

$\Rightarrow \quad \alpha + \beta = \frac{5}{4} \text{ and } 2(\alpha + \beta) = -p \Rightarrow 2 \times \frac{5}{4} = -p \Rightarrow p = -\frac{5}{2}$

20. If α and β are the zeroes of the quadratic polynomial $p(x) = x^2 - ax - b$, then the value of $\alpha^2 + \beta^2$ is

(A) $a^2 - 2b$ (B) $a^2 + 2b$ (C) $b^2 - 2a$ (D) $b^2 + 2a$

Ans. : (B) $a^2 + 2b$

Given that α and β are the zeroes of the polynomials $p(x) = x^2 - ax - b$.

$\therefore \quad \alpha + \beta = a \text{ and } \alpha\beta = -b$

Hence, $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta = a^2 + 2b$.

21. If $(a-2)x^2 + 3x - 5$ is a quadratic polynomial, then

(A) a can take any real value
(B) a can take any non-zero value
(C) $a \neq 2$
(D) $a = 2$

Ans. : (C) $a \neq 2$
If $(a-2)x^2+3x-5$ is a quadratic polynomial, then $a-2 \neq 0$ i.e. $a \neq 2$.

22. If zeroes of the quadratic polynomial $f(x)=\left(k^2+4\right)x^2+7x+4k$ are reciprocal of each other, then the value (s) of k is (are)
(A) 1
(B) -1
(C) 2
(D) -2

Ans. : (C) 2
Let α and $\frac{1}{\alpha}$ be zeroes of $f(x)$. Then,
$\alpha \times \frac{1}{\alpha}=\frac{4k}{k^2+4} \Rightarrow k^2+4=4k \Rightarrow (k-2)^2=0 \Rightarrow k=2$

23. The zeroes of the polynomial $x^2+\frac{1}{6}x-2$ are
(A) $-3,4$
(B) $-\frac{3}{2},\frac{4}{3}$
(C) $-\frac{4}{3},\frac{3}{2}$
(D) $-\frac{4}{3},-\frac{3}{2}$

Ans. : (B) $-\frac{3}{2},\frac{4}{3}$
Let $f(x)=x^2+\frac{1}{6}x-2$. Then,
$f(x)=\frac{1}{6}\left(6x^2+x-12\right)=\frac{1}{6}\left(6x^2+9x-8x-12\right)=\frac{1}{6}\{3x(2x+3)-4(2x+3)\}=\frac{1}{6}(2x+3)(3x-4)$
Zeroes of $f(x)$ are given by
$f(x)=0 \Rightarrow \frac{1}{6}(2x+3)(3x-4)=0 \Rightarrow 2x+3=0 \text{ or } 3x-4=0 \Rightarrow x=-\frac{3}{2},\frac{4}{3}$

24. If the product of two zeros of the polynomial $f(x)=2x^3+6x^2-4x+9$ is 3 , then its third zero is
(A) $\frac{3}{2}$
(B) $-\frac{3}{2}$
(C) $\frac{9}{2}$
(D) $-\frac{9}{2}$

Ans. : (B) $-\frac{3}{2}$
Let α,β,γ be three zeroes of $f(x)=2x^3+6x^2-4x+9$ such that $\alpha\beta=3$. But it is given that
Product of zeroes $=-\frac{9}{2} \Rightarrow \alpha\beta\gamma=-\frac{9}{2} \Rightarrow 3\gamma=-\frac{9}{2} \Rightarrow \gamma=-\frac{3}{2}$
Hence, the third zero is $-\frac{3}{2}$.

