ATOMIC ENERGY CENTRAL SCHOOLS

Class : 10 Sub : Mathematics Ch 2 Polynomials

SECTION A (1 X 12 = 12)

Fill in the blanks with the correct options.

1. **If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is _____.**

   (a) 10 (b) -10 (c) 5 (d) -5

2. **If the zeroes of the quadratic polynomial x^2 + (a + 1) x + b are 2 and -3, then _____.**

   (a) a = -7, b = -1 (b) a = 5, b = -1 (c) a = 2, b = -6 (d) a = 0, b = -6

3. **The number of polynomials having zeroes as 2 and -3 is _____.**

   (a) 1 (b) 2 (c) 3 (d) more than 3

4. **A quadratic polynomial, whose zeroes are -4 and -5, is _____.**

   (a) x^2-9x + 20 (b) x^2 + 9x + 20 (c) x^2-9x- 20 (d) x^2 + 9x- 20

5. **The zeroes of the quadratic polynomial $x^2 + 20x + 75$ are _____.**

   (a) both negative (b) one positive and one negative (c) both positive (d) both equal

6. **What is the quadratic polynomial whose sum and the product of zeroes is $\sqrt{2}$, ⅓ respectively?**

   (a) $3x^2-3\sqrt{2}x+1$ (b) $3x^2+3\sqrt{2}x+1$ (c) $3x^2+3\sqrt{2}x-1$ (d) None of the above

7. **If $p(x) = ax^2 + bx + c$, then $\frac{c}{a}$ is equal to _____.**

   (a) 0 (b) 1 (c) sum of zeroes (d) product of zeroes

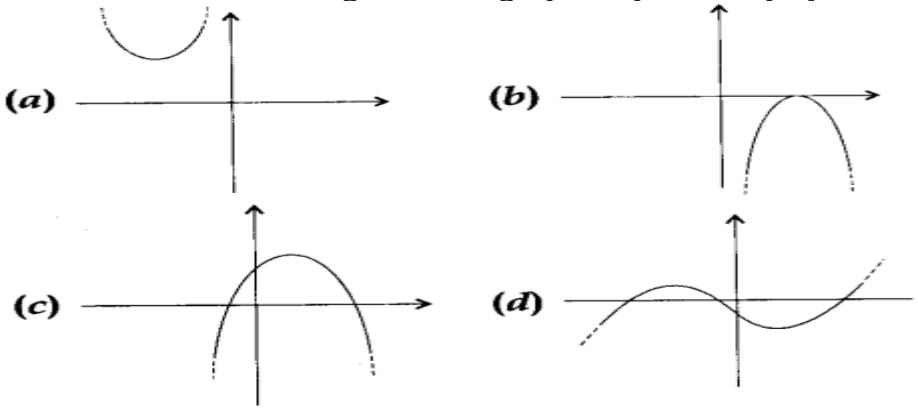
8. **If $p(x) = ax^2 + bx + c$, then $-\frac{b}{a}$ is equal to _____.**

   (a) 0 (b) 1 (c) sum of zeroes (d) product of zeroes

9. **A quadratic polynomial whose one zero is 6 and sum of the zeroes is 0, is**

   (a) $x^2 – 6x + 2$ (b) $x^2 – 36$ (c) $x^2 – 6$ (d) $x^2 – 3$

10. Which of the following is not the graph of quadratic polynomial?



11. Assertion: The graph of quadratic polynomial p(x) intersect x-axis at two points.

Reason: The degree of quadratic polynomial is 2.

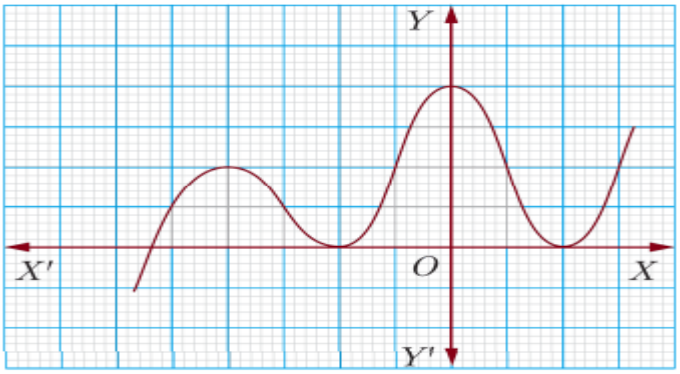
a) Both Assertion and Reason are true and reason is the correct explanation of Assertion

b) Both Assertion and Reason are true but reason is not the correct explanation of Assertion

c) Assertion is true but Reason is false.

d) both Assertion and Reason are false.

12. Assertion: The graph y=f(x) is shown in figure, for the polynomial f(x). The number of zeroes of f(x) is 3.
Reason: The number of zeroes of the polynomial f(x) is the number of point of which f(x) cuts or touches the axes.



SECTION B (2 X 10 = 20)

1. **Find the zeroes of the polynomial f(x) = x^2 + 4x + 4.**
2. **For what value of k, is -2 a zero of the polynomial 3x^2 + 4x + 2k?**
3. **Find a quadratic polynomial whose zeroes are 3 + and -3.**
4. **If α, β are the zeroes of a polynomial, such that α + β = 6 and αβ = 4, then write the polynomial.**
5. **If α and β are zeroes of a polynomial x^2 + 6x + 9, then form a polynomial whose zeroes are -α and -β.**

6. **The quadratic polynomial 2x^2 – 3x + 1 has zeroes as α and β. Now form a quadratic polynomial whose zeroes are 3α and 3β.**
7. **Find the roots of $x^2 – 2x – 8$.**
8. **Find the zeroes of x^2 -2x.**
9. **α and β are zeroes of the quadratic polynomial $x^2 – 6x + y$. Find the value of 'y' if 3α + 2β = 20.**
10. **Find a quadratic polynomial with ¼ as the sum and -1 as the product of its zeroes, respectively.**

