

# Polynomials

## Case Study Based Questions

### Case Study 1

A reputed school of Meerut decided to conduct different types of Tours for the students to educate them. So in class X,  $\frac{1}{6}$ th times the square of the total number of students planned to visit historical monuments,  $\frac{5}{6}$ th times the total number of students planned to visit old age homes while 10 students decided to teach poor children.



On the basis of the above information, solve the following questions:

**Q 1.** Using above information, express the total number of students as a polynomial in terms of  $x$ :

- a.  $\frac{x^2}{6} + \frac{5}{6}x + 10$       b.  $\frac{x^2}{4} + \frac{7}{4}x + 10$   
c.  $\frac{7x^2}{12} + \frac{1}{12}x + 10$       d.  $\frac{x^2}{4} + \frac{7}{4}x + 15$

**Q 2.** Write the coefficient of  $x$  in polynomial.

- a.  $\frac{9}{13}$       b.  $\frac{5}{6}$       c.  $\frac{11}{12}$       d.  $\frac{13}{12}$

**Q 3. Write the coefficient of  $x^2$  in polynomial.**

- a.  $\frac{1}{13}$       b.  $\frac{1}{10}$       c.  $\frac{1}{6}$       d. 15

**Q 4. Value of  $p(x)$  at  $x = 2$  is:**

- a.  $\frac{37}{3}$       b.  $\frac{11}{2}$       c.  $\frac{22}{3}$       d.  $\frac{14}{3}$

**Q 5. When  $p(x)$  is divided by  $x$ , then quotient is:**

- a.  $\frac{x}{6} + \frac{5}{6} - \frac{10}{x}$       b.  $\frac{x}{6} + \frac{5}{6} + \frac{10}{x}$   
c.  $\frac{x^3}{6} + \frac{5}{6}x^2 + 10x$       d.  $\frac{x^3}{6} + \frac{5}{6}x + 10$

## Case Study 2

Amit along with his four friends visited the house of Rohit, who was a common friend. There they meet his father, who was having keen interest in mathematics. Rohit's father wanted to test the practical knowledge of all his friends, so he showed some objects like a cuboid shaped geometry box, a rectangular photo frame, a circular cardboard, square shaped files and a cube. He started asking the following questions one by one.



(Cuboid Geometry Box)



(Rectangular Photo Frame)



(Circular Cardboard)

On the basis of the above information, solve the following questions:



### Case Study 3

Nari Niketan is an organisation to help the women and child having distress. Swati donated some amount to this organisation for betterment. The amount of donation is represented by the

expression  $\text{₹ } 4x^2 + \frac{1}{4x^2}$ . She also discussed

her friends about this organisation. Some of her friends wanted to know the amount of donation, but she did not disclose this amount to anyone. Some how her friend got to know that she gave

amount having expression  $\left(2x + \frac{1}{2x}\right)$ , whose value is ₹ 90.



On the basis of the above information, solve the following questions:

**Q 1. The amount donated by Swati in the expression form is:**

- a. linear equation      b. quadratic equation
- c. algebraic expression      d. polynomial

**Q 2. If  $x = \sqrt{2}$ , then the amount donated by Swati is:**

- a. ₹ 8      b. ₹ 8.125      c. ₹ 8.75      d. ₹ 9

**Q 3. The value of  $\left(2x + \frac{1}{2x}\right)^2$  is:**

- a. 8000      b. 8100      c. 8200      d. 8300

**Q 4. The amount donated by Swati (in ₹) is:**

- a. ₹ 9020      b. ₹ 8096      c. ₹ 8090      d. ₹ 9000

**Q 5. If  $x = 5$ , then the value of donated expression is:**

- a.  $\frac{10001}{100}$       b.  $\frac{1003}{100}$       c.  $\frac{999}{100}$       d.  $\frac{10005}{100}$

### Case Study 4

In the current scenario, people use such door whose top half part is made of glass and bottom half part is wooden.



The glass portion of the door is having length and width in the ratio of 5: 3. The wooden frame around the glass portion adds 11 inches to the total width and 14 inches to the total length. Consider the length of the glass portion as  $5x$  inches:

On the basis of the above information, solve the following questions:

**Q1. Find the total length of the glass portion of the door (in inches) is represented in terms of  $x$ .**

**Q 2. Find the total width of the glass portion of the door (in inches).**

**Q3. Write the polynomial representation of the area top half part of the door.**

**Q4. Find the zeroes of the polynomial representing the area.**