25. If two zeros of the polynomial $f(x)=x^3+x^2-5x-5$ are $\sqrt{5}$ and $-\sqrt{5}$, then its third zero is
(A) 1
(B) -1
(C) 2
(D) -2

Ans. : (B) -1
Let the third zero of $f(x)$ be α. Then,
Sun of the zeroes $=-\frac{\text{Coeff.of } x^2}{\text{Coeff.of } x^3} \Rightarrow \sqrt{5}+(-\sqrt{5})+\alpha=-\frac{1}{1} \Rightarrow \alpha=-1$

26. If α,β,γ are the zeroes of the polynomial $f(x)=ax^3+bx^2+cx+d$, then $\alpha^2+\beta^2+\gamma^2=$
(A) $\frac{b^2-ac}{a^2}$
(B) $\frac{b^2-2ac}{a}$
(C) $\frac{b^2+2ac}{b^2}$
(D) $\frac{b^2-2ac}{a^2}$

Ans. : (D) $\frac{b^2-2ac}{a^2}$
It is given that α,β,γ are the zeroes of $f(x)=ax^3+bx^2+cx+d$. Therefore,
$\alpha+\beta+\gamma=-\frac{b}{a} \text{ and } \alpha\beta+\beta\gamma+\gamma\alpha=\frac{c}{a}$
$\therefore \quad \alpha^2+\beta^2+\gamma^2=(\alpha+\beta+\gamma)^2-2(\alpha\beta+\beta\gamma+\gamma\alpha) \Rightarrow \alpha^2+\beta^2+\gamma^2=\left(-\frac{b}{a}\right)^2-\frac{2c}{a}=\frac{b^2-2ac}{a^2}$

27. If α,β,γ are the zeroes of the polynomial $f(x)=x^3-px^2+qx-r$, then $\frac{1}{\alpha\beta}+\frac{1}{\beta\gamma}+\frac{1}{\gamma\alpha}$ is equal to
(A) $\frac{r}{p}$
(B) $\frac{p}{r}$
(C) $-\frac{p}{r}$
(D) $-\frac{r}{p}$

Ans. : (B) $\frac{p}{r}$
It is given that α,β,γ are zeroes of $f(x)=x^3-px^2+qx-r$.
$\therefore \quad \alpha+\beta+\gamma=p, \alpha\beta+\beta\gamma+\gamma\alpha=q \text{ and } \alpha\beta\gamma=r$
Hence, $\quad \frac{1}{\alpha\beta}+\frac{1}{\beta\gamma}+\frac{1}{\gamma\alpha}=\frac{\alpha+\beta+\gamma}{\alpha\beta\gamma}=\frac{p}{r}$

28. If α,β are the zeros 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

Ans. : (A) 1
It is given that α,β are the zeroes of $f(x)=x^2-px-(p+c)$.
$\therefore \quad \alpha+\beta=p$ and $\alpha\beta=-(p+c)$
Now, $\quad (\alpha+1)(\beta+1)=0 \Rightarrow \alpha\beta+(\alpha+\beta)+1=0 \Rightarrow -p-c+p+1=0 \Rightarrow c=1$

29. The zeros of the quadratic polynomial $f(x)=x^2+99x+127$ are

(A) both positive
(B) both negative
(C) one positive and one negative
(D) both equal

Ans. : (B) both negative

Let α,β be the zeros of the quadratic polynomial $f(x)=x^2+99x+127$. Then, $\alpha+\beta=-99$ and $\alpha\beta=127$
Thus, the sum of the zeros is negative and product is positive. Therefore, α and β both are negative.

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

(A) 1
(B) 2
(C) 4
(D) 5

Ans. : (B) 2

Let the number be c. Then, 3 is a zero of the polynomial $x^2-5x+4+c$.

$\therefore \quad 9-15+4+c=0 \Rightarrow c-2=0 \Rightarrow c=2$

ALITER Let $f(x)=x^2-5x+4$. Then, the remainder when $f(x)$ is divided by 3 is $f(3)$. Thus, if we add $-f(3)$ to $f(x)$ the remainder will be zero and hence 3 will be a zero of the resulting polynomial.

$\therefore \quad \text{Required number } =-f(3)=-(9-15+4)=2$

----- -----