SECTION C (3 X 5 = 15)

1. **Find the zeroes of the polynomial f(u) = 4u^2 + 8u, and verify the relation between the zeroes and its coefficients.**
2. **If one root of the polynomial f(x) = 5x^2 + 13x + k is reciprocal of the other, then find the value of k.**
3. **If α, β are the zeros of the polynomial 2y^2 + 7y + 5, write the value of α + β + αβ.**
4. **If α and β are the zeros of the polynomial f(x) = x^2 – 5x + k such that α - β = 1, find the value of k.**
5. **If the product of zeroes of the polynomial ax^2 – 6x – 6 is 4, find the value of a. Find the sum of zeroes of the polynomial.**

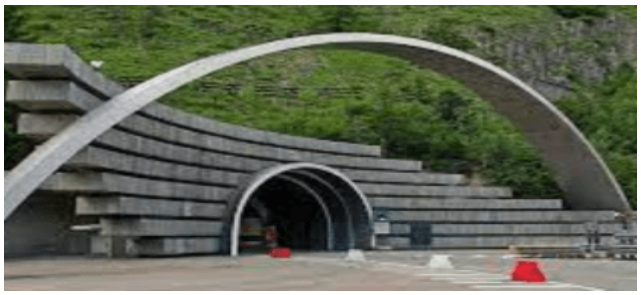
SECTION D (5 X 5 = 25)

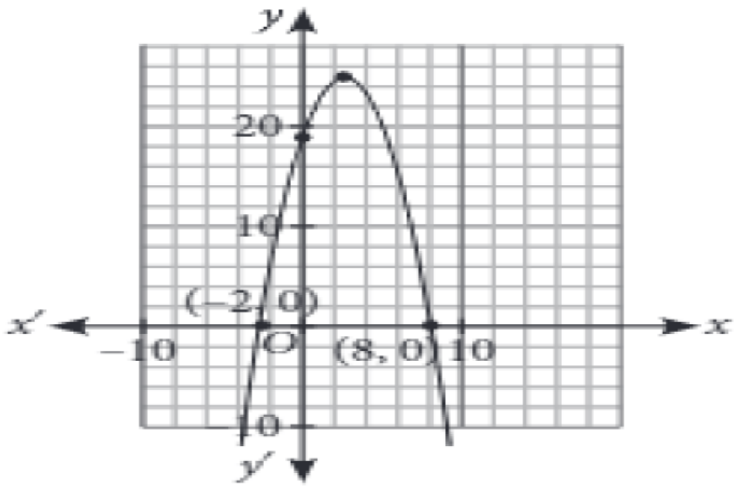
1. **If α and β are the zeroes of the polynomial $p(x) = 2x^2 + 5x + k$, satisfying the relation, $\alpha^2 + \beta^2 + \alpha\beta = 21/4$ then find the value of k.**
2. **Find a quadratic polynomial whose zeroes are reciprocals of the zeroes of the polynomial $f(x) = ax^2 + bx + c$, $a \neq 0$, $c \neq 0$.**
3. **If α and β are zeroes of $p(x) = kx^2 + 4x + 4$, such that $\alpha^2 + \beta^2 = 24$, find k.**
4. **If p and q are the zeroes of $x^2 + px + q$, then find the values of p and q.**
5. **Find $\alpha^{-1} + \beta^{-1}$, if α and β are zereos of the polynomial $9x^2 – 3x – 2$.**

SECTION E (4 x 2 = 8)

CASE STUDY BASED QUESTION – 1

Mont Blanc Tunnel which is a highway tunnel between France and Italy, under the Mont Blanc Mountain in the Alps, and has a parabolic cross-section. The mathematical representation of the tunnel is shown in the graph.



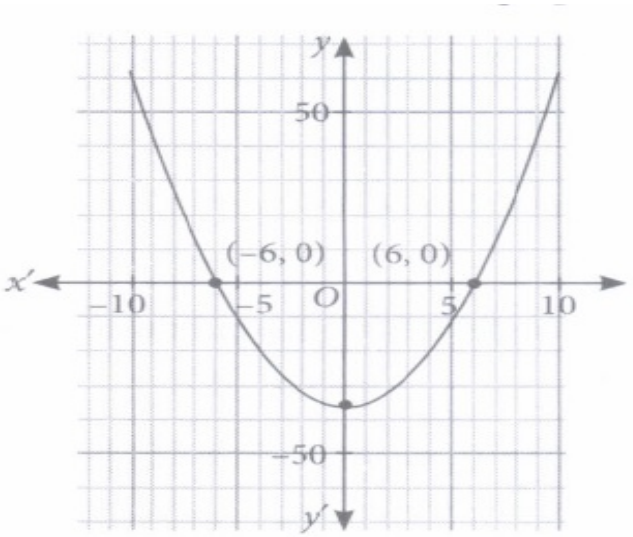


Based on the above information, answer the following questions.

(1) What are the zeroes of the polynomial whose graph is given? (1)
(2) What will be the expression of the polynomial given in diagram? (1)

(3) What is the value of the polynomial represented by the graph, when x = 4? (2)

CASE STUDY BASED QUESTION – 2
The shape of the honeycomb formed is that of a parabola. The mathematical representation of the honeycomb structure is shown in the graph.



Based on the above information, answer the following questions.
(i) Which polynomial is represented by the graph? (1)

(ii) Find the value of the polynomial represented by the graph when x = 6. (1)

(iii) If the sum of zeroes of polynomial $at^2 + 5t + 3a$ is equal to their product, then find the value of a. (2)