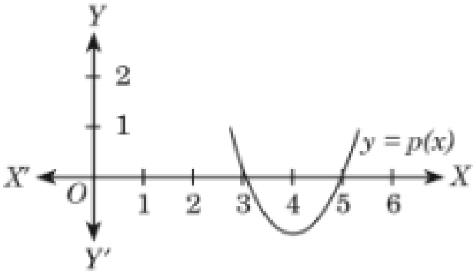
*** Choose the right answer from the given options. [1 Marks Each]** **[30]**

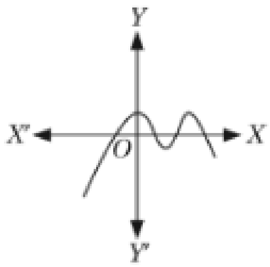
1. In the figure, graph of a polynomial $p(x)$ is given. Find the zeroes of $p(x)$.



(A) $-3, 4$ (B) 3, 5 (C) $-3, 5$ (D) 3, 4

Ans. : (b) : Since, the graph of the polynomial $p(x)$ intersects the x-axis at two points i.e, $x = 3$ and $x = 5$. Therefore, 3 and 5 are the zeroes of $p(x)$.

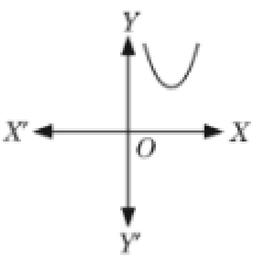
2. The number of zeroes of the polynomial shown in the graph are

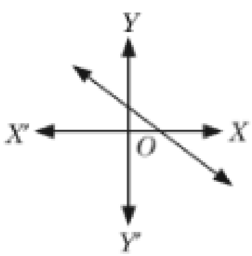


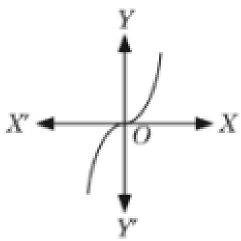
(A) 3 (B) 4 (C) 1 (D) 2

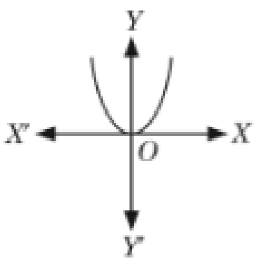
Ans. : (b) : The number of zeroes of the polynomial shown in the graph is four, as the graph intersects the x-axis at four distinct points.

3. Which of the following figure represents the graph of linear polynomial?

(A) 

(B) 

(C) 

(D) 

Ans. : (b) : We know, graph of linear polynomial is a straight line. Only in option (b), the graph is a straight line. So, it represents linear polynomial

4. The zeroes of the quadratic polynomial $x^2 + 25x + 156$ are

(A) both positive (B) both negative

(C) one positive and one negative (D) can't be determined

Ans. : (b) : Let α and β be the zeroes of $x^2 + 25x + 156$.
Then, $\alpha + \beta = -25$ and $\alpha\beta = 156$
This happens when α and β are both negative.

5. If one root of the polynomial $f(x) = 3x^2 + 11x + p$ is reciprocal of the other, then the value of p is

(A) 0 (B) 3 (C) $\frac{1}{3}$ (D) -3

Ans. : (b) : Let α and $\frac{1}{\alpha}$ be the roots of $f(x) = 3x^2 + 11x + p$
$\therefore$ Product of roots $= \alpha \cdot \frac{1}{\alpha} = \frac{p}{3} \Rightarrow p = 3$

6. If the sum of the zeroes of the quadratic polynomial $kx^2 + 4x + 3k$ is equal to their product, then the value of k is

(A) $-\frac{3}{4}$ (B) $\frac{3}{4}$ (C) $\frac{4}{3}$ (D) $-\frac{4}{3}$

Ans. : (d) : Let α and β be the zeroes of polynomial $kx^2+4x+3k$
According to question,
$\alpha+\beta=\alpha\beta \Rightarrow -\frac{4}{k}=\frac{3k}{k} \Rightarrow -\frac{4}{k}=3 \Rightarrow k=-\frac{4}{3}$

7. The zeroes of the quadratic polynomial x^2+kx+k , where $k>0$
(A) are both positive
(B) are both negative
(C) are always equal
(D) are always unequal

Ans. : (b) : Let α and β be the zeroes of x^2+kx+k .
Then, $\alpha+\beta=-k$ and $\alpha\beta=k$.
This is possible only when α and β are both negative.

