

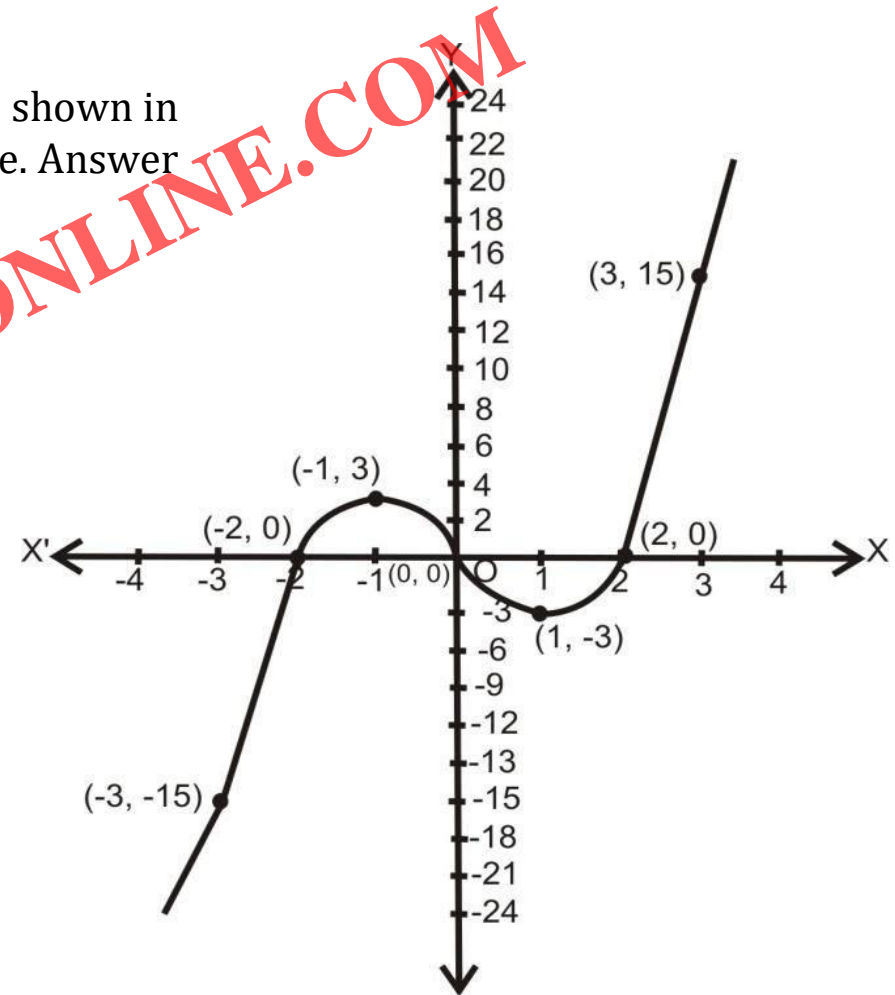
# Case study-based questions

## Class X Polynomials

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STUDY MATERIALS

### CASE STUDY QUESTION 01

One day, due to heavy storm an electric wire got bent as shown in the figure. It followed some mathematical shape of curve. Answer the following questions below.



(a) How many zeroes are there for the polynomial  
(shape of the wire)

- (i) 2      (ii) 3      (iii) 4      (iv) 5

(b) Find the zeroes of the polynomial. (i) 2, 0, -2

(ii) 2, -2, -5

(iii) -2, 2, -5.5

(iv) None of these

(c) Find the quadratic polynomial whose zeroes are -3 and 4. (i)  $x^2 + 4x + 2$

(ii)  $x^2 - x - 12$

(iii)  $x^2 - 7x - 12$

(iv) None of these

(d) Name the type of expression of the polynomial?

(i) quadratic

(ii) cubic

(iii) linear

(iv) bi-quadratic

(e) If one zero of the polynomial  $x^2 - 5x - 6$  is 6 then find the other zero.

(i) 1

(ii) -1

(iii) 2

(iv) -2

## CASE STUDY QUESTION 02

Junk food is unhealthful food that is high in calories from sugar or fat, with little dietary fiber, protein, vitamins, minerals, or other important forms of nutritional value. A sample of few students have taken. If  $\alpha$  be the number of students who take junk food,  $\beta$  be the number of students who take healthy food such that  $\alpha > \beta$  and  $\alpha$  and  $\beta$  are the zeroes of the quadratic polynomial  $f(x) = x^2 - 7x + 10$ , then answer the following questions:



(a) Name the type of expression of the polynomial in the above statement?

- (i) quadratic            (ii) cubic            (iii) linear            (iv) bi-quadratic

(b) Find the number of students who take junk food.

- (i) 5                      (ii) 2                      (iii) 7                      (iv) None of these

(c) Find the number of students who take healthy food.

