SATISH CHANDRA MEMORIAL SCHOOL

SUB-MATHEMATICS   CLASS-X
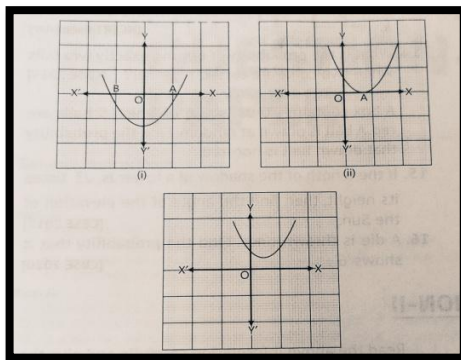
TEACHER NAME- GOUR SUNDOR GHOSH

TYPE- CASE STUDY

1.   **POLYNOMIAL**

CASE STUDY -1: Three students were given the task to prepare a graph of quadratic polynomial $y = p(x)$. They are drawn the following graphs:

Baesd on the above graphs, answer the following questions:

i) The zeroes of the graph of the polynomial p(x) drawing by first student is:

(a) 0   (b) 1   (c) 2   (d) none of these

ii) The zeroes of the graph of the polynomial p(x) drawing by second student is:

(a) 0   (b) 1   (c) 2   (d) none of these

iii) For any quadratic polynomial $ax^2 + bx + c = 0,\ \ a \neq 0$, the graph of the corresponding equation $y = ax^2 + bx + c$ has shape open upwards like $'\cup'$ depending on:

(a) $a < 0$ (b) $a = 0$ (c) $a > 0$ (d) none of these

iv) The zeroes of the graph of the polynomial p(x) drawing by third student is:

(a) 1   (b) 2   (c) 3   (d) 0

v) The zeroes of a quadratic polynomial $ax^2 + bx + c = 0,\ \ a \neq 0$, are precisely the x-coordinate of points where the parabola $'\cup'$ representing $y = ax^2 + bx + c$

(a) the Y-axis   (b) the X-axis   (c) both axes   (d) none of these.

2.

CASE STUDY -2 The **Gateway Arch** is a 630-foot (192 m) monument in St. Louis, Missouri, United States. Clad in stainless steel and built in the form of a weighted catenary arch, it is the world's tallest arch, the tallest man-made monument in the Western Hemisphere, and Missouri's tallest accessible building. Built as a monument to the westward expansion of the United States, and officially dedicated to "the American people," the Arch, commonly referred to as "The Gateway to the West" is the centerpiece of Gateway Arch National Park and has become an internationally recognized symbol of St. Louis, as well as a popular tourist destination.

i) Name the shape of Gateway Arch

i) Linear   ii) hyperbola   iii) Parabola   iv) Ellipse

ii) What will be the general expression of the shape shown in the figure ?

i) $y = ax^2 + bx + c$ ii) $y = ax + b$
ii) iii) $y = ax^3 + bx^2 + cx + d$ iv) $y = ax^3 + bx + c$

iii) What is the possible value of "a" in the given expressions in Q2 for the Gateway arch?

i) a>0   ii) a<0   iii) a=0   iv) cannot be determined

iv) Zeroes of a polynomial p(x) 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

v) Arch with respect to axes is shown in the above figure. Measurement are in feet and the y-axis intercept is at 630 ft . The x-axis intercept are at -300 and 300 feet. Deduce the mathematical formula for the arch

i) $k(x^2 - 900)$ ii) $k(x^2 - 90000)$
iii) $k(x^2 + 300x - 300)$ iv) $k(x^3 - 300x^2 + 330)$

REAL NUMBERS

CASE STUDY-3: A seminar is being conducted by an Educational Organisation, where the participants will be educators of different subjects. The number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively.

i) In each room the same number of participants are to be seated and all of them being in the same subject, hence maximum number participants that can accommodated in each room are

a) 14   b) 12   c) 16   d) 18

ii) What is the minimum number of rooms required during the event?

a) 11   b) 31   c) 41   d) 21

iii) The LCM of 60, 84 and 108 is

a) 3780   b) 3680   c) 4780   d) 4680

iv) The product of HCF and LCM of 60,84 and 108 is

a) 55360   b) 35360   c) 45500   d) 45360

v) 108 can be expressed as a product of its primes as

a) $2^3 \times 3^2$ b) $2^3 \times 3^3$ c) $2^2 \times 3^2$ d) $2^2 \times 3^3$