ASSIGNMENT
CLASS X POLYNOMIALS

Q1. Without drawing actual graph, find the zeroes of the following polynomials if any.

(a) x^2-2x-8 (b) $-x^2-2x+3$ (c) x^2+x+1 (d) x^2-1

(e) x^2+4x+4 (f) $-4x^2+4x-1$

Q2. Draw the graphs of each of the following polynomials and if possible, read the zeroes from the graph: (a) x^2-2x+9 (b) $-2x^2+4x$ (c) x^2+2x-3

(d) $x^2-8x+16$ (e) x^3 (f) x^3-x^2

Q3. Draw the graph of the polynomial $x^2-3x-10$. Read off the zeroes of the polynomial from the graph. Also show that the axis of symmetry on it.

Q4. Show that 2 and $-\frac{1}{3}$ are the zeroes of the polynomial $p(x)=3x^2-5x-2$.

Q5. Show that the polynomial $p(x)=x^2-4x+9$ have no zeroes.

Q6. Find the zeroes of each of the following quadratic polynomial. Also, in each case, verify the relationship between the zeroes and its coefficients.

(a) $x^2+8x+12$ (b) x^2+3x-4 (c) $x^2-7x+10$ (d) y^2-4

Q7. Find a quadratic polynomial each with the given numbers as the sum and product of its zeroes respectively:

(a) 3 and 4 (b) -2 and $\frac{3}{2}$ (c) $-\frac{3}{2}$ and 0 (d) $-\sqrt{2}$ and $\sqrt{3}$

Q8. Verify that the numbers given alongside of the cubic polynomials below are their zeroes. Also, verify the relationship between the zeroes and the coefficients in each case.

(a) x^3-x ; 0, 1 and -1

(b) $2x^3-5x^2+x+2$; 1, 2, and $-\frac{1}{2}$

(c) $3x^3-5x^2-11x-3$; 3, -1 and $-\frac{1}{3}$

(d) $6y^3+23y^2-5y-4$; -4, $-\frac{1}{3}$ and $\frac{1}{2}$

Q9. Find a cubic polynomial with the sum, sum of product of its zeroes taken two at a time and the product of its zeroes respectively as given below:

(a) -4, 7 and 0 (b) 5, -2, and -24 (c) -2, $-\frac{8}{3}$ and 0.

Q10. Apply the division algorithm to find the quotient and the remainder on division of p(x) by g(x) as given below:

(a) $p(x)=-5x^2+14x^3+9x-1$, $g(x)=-1+2x$

(b) $p(x)=6x^3+11x^2-39x-65$, $g(x)=x^2+x-1$

(c) $p(x)=x^4-5x+6$, $g(x)=2-x^2$

(d) $p(x)=3x^3+x^2+2x+5$, $g(x)=1+2x+x^2$

Q11. Check whether the first polynomial is a factor of the second polynomial by applying the division algorithm:

(a) $x+8$, x^3+15x^2+56x

(b) $x-2$, x^4-x^3+3x-9

(c) x^2-2, x^3-3x^2+5x-3

(d) $-5y^2-4y+2$, $15y^4+2y^3-39y^2-16y+10$

Q12. If the polynomial $6x^4+8x^3+17x^2+21x+7$ is divided by another polynomial $3x^2+4x+1$, the remainder comes out to be $ax+b$, find a and b.

Q13. If the polynomial $x^4+2x^3+8x^2+12x+18$ is divided by another polynomial x^2+5, the remainder comes out to be $px+q$, find p and q.

Q14. Obtain all the zeroes of the polynomial $p(x)=x^4-3x^3-x^2+9x-6$, if two of its zeroes are $\sqrt{3}$ and $-\sqrt{3}$.

Q15. Obtain all the zeroes of the polynomial $p(x)=3x^4-15x^3+17x^2+5x-6$, if two of its zeroes are $\frac{1}{\sqrt{3}}$ and $\frac{-1}{\sqrt{3}}$.

Q16. Find the value of a and b so that $1, -2$ are the zeroes of the polynomial x^3+10x^2+ax+b.

Q17. On dividing x^3-3x^2+5x-3 by a polynomial g(x), the quotient and remainder are $x-3$ and $7x-9$ respectively. Find g(x).

Q18. On dividing x^4-5x+6 by a polynomial g(x), the quotient and remainder are $-x^2-2$ and $-5x+10$ respectively. Find g(x).

***Q19.** If α and β are the zeroes of the quadratic polynomial $f(x)=3x^2-6x+4$, find the value of $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}+2\left(\frac{1}{\alpha}+\frac{1}{\beta}\right)+3\alpha\beta$.

***Q20.** If α and β are the zeroes of the quadratic polynomial $f(x)=x^2-2x+3$, find a polynomial whose roots are $\alpha+2, \beta+2$.

ANSWERS

1. (a) -2 and 4 (b) -3 and 1 (c) no zeroes (d) 1 and -1 (e) -2 and -2
   (f) $\frac{1}{2}$ and $\frac{1}{2}$
2. (a) no zeroes (b) 0 and 2 (c) -3 and 1 (d) 4 (e) 0 (f) 0 and 1
3. 5 and -2.; axis of symmetry $x=\frac{3}{2}$
6. (a) -2 and -6 (b) 1 and -4 (c) 2 and 5 (d) ± 2
7. (a) $k(x^2-3x+4)$ (b) $k(x^2+2x+\frac{3}{2})$ (c) $k(x^2+\frac{3}{2}x)$ (d) $k(x^2+\sqrt{2}x+\sqrt{3})$ where k is real
9. (a) x^3+4x^2-7 (b) $x^3-5x^2-2x+24$ (c) $3x^3-6x+8$
10. (a) quotient = $7x^2+x+5$; remainder = 4
    (b) quotient = $6x+5$; remainder = $-38x-60$
    (c) quotient = $-x^2-2$; remainder = $-5x+10$
    (d) quotient = $3x-5$; remainder = $9x+10$
11. (a) Yes (b) Yes (c) No (d) Yes
12. $a=1, b=2$
13. $p=2, q=3$
14. $-\sqrt{3}, \sqrt{3}, 1, 2$
15. $\frac{-1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}$, 2 , 3
16. a = 7 , b = – 18
17. x^2-2
18. $-x^2+2$
19. 8
20. $k\left(x^2-6x+11\right)$