- (i) 5                      (ii) 2                      (iii) 7                      (iv) None of these

(d) Find the quadratic polynomial whose zeros are -3 and -4. (i)  $x^2 + 4x + 2$

(ii)  $x^2 - x - 12$

(iii)  $x^2 - 7x + 12$

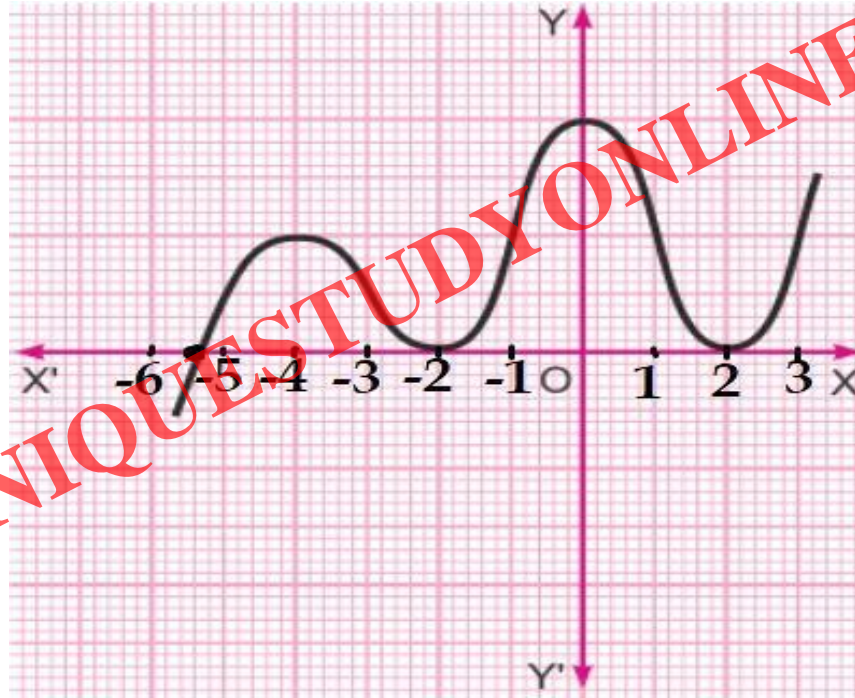
(iv) None of these

(e) If one zero of the polynomial  $x^2 - 5x + 6$  is 2 then find the other zero.

- (i) 6                      (ii) -6                      (iii) 2                      (iv) None of these

### CASE STUDY QUESTION 03

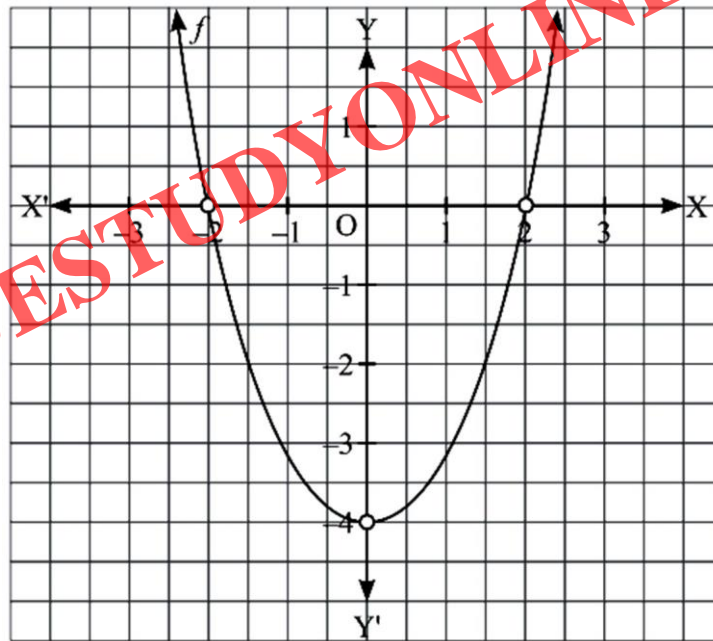
One day, due to heavy storm an electric wire got bent as shown in the figure. It followed some mathematical shape of curve. Answer the following questions below.





### CASE STUDY QUESTION 04

Puja tied a rope between two poles for drying clothes in her garden. She was very happy that the rope is working fine but One day due to heavy storm the rope bent as shown in the below figure. The bent shape followed a mathematical shape.