8. If the sum of the zeroes of the polynomial $p(x)=\left(p^2-23\right)x^2-2x-12$ is 1 , then p takes the value(s) are
(A) $\sqrt{23}$
(B) -23
(C) 2
(D) ± 5

Ans. : (d) : Let α and β be the zeroes of the polynomial $p(x)=\left(p^2-23\right)x^2-2x-12$.
Then $\alpha+\beta=-\frac{(-2)}{p^2-23}=\frac{2}{p^2-23}$
Also, sum of zeroes $=\alpha+\beta=1$ [Given]
$\Rightarrow p^2-23=2 \Rightarrow p^2=25 \Rightarrow p=\pm 5$

9. The zeroes of the polynomial x^3-x are
(A) $0, \pm 2$
(B) $0, \pm 1$
(C) $0, \pm 3$
(D) $0, \pm 4$

Ans. : (b) : Let $f(x)=x^3-x$
$=x\left(x^2-1\right)=x(x-1)(x+1)$
$f(x)$ is zero, when $x=0$ or $x-1=0$ or $x+1=0$
i.e., $x=0,1,-1$.

10. If one of the zeroes of the quadratic polynomial bx^2+cx+d is 0 , then the other zero is
(A) $-\frac{b}{d}$
(B) $-\frac{c}{b}$
(C) $\frac{b}{d}$
(D) $\frac{c}{b}$

Ans. : (b): Let α, β be the zeroes of bx^2+cx+d .
$\therefore$ Sum of zeroes $=-\frac{c}{b}$
Now one zero $=0$ [Given]
$\therefore$ Other zero $=-\frac{c}{b}$

11. The zeroes of polynomial x^2-5x+6 are
(A) $-1,0$
(B) 4,5
(C) 3,2
(D) None of these

Ans. : (c) : The given polynomial is $x^2-5x+6=x^2-3x-2x+6=(x-3)(x-2)$
So, $x^2-5x+6=0$ when $x=3$ or $x=2$.
Hence, zeroes of x^2-5x+6 are 3 and 2 .

12. For what value of $p, 1$ is a zero of the polynomial $f(x)=2x^2+5x-(3p+1)$?
(A) 3
(B) 5
(C) 2
(D) -1

Ans. : (c) : Since 1 is a zero of the polynomial
$f(x)=2x^2+5x-(3p+1)$, then $f(1)=0$
i.e., $2(1)^2+5(1)-(3p+1)=0$
$\Rightarrow 2+5-3p-1=0 \Rightarrow p=2$

13. The zeroes of the polynomial $f(x)=x^2-2\sqrt{2}x-16$ are
(A) $\sqrt{2},-\sqrt{2}$
(B) $4\sqrt{2},-2\sqrt{2}$
(C) $-4\sqrt{2}, 2\sqrt{2}$
(D) $4\sqrt{2}, 2\sqrt{2}$

Ans. : (b) : The zeroes of $f(x)=x^2-2\sqrt{2}x-16$ are given by

$f(x)=0$ i.e., $x^2-2\sqrt{2}x-16=0$
$\Rightarrow \quad x^2-4\sqrt{2}x+2\sqrt{2}x-16=0$
$\Rightarrow \quad x(x-4\sqrt{2})+2\sqrt{2}(x-4\sqrt{2})=0$
$\Rightarrow \quad (x+2\sqrt{2})(x-4\sqrt{2})=0$
$\Rightarrow \quad x=4\sqrt{2}$ or $x=-2\sqrt{2}$

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

Ans. : (b): The zeroes of the polynomial $f(x)=x^2+x-\frac{3}{4}$ are given by $f(x)=0$.

$\Rightarrow x^2+x-\frac{3}{4}=0 \Rightarrow 4x^2+4x-3=0$
$\Rightarrow 4x^2+6x-2x-3=0 \Rightarrow 2x(2x+3)-1(2x+3)=0$
$\Rightarrow (2x-1)(2x+3)=0 \Rightarrow 2x-1=0$ or $2x+3=0$
$\Rightarrow x=\frac{1}{2}$ or $x=-\frac{3}{2}$.

15. If one zero of the quadratic polynomial $2x^2-8x-m$ is $5/2$, then find the other zero.

(A) $\frac{1}{2}$ (B) $\frac{3}{2}$ (C) $\frac{-3}{2}$ (D) $\frac{-1}{2}$

Ans. : (b) : Let α, β be two zeroes of $2x^2-8x-m$, where $\alpha=5/2$.

