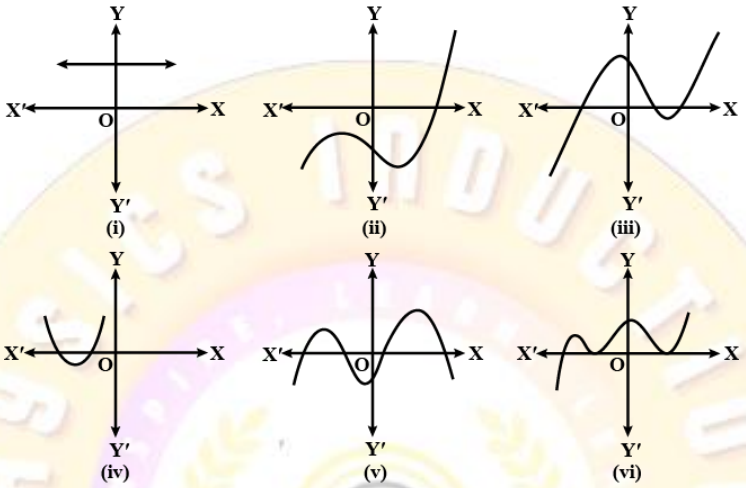
CLASS X : ASSIGNMENT : CHAPTER-2 : POLYNOMIALS : MATHEMATICS

1. What is the degree of a constant and a zero polynomial?
2. Classify the following as linear, constant, quadratic, cubic, or bi-quadratic polynomials:
   (i) $p(x) = 0$
   (ii) $g(x) = 2x^3 - 7x + 4$
   (iii) $h(x) = -3x + ½$
   (iv) $f(x) = 2x^2 - x + 4$
   (v) $q(x) = 10x^4 - 7x^3 + 8x^2 - 12x - 20$
   (vi) $r(x) = 3x^3 + 4x^2 + 5x - 7$
   (vii) $s(x) = 3/2$
   (viii) $t(x) = 3x$
   (ix) $u(x) = 7x^4 + 4x^3 + 3x - 2$
   (x) $v(x) = x + x^2 + 4$
3. The graphs of $y = p(x)$ is given in the figures below for some polynomial $p(x)$. Find the number of zeroes of $p(x)$ in each case.



4. Draw the graphs of the following polynomials:
   (i) $p(x) = 2x - 5$
   (ii) $q(x) = x^2 - 2x - 8$
   (iii) $f(x) = 3 - 2x - x^2$
   (iv) $r(x) = x^2 - 6x + 9$
   (v) $u(x) = x^3$
   (vi) $w(x) = x^3 - 4x$
   (vii) $t(x) = x^3 - 2x^2$
5. Find the zeroes of the following polynomials:
   (i) $f(x) = x^2 - 1$
   (ii) $g(x) = 3x^2 - 2$
   (iii) $h(x) = x^2$
   (iv) $p(x) = lx + m$
   (v) $q(y) = 2y$
   (vi) $r(t) = at$
   (vii) $x^6 - 7x^3 - 8$
   (viii) $4√3\ x^2 + 5x - 2√3$
   (ix) $v(x) = x^3 + 13x^2 + 32x + 20$
   (x) $w(x) = 4x^3 + 20x^2 + 33x + 18$
   (xi) $u(y) = y^3 - 7y + 6$
   (xii) $t(x) = x^3 + 2x^2 - x - 2$
6. Find a quadratic polynomial whose zeroes are given below:
   (i) -2, 4
   (ii) ½, ½
   (iii) -1/3, 3/2
   (iv) 0, -2
   (v) $\pm √15$
7. Find the zeroes of the given polynomials and verify the relationships between the zeroes and the coefficients:
   (i) $x^2 + 7x + 12$
   (ii) $4√3x^2 + 5x - 2√3$
   (iii) $abx^2 + (b^2 - ac)\,x - bc$
   (iv) $x^2 - (√3 + 1)\,x + √3$
8. If one of the roots(zeroes) of the equation $2x^2 - 8x - m = 0$ is 5/2. Find the other root and the value of m.
9. If the sum of the zeroes of the quadratic polynomial $f(t) = kt^2 + 2t + 3k$ equals their product, find the value of k.
10. If $x = 0$ and $x = 2$ are the zeroes of the polynomials $f(x) = 2x^3 - 5x^2 + ax + b$. Find the values of a and b.
11. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - 4x - 4$. Find the value of the

following:

(i) $\alpha^2 + \beta^2$
(ii) $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$
(iii) $\alpha^3 + \beta^3$
(iv) $\frac{1}{\alpha^3} + \frac{1}{\beta^3}$
(v) $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$
(vi) $\alpha^4 + \beta^4$
(vii) $\frac{\alpha^2}{\beta^2} + \frac{\beta^2}{\alpha^2}$
(viii) $\alpha - \beta$
(ix) $\frac{1}{\alpha} - \frac{1}{\beta}$
(x) $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$
(xi) $\alpha^2\beta + \alpha\beta^2$
(xii) $\alpha^4\beta^3 + \alpha^3\beta^4$

12. If α and β are the zeroes of a quadratic polynomial such that α + β = 24 and α – β = 8, Find the quadratic polynomial having α and β as its zeroes.
13. If α and β are the zeroes of a quadratic equation $x^2 – x – 2 = 0$. Form an equation whose zeroes are (2α + 1) and (2β + 1).
14. If α and β are the zeroes of a quadratic equation $2x^2 – 5x + 7 = 0$. Form an equation whose zeroes are (2α + 3β) and (3α + 2β).
15. If α and β are the zeroes of a quadratic equation $x^2 – 1 = 0$. Form an equation whose zeroes are $\frac{2\alpha}{\beta}$ and $\frac{2\beta}{\alpha}$.
16. If α and β are the zeroes of a quadratic equation $x^2 – 3x – 2 = 0$. Form an equation whose zeroes are $\frac{1}{2\alpha+\beta}$ and $\frac{1}{2\beta+\alpha}$.
17. Find a quadratic equation whose zeroes are reciprocal of the zeroes of the equation $ax^2 + bx + c = 0$.
18. If α and β are the zeroes of a quadratic polynomial $f(x) = x^2 – 5x + k$, such that (α – β) = 1, find the value of k.
19. If α and β are the zeroes of a quadratic polynomial $f(x) = kx^2 + 4x + 4$ such that $\alpha^2 + \beta^2 = 24$, find the value of k.
20. If α and β are the zeroes of a quadratic polynomial $f(x) = 2x^2 + 5x + k$ satisfying the relation $\alpha^2 + \beta^2 + \alpha\beta = 21/4$, then find the value of k.
21. If the sum of the zeroes of the equation $\frac{1}{x+a} + \frac{1}{x+b} = \frac{1}{c}$ is zero, prove that the product of the zeroes is $-\frac{1}{2}(a^2 + b^2)$.
22. If the ratio of the zeroes of the equation $lx^2 + nx + n = 0$ is p: q, Prove that $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{h}{l}} = 0$
23. Divide the polynomial p(x) by the polynomial g(x) and find the quotient and remainder in each of the following:

(i)	$p(x) = x^3 + 4x^2 - 3x + 10$	$g(x) = x + 4$
(ii)	$p(x) = 4x^3 - 12x^2 + 14x - 3$	$g(x) = 2x – 1$
(iii)	$p(x) = x^4 - 3x^2 + 4$	$g(x) = x – 2$
(iv)	$p(x) = 9x^3 - 3x^2 + x – 5$	$g(x) = x – 2/3$
(v)	$p(x) = x^3 + 4x^2 - 3x + 10$	$g(x) = x + 4$

24. Verify that 3, -1, and -1/3 are the zeroes of the cubic polynomial $p(x) = 3x^3 - 5x^2 - 11x – 3$ and then verify the relationship between the zeroes and the coefficients.
25. Find the zeroes of the polynomial $f(x) = x^3 – 5x^2 – 16x + 80$, if its two zeroes are equal in magnitude but opposite in sign.
26. Find the zeroes of the polynomial $f(x) = x^3 – 5x^2 – 2x + 24$, if it is given that the product of its two zeroes is 12.
27. Find the zeroes of the polynomial $f(x) = 2x^4 – 3x^3 – 3x^2 + 6x – 2$, if its two zeroes are $\pm \sqrt{2}$.