- (i) How many zeroes are there for the polynomial (shape of the wire) :  
(a) 2                    (b) 3                    (c) 1                    (d) 0
- (ii) The zeroes of the polynomial are :  
(a)  $-2, 3$    (b)  $-2, 2$    (c)  $-2, 0$    (d)  $-1, -2$
- (iii) Name the shape in which the wire is bent.  
(a) spiral   (b) ellipse   (c) linear   (d) parabola
- (iv) What will be the expression of the polynomial?  
(a)  $x^2 + 4$       (b)  $x^2 - 4$       (c)  $x + 4$       (d)  $(x - 2)$
- (v) What is the value of the polynomial if  $x = -2$ ?  
(a) 2      (b)  $-4$       (c) 0      (d) 9



## CASE STUDY QUESTION 05

**Applications of Parabolas-Highway Overpasses/Underpasses**A highway underpass is parabolic in shape.

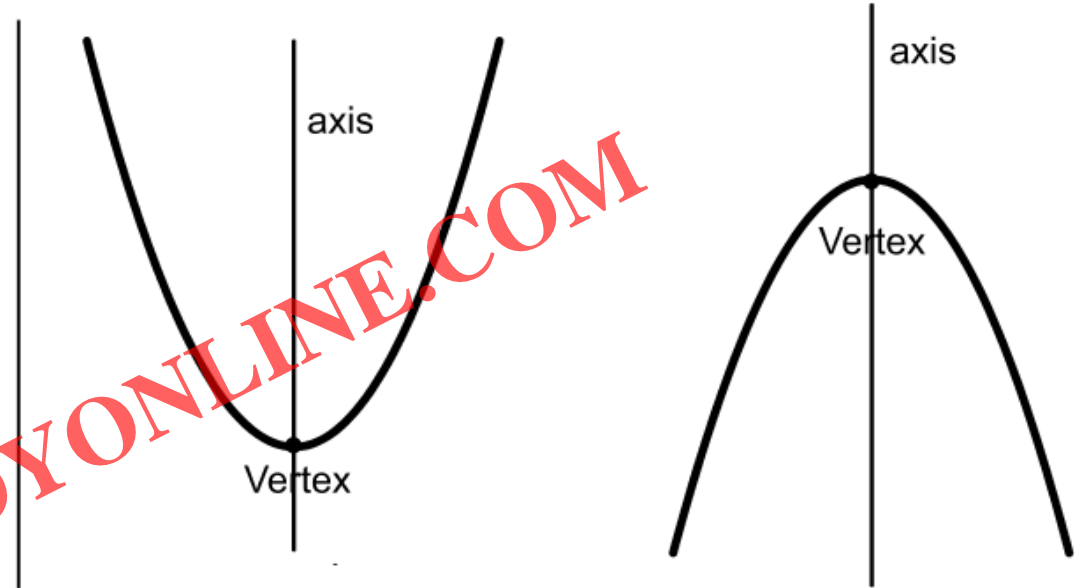
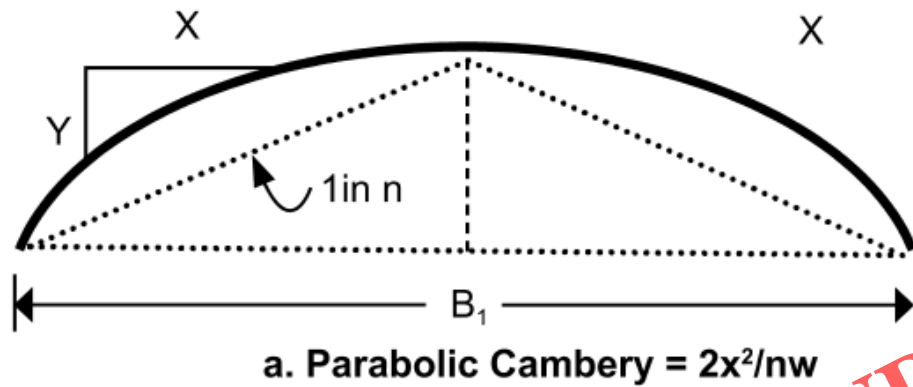
### **Parabola**

A parabola is the graph that results from  $p(x) = ax^2 + bx + c$ . Parabolas are symmetric about a vertical line known as the *Axis of Symmetry*.

The Axis of Symmetry runs through the maximum or minimum point of the parabola which is called the vertex.



➤ Shape of Cross Slope:



- (a) If the highway overpass is represented by  $x^2 - 2x - 8$ . then its zeroes are :
- (i) (2, -4)      (ii) (4, -2)      (iii) (-2, -2)      (iv) (-4, -4)

(b) The highway overpass is represented graphically.

Zeros of a polynomial can be expressed graphically. Number of zeroes of polynomial is equal to number of points where the graph of polynomial

- (i) Intersects x-axis
- (ii) Intersects y-axis
- (iii) Intersects y-axis or x-axis
- (iv) None of the above

(c) Graph of a quadratic polynomial is a

- (i) straight line
- (ii) circle
- (iii) parabola
- (iv) ellipse

(d) The representation of Highway Underpass whose one zero is 6 and sum of the zeroes is 0, is

- (i)  $x^2 - 6x + 2$
- (ii)  $x^2 - 36$
- (iii)  $x^2 - 6$
- (iv)  $x^2 - 3$

(e) The number of zeroes that polynomial  $f(x) = (x - 2)^2 + 4$  can have is:

- (i) 1
- (ii) 2
- (iii) 0
- (iv) 3

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