Sample Paper – 2013
Class – X
Subject – Mathematics

Polynomials

Multiple Choice Questions

1. A real number α is a zero of the polynomial *f(x)* if
   (a) *f(α)>0* (b) *f(α)=0*
   (c) *f(α)<0* (d) none

2. The zeros of a polynomial *f(x)* are the coordinates of the points where the graph of *y=f(x)* intersects
   (a) x-axis (b) y-axis
   (c) origin (d) (x,Y)

3. If β is 0 zero of f(x) then _____is one of the factors of f(x)
   (a) (x-β) (b) (x-2β)
   (c) (x+β) (d) (2x-β)

4. If (y-a) is factor of f(y) then _____ is a zero of f(y)
   (a) y (b) a
   (c) 2a (d) 2y

5. Which of the following is not correct for: A quadratic polynomial may have
   (a) no real zeros (b) two equal real zeros
   (c) two distinct zeros (d) three real zeros

6. Cubic polynomial x=f(y) cuts y-axis at almost
   (a) one point (b) two points
   (c) three points (d) four points

7. Polynomial $x^2 + 1$ has _____ zeros
   (a) only one real (b) no real
   (c) only two real (d) one real and the other non-real

8. If α, β are the zeros of the polynomials $f(x) = x^2 + x + 1$ then $\frac{1}{\alpha} + \frac{1}{\beta}$ = _____
   (a) 1 (b) -1

(c) 0 (d) none

9. If one of the zero of the polynomial $g(x)=\left(k^2+4\right)x^2+13x+4k$ is reciprocal of the other then k = _____
   (a) 2 (b) -2
   (c) 1 (d) -1

10. If 2 is a zero of both the polynomial, $3x^2+ax-14$ and $2x-b$ then $a-2b=$ _____
    (a) -2 (b) 7
    (c) -8 (d) -7

11. If zeros of the polynomial ax^2+bx+c are reciprocal of each other then
    (a) a = c (b) a = b
    (c) b = c (d) a = -c
12. The zeros of the polynomial $h(x)=\left(x-5\right)\left(x^2-x-6\right)$ are
    (a) -2, 3, 5 (b) -2, -3, -5
    (c) 2, -3, -5 (d) 2, 3, 5

13. Graph of $y=ax^2+bx+c$ intersects x-axis at 2 distinct points if
    (a) $b^2-4ac>0$ (b) $b^2-4ac<0$
    (c) $b^2-4ac=0$ (d) none

Short Answer type Questions

14. If α and β are the zeros of the polynomial $2x^2-7x+3$. Find the sum of the reciprocal of its zeros.
15. If α, β are the zeros of the polynomial $p(x)=x^2-a\left(x+1\right)-b$ such that $\left(\alpha+1\right)\left(\beta+1\right)=0$ then find value of *b*.
16. If α, β are the zeros of the polynomial $x^2-\left(k+6\right)x+2\left(2k-1\right)$. Find $\alpha+\beta=\frac{1}{2}\alpha\beta$.
17. If $\left(x+p\right)$ is a factor of the polynomial $2x^2+2px+5x+10$ find *p*.
18. Find a quadratic polynomial whose zeroes are $\left(5-3\sqrt{2}\right)$ and $\left(5+3\sqrt{2}\right)$.
19. If 1/5 and -2 are respectively product and sum of the zeroes of a quadratic polynomial. Find the polynomial.

20. Find the zeroes of $\sqrt{3}x^2 - 8x + 4\sqrt{3}$.
21. If $(x+k)$ is a factor of the polynomial $x^2 - 2x - 15$ and $x^3 + a$. Find k and a.
22. Form a quadratic polynomial, one of whose zero is $(2+\sqrt{5})$ and the sum of zeros is 4.
23. If sum of the zeroes of $kx^2 + 3k + 2x$ is equal to their product. Find k.
24. If one zero of $4x^2 - 9 - 8kx$ is negative of the other find k.

