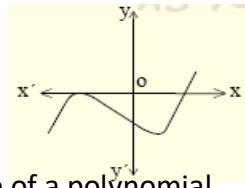# Polynomials

1 Mark

1. Find the degree of a polynomial whose graph is given below

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

3. Find the other two zeroes of the polynomial $x^3 - 8x^2 + 19x - 12$ if its one zero is $x = 1$,

4. Find the quadratic polynomial , the sum and product of whose zeroes are − 3 and 2,

5. Find the third zero of the polynomial $x^3 + 7x^2 - 2x - 14$ if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$,

6. If $a - b$, a and $a + b$ are zeroes of the polynomial $x^3 - 3x^2 + x + 1$ the value of $a + b$ is

7. A real number α is called zero of the polynomial $f(x)$, then find the value of $f(\alpha)$

8. Which of the following is a polynomial :

    (a) $x^2 + \dfrac{1}{x}$

    (b) $2x^2 - 3\sqrt{x} + 1$

    (c) $3x^2 - 3x + 1$

    (d) $x^2 + x^{-2} + 7$

9. Find the product and sum of zeroes of the quadratic polynomial $ax^2 + bx + c$

10. Find the quadratic polynomial ,sum and product of whose zeroes are 1 and -12 respectively

11. If the product of two of the zeroes of the polynomial $2x^3 - 9x^2 + 13x - 6$ is 2, find the third zero of the polynomial

12. The zeroes of a polynomial $f(x)$ are the coordinates of the points where the graph $y = f(x)$ intersects

    (a) X-axis
    (b) y-axis
    (c) Origin
    (d) (x, y)
    (e)

13. If β is zeroes of $f(x)$ then _____ is one of the factor of $f(x)$

14. If $(y - a)$ is factor $f(y)$ then _____ is zero of $f(y)$

15. Cubic polynomial $x = f(y)$ cuts y-axis at atmost_____

16. Find Zeroes of the polynomial $4x^2 - 1$

17. If 2 is a zero of both the polynomial, $3x^2 + ax - 14$ and $2x - b$ then find the value of $(a - 2b)$

18. If zeroes of the polynomial $ax^2 + bx + c$ are reciprocal of each other then find the relation between coefficients

19. Find three zeroes of $(x + 4)(x^2 - 6x + 8)$

2/3/4 Marks

1. If α and β are the zeroes of the polynomial $2x^2 - 7x + 3$. Find the sum of the reciprocal of its zeroes.

2. If $\frac{1}{3}$ is a zero of the polynomial $3x^3 - 4x^2 - 17x - k$ then find value of k.

3. If the polynomial $6x^3 + 16x^2 + px - 5$ is exactly divisible by $3x + 5$, then find the value of p.

4. Find a quadratic polynomial whose zeroes are $(5 - 3\sqrt{2})$ and $(5 + 3\sqrt{2})$.

5. Find zeroes of $\sqrt{3}x^2 - 8x + 4\sqrt{3}$.

6. If sum of the zeroes of $kx^2 + 3k + 2x$ is equal to their product . Find k

7. If one zero of $4x^2 - 9 - 8kx$ is negative of the other find k

8. If one zero of the polynomial $(a^2 + a)x^2 + 13x + 6a$ is reciprocal of the other find the values of a.

9. If – 5 is one of the zeroes of $2x^2 + px - 15$. Quadratic polynomial $p(x^2 + x) + k$ has both the zeroes equal to each other. Then find k

10. Find the value of k such that $3x^2 + 2kx + x - k - 5$ has the sum of the zeroes as half of their product.

11. If $(x - 2)$ is one of the factors of $x^3 - 3x^2 - 4x + 12$ find the other zeroes.

12. If α and β the zeroes of the polynomial $x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of k.

13. What must be subtracted from $8x^4 + 14x^3 - 4x^2 + 7x - 8$ so that the resulting polynomial is exactly divisible by $4x^2 + 3x - 2$.

