> **WEEK:** 30th November to 4thDecember
> **SUBJECT:**MATHEMATICS
> **CLASS:**X
> **NO. OF BLOCKS:** 4
> **TOPIC: Case Study Questions**

CASE STUDY QUESTIONS - REVISION ASSIGNMENT CLASS X

The following questions will be discussed during the online class:

Q1.

A test consists of 'True' or 'False' questions. One mark is awarded for every correct answer while ¼ mark is deducted for every wrong answer. A student knew answers to some of the questions. Rest of the questions he attempted by guessing. He answered 120 questions and got 90 marks.

(i)   If answer to all questions he attempted by guessing were wrong, then how many questions did he answer correctly?

(ii) How many questions did he guess?

(iii) If answer to all questions he attempted by guessing were wrong and answered 80 correctly, then how many marks he got?

(iv) If answer to all questions he attempted by guessing were wrong then how many questions answered correctly to score 95 marks?

Q2.

The below quadratic function can model the natural shape of a banana. Now, we know that a parabolic shape must have a quadratic function, therefore an equation in standard form of $f(x)=ax^2 + bx + c$. To find an equation for the parabolic shape of the banana, we need to find the values of a, b, and c. From the banana picture above, we can see that a quadratic function is able to model the banana quite accurately, with a=0.1, b=0, and c=0. Therefore, the equation is $f(x)=0.1x^2$.

Quadratic Function on a Banana
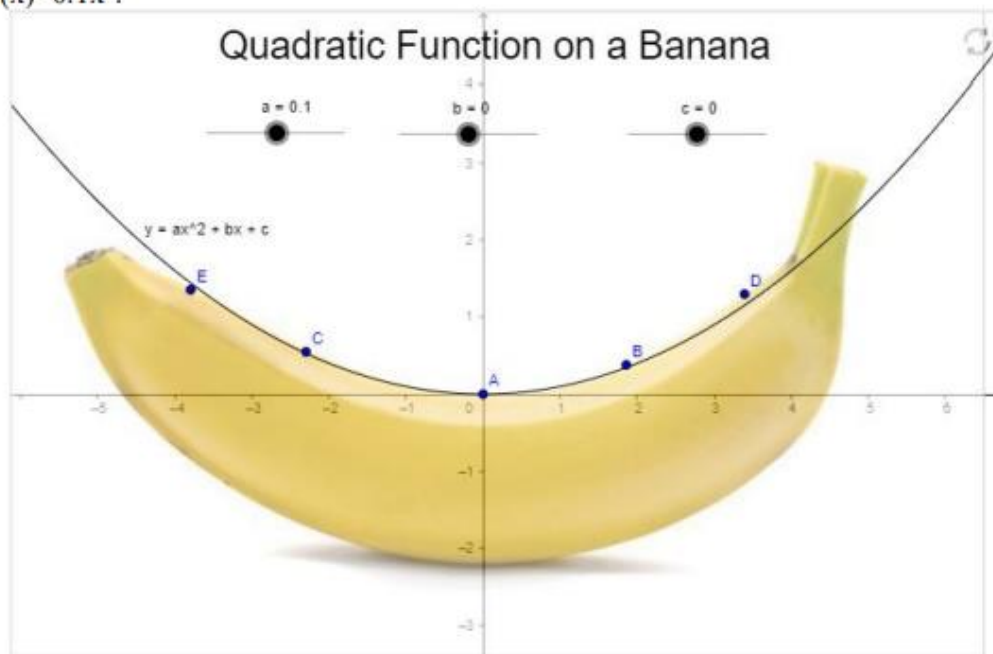
(i) Name the shape of the banana curve from the above figure.
   Ans: Parabola
(ii) Find the number of the zeroes of the polynomial for the shape of the banana.
   Ans: No. of zeroes = 1
(iii) If the curve of banana represented by $f(x) = x^2 - x - 12$. Find its zeroes.

(iv) If the representation of banana curves whose one zero is 4 and the sum of the zeroes is 0 then find the quadratic polynomial.

Q3.

1) A geodesic dome is a structure built in an almost spherical shape—a structure made from struts set on large circles. Because of its curved walls and ceiling, these domes use approximately a third less surface area to enclose the same volume as a traditional box home.

Figure 1

(a) A hollow model of a similar type of structure is constructed with a hemisphere mounted on a cylinder.