Long Answer type Questions

25. Find the zeroes of $6x^2 - 3 - 7x$. Verify the relationship between the zeroes and coefficients.
26. If one zero of the polynomial $(a^2 + a)x^2 + 13x + 6a$ is reciprocal of the other, find value (s) *a*.
27. -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*.
28. Find the value of *k* such that $3x^2 + 2kx + x - k - 5$ has the sum of the zeroes as half of their product.
29. If $f(x) = 2x^4 - 5x^3 + x^2 + 3x - 2$ is divided by *g(x)* the quotient is $q(x) = 2x^2 - 5x + 3$ and $r(x) = -2x + 1$ find *g(x)*.
30. If $(x-2)$ is one of the factors of $x^3 - 3x^2 - 4x + 12$ find the other zeroes.
31. If α and β are the zeroes of the polynomial $x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of *k*.
32. If α, β are zeroes of quadratic polynomial $2x^2 + 5x + k$, find the value of *k*, such that $(\alpha + \beta)^2 - \alpha\beta = 24$.
33. Obtain all zeroes of $x^4 - x^3 - 7x^2 + x + 6$ if 3 and 1 are zeroes.
34. Find all the zeroes of the polynomial $4x^4 - 20x^3 + 23x^2 + 5x - 6$ if two of its zeroes are 2 and 3.
35. If $(2+\sqrt{3})$ and $(2-\sqrt{3})$ are two zeroes of $x^4 - 4x^3 - 8x^2 + 36x - 9$ find the other two zeroes.
36. What must be subtracted from $8x^4 + 14x^3 - 4x^2 + 7x - 8$ so that the resulting polynomial is exactly divisible by $4x^2 + 3x - 2$.
37. When we add $p(x)$ to $4x^4 + 2x^3 - 2x^2 + x - 1$ the resulting polynomial is divided by $x^2 + 2x - 3$ find $p(x)$

38. Find *a* and *f* if $x^4+x^3+8x^2+ax+f$ is a multiple of x^2+1.
39. If the polynomial $6x^4+8x^3+17x^2+21x+7$ is divided by $3x^2+1+4x$ then $f(x)=(ax+b)$ find *a* and *b*.
40. Obtain all the 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.
41. Find all the zeroes of $x^4-3x^3-x^2+9x-6$ if $-\sqrt{3}$ and $\sqrt{3}$ are two of its zeroes.
42. If x^3-3x+1 is one of the factors of the polynomial $x^5-4x^3+x^2+3x+1$, find the other two factors.
43. What does the graph of the polynomial ax^2+bx+c represents. What type of graph will it represent (i) for a>0, (ii) for a<0. What happens if a=0.

Answers

1.	**b**	**2.**	**A**
3.	**a**	**4.**	**B**
5.	**a**	**6.**	**C**
7.	**b**	**8.**	**B**
9.	**a**	**10.**	**D**
11.	**a**	**12.**	**A**
13.	**a**	**14.**	$\frac{1}{\alpha}+\frac{1}{\beta}=\frac{7}{3}$
15.	1	16.	K=7
17.	p=2	18.	$x^2-10x+7$
19.	$x^2+2x+\frac{1}{5}$	20.	$2\sqrt{3},\frac{2}{3}\sqrt{3}$
21.	k=-5,3 and a=-125+27	22.	x^2-4x-1
23.	$-2/3$	24.	0
25.	-1/3, 3/2	26.	5

27. $p = 7, k = \frac{7}{4}$

28. K=1

29. $g(x) = x^2 - 1$

30. -2, 3

31. k =6

32. K=2

33. -2, -1

34. $-\frac{1}{2}, +\frac{1}{2}$

35. ± 3

36. 14x-10

37. 61x+65

38. a=1,f=7

39. a=1,f=2

40. $2, -1 \pm \sqrt{\frac{3}{2}}$

41. $\pm\sqrt{3}, 1, 2$

42. (x-1), (x+1)

43. A curve (parabola) upward parabola, downward parabola, straight line.