14. When we add $p(x)$ to $4x^4 + 2x^3 - 2x^2 + x - 1$ the resulting polynomial is divisible by $x^2 + 2x - 3$ find $p(x)$

15. Find a and f if $(x^4 + x^3 + 8x^2 + ax + f)$ is a multiple of $(x^2 + 1)$.

16. If the polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by $3x^2 + 1 + 4x$ then $r(x) = ax + b$ find a and b.

17. Obtain all zeroes of $2x^4 - 2x^3 - 7x^2 + 3x + 6$ if $\left(x \pm \sqrt{\frac{3}{2}}\right)$ are two factors of this polynomial.

18. Find all zeroes of $x^4 - 3x^3 - x^2 + 9x - 6$ if $-\sqrt{3}$ and $\sqrt{3}$ are two of its zeroes.

19. Find the condition which must be satisfied by the coefficients of the polynomial $f(x) = x^3 - lx^2 + mx - n$. Given that sum of two zeroes is zero.

20. Let α, β be the zeroes of the polynomial $3x^2 + 2x + 1$. Find the polynomial whose zeroes are $\frac{1 - \alpha}{1 + \alpha}$ and $\frac{1 - \beta}{1 + \beta}$

21. Given that the sum of the zeroes of the polynomial $(a + 1)x^2 + (2a + 3)x + (3a + 4)$ is -1. Find the product of its zeroes.

22. If $x^3 + 2x^2 + 4x + b$ is divided by $x + 1$, then the quotient and remainder are $x^2 + ax + 3$ and $2b - 3$ respectively . Find values of a and b.

23. If α and β are the zeroes of the polynomial $x^2 + 8x + 6$ frame a quadratic polynomial whose zeroes are

(a) $\dfrac{1}{\alpha}$ and $\dfrac{1}{\beta}$

(b) $1+\dfrac{\beta}{\alpha},\ 1+\dfrac{\alpha}{\beta}.$

24. If α and β are the zeroes of the polynomial $2x^2-4x+5$, then find the value of

(a) $\alpha^2+\beta^2$

(b) $\dfrac{1}{\alpha}+\dfrac{1}{\beta}$

(c) $(\alpha-\beta)^2$

(d) $\dfrac{1}{\alpha^2}+\dfrac{1}{\beta^2}$

(e) $\alpha^3+\beta^3$

(f) $(\alpha-\beta)$

25. If one zero of the polynomial $3x^2-8x+2k+1$ is seven times the other. Find the value of k.

Answers
1 Mark
1. 2
2. 9
3. 3, 4
4. x^2+3x+2
5. -7
6. $1\pm\sqrt{2}$
7. $f(\alpha)=0$
8. $3x^2-3x+1$
9. $\dfrac{c}{a}, -\dfrac{b}{a}$
10. x^2-x-12
11. $\dfrac{3}{2}$
12. $X-axis$
13. $(x-\beta)$
14. a
15. Three points
16. Equal in magnitude but opposite in sign

17. -7
18. $a=c$
19. $4,-4,2$

2/3/4 Marks
1. $\dfrac{7}{3}$
2. -6
3. 7
4. $x^2-10x+7$
5. $2\sqrt{3},\dfrac{2}{3}\sqrt{3}$
6. $-\dfrac{2}{3}$
7. 0
8. 5
9. $p=7, k=\dfrac{7}{4}$
10. $k=1$
11. $-2,3$
12. $k=6$
13. $14x-10$
14. $61x+65$
15. $a=1, f=7$
16. $a=1, b=1$
17. $2,-1\pm\sqrt{\dfrac{3}{2}}$
18. $\pm\sqrt{3},1,2$
19. $ml=n$
20. x^2-2x+3
21. 2
22. $a=1, b=0$
23. $x^2+\dfrac{4}{3}x+\dfrac{1}{6},\ x^2-\dfrac{32}{3}x+\dfrac{32}{3}$
24. $1,\ \dfrac{4}{5}$, - 6, $-\dfrac{4}{25}$, -7 , Not exist.
25. $k=\dfrac{2}{3}$

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