If the height of the cylindrical part is 6 cm, and the total height of the model is 13 cm, then find the radius of the hemisphere

. (i) 5 cm (ii) 3 cm (iii) 7 cm (iv) 4 cm

(b) A square band of side 17 cm is put outside along the edge of the hemisphere as shown in figure 1. Find the area of the metal sheet required for the band:

(i) 145 cm2 (ii) 125 cm2 (iii) 135 cm2 (iv) 155 cm2

(c) A test tube is cylindrical in shape with hemispherical base of diameter 2 cm as shown in figure 2. If it is filled with chemical solution up to the height of 7 cm, then find the volume of the chemical solution in the test tube.

(i) 20 3 π cm3 (ii) 8π cm3 (iii) 20 5 π cm3 (iv) 10 3 π cm3

(d) Two hemispheres of the same radius are joined end to end along their base. Find the total surface area of the solid so obtained.

(i) $4\pi r^2$ (ii) πr^2 (iii) $2\pi r^2$ (iv) $6\pi r^2$

Q4.

Arithmetic progression is sequence of numbers such that the difference of any two successive members of the sequence is a constant. Reema being a plant lover decides to open a nursery and she bought a few plants with pots. She wants to place the pots in such a way that the number of pots in the first row is 3, in the second row is 5 and in the third row is 7 and so on.

(a) If Reema wants to place 120 pots in total, then the total number of rows formed in this arrangement is:

 (i) 12   (ii) 10   (iii) 14   (iv) 8

(b)How many pots are placed in the last row?

 (i) 22   (ii) 21   (iii) 24   (iv) 18

(c) Find the difference in the number of pots placed in the 8th row and the 3rd row.

 (i) 10   (ii) 11   (iii) 14   (iv) 15

 (d) If Reema has sufficient space for 15 rows then how many total number of pots are placed by her with the same arrangement?

 (i) 200   (ii) 150   (iii) 255   (iv) 180

(e) If for an AP, an = 4n + 5 find the common difference:

    (i) 5   (ii) 4   (iii) 1   (iv) 0

Q5

Kerala

Kerala is a state in Southern India. The state is known as a tropical paradise of waving palms and wide sandy beaches.

This map of the Indian province of Kerala shows its area can be approximated using a simple straight-sided shape. The shape has two parallel sides 561 km and 216 km long. The other sides are 180 km and 211 km long. Its parallel sides are 100 km apart.

Shreya observed the shape formed by four straight lines and explored it on her notebook in different ways shown below.

Shape I   Shape II

Refer to Shape I

(a) Let ABCD is a trapezium with AB || DC, E and F are points on non-parallel sides AD and BC respectively such that EF is parallel to AB. Then $\dfrac{AE}{ED}$ =   **1**

    (i) $\dfrac{BF}{CD}$ (ii) $\dfrac{AB}{CD}$ (iii) $\dfrac{BF}{FC}$ (iv) None of these.

(b) Here, AB || CD. If DO = 3x – 19, OB = x – 5, CO = x – 3 and AO = 3, the value of x is   **1**

    (i) 5 or 8   (ii) 8 or 9   (iii) 10 or 12   (iv) None of these.

(c) Again AB || CD. If DO = 3x – 1, OB = 5x – 3, AO = 6x – 5 and OC = 2x + 1, then the value of x is   **1**

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

Refer to Shape II

(d) In ΔABC, PQ || BC. If AP = 2.4 cm, AQ = 2 cm, QC = 3 cm and BC = 6 cm, AB and PQ are respectively   **1**

    (i) AB = 6 cm, PQ = 2.4 cm   (ii) AB = 4.8 cm, PQ = 8.2 cm

    (iii) AB = 4 cm, PQ = 5.3 cm   (iv) AB = 8.4 cm, PQ = 2.8 cm

(e) In ΔDEF, if RS || EF, DR = 4x – 3, DS = 8x – 7, ER = 3x – 1 and FS = 5x – 3, then the value of x is   **1**

    (i) 1   (ii) 2   (iii) 8   (iv) 10

Q6

Saving Money

Saving money is a good habit for everyone. It helps you in the event of financial emergency. Some children of Class X decided to save their pocket money. The following distribution shows their daily pocket allowance.

Daily Pocket allowance (in ₹)	100-120	120-140	140-160	160-180	180-200
Number of children	12	14	8	6	10

(a) The class-mark of class 140-160 is   1
    (i) 140   (ii) 160   (iii) 150   (iv) 20

(b) The median class is   1
    (i) 120-140   (ii) 140-160   (iii) 160-180   (iv) 180-200

(c) The mean daily pocket allowance is   1
    (i) ₹ 150   (ii) ₹ 142.50   (iii) ₹ 135.70   (iv) ₹ 145.20

(d) The upper limit of modal class is   1
    (i) 120   (ii) 140   (iii) 180   (iv) 200

(e) The modal daily pocket allowance is   1
    (i) ₹ 125   (ii) ₹ 140   (iii) ₹ 135   (iv) ₹ 160

Aquarium

An aquarium is a transparent tank of water in which live fish and other water creatures and plants are kept.