$\therefore \alpha+\beta=\frac{(-\text{ Coefficient of } x)}{\text{Coefficient of } x^2}$
$\Rightarrow \frac{5}{2}+\beta=\frac{8}{2} \Rightarrow \beta=\frac{8}{2}-\frac{5}{2}=\frac{3}{2}$

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

(A) $\frac{4}{3}$ (B) $\frac{-4}{3}$ (C) $\frac{2}{3}$ (D) $\frac{-2}{3}$

Ans. : (a) : Let $p(x)=(k-1)x^2+kx+1$
Given that, one of the zeroes is -3 , then $p(-3)=0$

$\Rightarrow \quad (k-1)(-3)^2+k(-3)+1=0$
$\Rightarrow 9(k-1)-3k+1=0 \Rightarrow 6k-8=0 \Rightarrow k=4/3$

17. Is $x=-2$ a zero of the polynomial $p(x)=x^2-2x+8$?

(A) Yes (B) No
(C) May or may not be (D) Can't be determined

Ans. : (b) : If $x=-2$ is a zero of $p(x)=x^2-2x+8$, then $p(-2)=0$.

$\therefore p(-2)=(-2)^2-2(-2)+8$
$=4+4+8=16 \neq 0$
Thus, $x=-2$ is not a zero of $p(x)$.

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

(A) 1 (B) 2 (C) -1 (D) -2

Ans. : (a) : Since it is given that, 1 is a zero of polynomial

$p(x)=ax^2-3(a-1)x-1 . \therefore p(1)=0$
$\Rightarrow p(1)=a(1)^2-3(a-1)(1)-1=0$
$\Rightarrow a-3a+3-1=0 \Rightarrow -2a=-2 \Rightarrow a=1$

19. If one zero of the polynomial $x^2-5x+3+\sqrt{3}$ is $2+\sqrt{3}$, then the other zero is

(A) $1-\sqrt{3}$ (B) $2-\sqrt{3}$ (C) $3-\sqrt{3}$ (D) $2+\sqrt{3}$

Ans. : (c) : Let α and β be two zeroes of polynomial

$x^2-5x+3+\sqrt{3}$
$\therefore \quad \alpha+\beta=-\frac{(-5)}{1} \Rightarrow 2+\sqrt{3}+\beta=5[\because \alpha=2+\sqrt{3} \text{ (Given) }]$
$\Rightarrow \quad \beta=5-2-\sqrt{3}=3-\sqrt{3}$

20. If α, β are the zeroes of the polynomial $2y^2+5y+3$, then the value of $\alpha+\beta+\alpha\beta$ is

(A) -2 (B) 2 (C) 1 (D) -1

Ans. : (d): Since α, β are the zeroes of the polynomial $2y^2+5y+3$

$\therefore \quad \alpha+\beta=-\frac{5}{2}$ and $\alpha\beta=\frac{3}{2}$
Now, $\alpha+\beta+\alpha\beta=-\frac{5}{2}+\frac{3}{2}=\frac{-5+3}{2}=\frac{-2}{2}=-1$

21. If the product of zeroes of the quadratic polynomial $f(x)=x^2-4x+k$ is 3 , then the value of k is

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

Ans. : (a) : The given polynomial is $f(x)=x^2-4x+k$

$\therefore \quad \text{Product of zeroes }=\frac{k}{1}=3$
$[\because \text{ Product of zeroes }=3 \text{ (Given)}]$
$\Rightarrow \quad k=3.$

22. If the product of zeroes of the polynomial ax^2-6x-6 is 4 , then the value of ' a ' is

(A) $\frac{2}{3}$ (B) $\frac{3}{2}$ (C) $\frac{-3}{2}$ (D) $-\frac{2}{3}$

Ans. : (c) : The given polynomial is ax^2-6x-6

$\therefore$ Product of its zeroes $=-\frac{6}{a}$
$\Rightarrow \quad \frac{-6}{a}=4 \quad [\because$ Product of zeroes $=4$ (Given) $]$
$\Rightarrow a=-\frac{3}{2}$

23. If α and β are the zeroes of the polynomial $2x^2+4x+5$, then find the value of $\alpha^3+\beta^3$.
(A) -7 (B) 7 (C) 6 (D) 5