The diagrams below show the plans for an aquarium. It will be built in hexagonal shape. It will be made using
  • six rectangular shaped clear glasses.
  • one regular hexagon clear glass for roof.

Top View

Front View

Not to scale
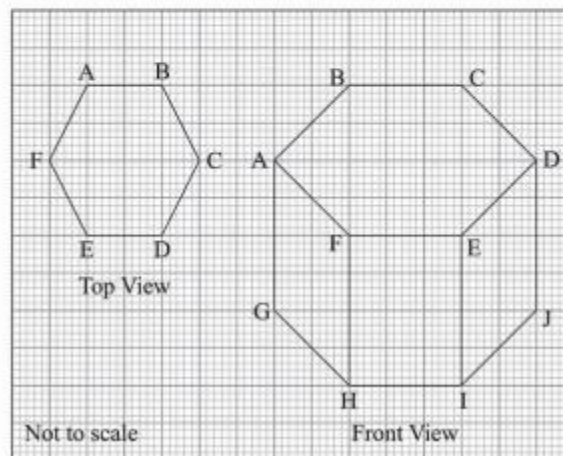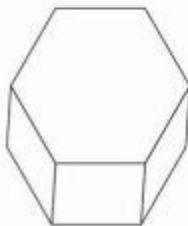
Refer to Top View

(a) The value of x for which the distance between the points F(2, –3) and C(x, 5) is 10, is **1**

    (i) 8 or –4   (ii) 4 or 8   (iii) 5 or –10   (iv) 5 or 10

(b) The mid-point of the line segment joining the points E(8, 11) and B(11, 15) is **1**

    (i) (6, 10)   (ii) $\left(\dfrac{11}{5}, \dfrac{8}{5}\right)$ (iii) $\left(17, \dfrac{15}{4}\right)$ (iv) $\left(\dfrac{19}{2}, 13\right)$

Refer to Front View

(c) The distance of a point F(8, 6) from origin is **1**

    (i) 12 units   (ii) 16 units   (iii) 14 units   (iv) 10 units

(d) The perimeter of square EFHI where E(–2, 0), F(3, 0), H(3, 5) and I(–2, 5) is **1**

    (i) $8\sqrt{5}$ units   (ii) 40 units   (iii) 20 units   (iv) None of these.

(e) The coordinates of the point which divides segment joining the point A(–4, 5) and D(6, 3) in the ratios 3 : 2 internally is **1**

    (i) (0, 8)   (ii) $\left(2, \dfrac{19}{5}\right)$ (iii) $\left(8, \dfrac{13}{2}\right)$ (iv) $\left(\dfrac{7}{5}, 3\right)$
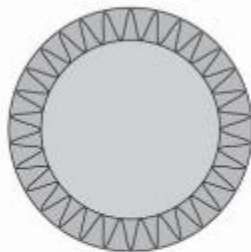
Q7   A Brooch

A brooch is a small piece of jewellery which has a pin at the back so it can be fastened on a dress, blouse or coat.

Designs of some brooch are shown below. Observe them carefully.
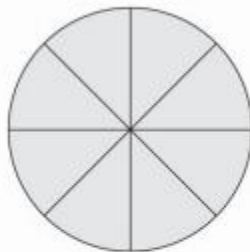
A   B

Design A: Brooch A is made with silver wire in the form of a circle with diameter 28 mm. The wire used for making 4 diameters which divide the circle into 8 equal sectors.

Design B: Brooch B is made in two colours — Gold and Silver. Outer part is made with gold. The circumference of silver part is 44 mm and the gold part is 3 mm wide everywhere.

Refer to Design A

(a) The total length of the silver wire required is **1**

    (i) 180 mm   (ii) 200 mm   (iii) 250 mm   (iv) 280 mm

(b) The area of each sector of the brooch is **1**

    (i) 44 mm²   (ii) 52 mm²   (iii) 77 mm²   (iv) 68 mm²

Refer to Design B

(c) The circumference of outer part (golden) is   **1**

    (i) 48.49 mm   (ii) 82.2 mm   (iii) 72.50 mm   (iv) 62.86 mm

(d) The difference of areas of golden and silver parts is   **1**

    (i) 18π (ii) 44π (iii) 51π (iv) 64π

(e) A boy is playing with the brooch B. He makes revolution with it along its edge. How many complete revolutions must it take to cover 80π mm?   **1**

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