Ans. : (b) : Given α and β are the zeroes of $2x^2+4x+5$.
$\Rightarrow \alpha+\beta=-\frac{4}{2}=-2$ and $\alpha\beta=\frac{5}{2}$
Now, $(\alpha^3+\beta^3)=(\alpha+\beta)^3-3\alpha\beta(\alpha+\beta)=(-2)^3-3\times\frac{5}{2}\times(-2)=-8+15=7$

24. Find the other zero of the polynomial $f(x)=x^2-7x-8$, if one of the zeroes is -1 .
(A) 8 (B) -1 (C) -8 (D) 1

Ans. : (a) : We have, $f(x)=x^2-7x-8$
Now, sum of the zeroes $=7$
Since one of the zeroes is -1 .
$\therefore$ Other zero $=7-(-1)=7+1=8$

25. The value of k such that the quadratic polynomial $x^2-(k+6)x+2(2k+1)$ has sum of the zeroes as half of their product, is
(A) 2 (B) 3 (C) -5 (D) 5

Ans. : (d) : $\alpha+\beta=\frac{-\{-(k+6)\}}{1}=k+6$
$\alpha\beta=\frac{2(2k+1)}{1}=2(2k+1)$
But $\frac{\alpha\beta}{2}=\alpha+\beta($ Given $)\Rightarrow \frac{2(2k+1)}{2}=k+6 \Rightarrow k=5$

26. If one zero of the polynomial $f(x)=(k^2+4)x^2+13x+4k$ is reciprocal of the other, then k is equal to
(A) 2 (B) -2 (C) 1 (D) -1

Ans. : (a) : Let α and $1/\alpha$ be the roots of
$f(x)=(k^2+4)x^2+13x+4k,$
where $\alpha+\frac{1}{\alpha}=\frac{-13}{k^2+4} \quad \ldots$ (i) and $\alpha\cdot\frac{1}{\alpha}=\frac{4k}{k^2+4}$ ..(ii)
From (ii), $k^2+4=4k \Rightarrow \quad k^2-2k-2k+4=0 \Rightarrow k(k-2)-2(k-2)=0$
$\Rightarrow \quad (k-2)^2=0 \therefore k=2.$

27. If α,β are the zeroes of the polynomial x^2+5x+c, and $\alpha-\beta=3$, then find c.
(A) 2 (B) 3 (C) 4 (D) 1

Ans. : (c) : Since α,β are zeroes of the polynomial
x^2+5x+c
$\therefore \quad \alpha+\beta=-5\ldots(i)$
and $\alpha-\beta=3$ (Given)$\ldots(ii)$
Solving (i) and (ii), we have $\alpha=-1$ and $\beta=-4$
Now, product of zeroes $=\alpha\beta=(-1)(-4)=4$
$\Rightarrow \quad c=4$

28. If α and β be the zeroes of the polynomial ax^2+bx+c, then the value of $\sqrt{\frac{\alpha}{\beta}}+\sqrt{\frac{\beta}{\alpha}}$ is
(A) b (B) $\frac{-b}{\sqrt{ac}}$
(C) $-\frac{\sqrt{b}}{ac}$ (D) $\frac{1}{ac}$

Ans. : (b) : We have, $\alpha+\beta=-b/a$ and $\alpha\beta=c/a$
$\sqrt{\frac{\alpha}{\beta}}+\sqrt{\frac{\beta}{\alpha}}=\frac{\alpha+\beta}{\sqrt{\alpha\beta}}=\frac{-\frac{b}{a}}{\sqrt{\frac{c}{a}}}=\frac{-b}{\sqrt{ac}}$

29. Zeroes of a quadratic polynomial are in the ratio $2:3$ and their sum is 15 . The product of zeroes of this polynomial is
(A) 36 (B) 48 (C) 54 (D) 60

Ans. : (c) : Let zeroes of polynomial be 2α and 3α

$\Rightarrow 2\alpha + 3\alpha = 15 \Rightarrow \alpha = 3$

$\therefore$ Zeroes are 6 and 9

Hence product of zeroes $= 54$

30. The sum and product of zeroes of $p(x) = 63x^2 - 7x - 9$ are S and P respectively.Find the value of $27S + 14P$.

(A) -1 (B) 1 (C) 2 (D) -2

Ans. : (b) : $S = -\left(\frac{-7}{63}\right) = \frac{1}{9}$ and $P = -\frac{9}{63} = -\frac{1}{7}$

$\therefore$ $27S + 14P = 27 \times \frac{1}{9} + 14 \times \frac{-1}{7} = 3 - 2 = 1$

----- -----