

S.D.PUBLIC SCHOOL,BU- BLOCK, PITAMPURA, DELHI
HOLIDAYS' HOMEWORK 2026-27
SUBJECT- MATHEMATICS
CLASS – X

The introduction of holidays' homework at SDPS reflects our commitment to maintaining high standards of teaching and learning excellence. We believe in nurturing students' academic growth not only within the classroom but also during breaks, ensuring continual progress and skill development. To this end, we have designed engaging and creative tasks to challenge our students, encouraging them to apply their knowledge, demonstrate self-discipline, and hone essential skills such as independent study and time management. We trust our students to approach these tasks with enthusiasm and creativity, showcasing their dedication to academic excellence.

TASK 1: INTERDISCIPLINARY PROJECT
PAIRING STATE – ANDAMAN AND NICOBAR ISLANDS

ECONOMIC GROWTH OF ANDAMAN AND NICOBAR ISLANDS
(Comparative study with economic growth of New Delhi)

What is Per Capita income?

Per capita income, often referred to as income per capita, is a crucial economic metric used to determine the average income earned by each individual in a particular nation, region, or geographic area. It serves as a valuable tool for assessing the economic well-being and quality of life for the population in that region.

How per capita income is calculated?

Per capita income is calculated by dividing the total income of a nation or region by its population. This simple formula provides an average income figure that helps economists, policymakers, and researchers gauge the overall economic health of an area.

Collect information about total income and population of Andaman and Nicobar Islands and New Delhi. Calculate per capita income of the two regions for last 5 years and complete the table below:

YEAR	ANDAMAN AND NICOBAR ISLANDS			NEW DELHI		
	Total Income	Population	Per capita income	Total Income	Population	Per capita income
2021						
2022						
2023						
2024						
2025						

- a) Represent the change in per capita income of both regions in the form of double bar graph using MS Excel
- b) Write a comparative analysis of the factors affecting per capita income of any region.

HOLIDAYS HOMEWORK

Assignment (Class – X)

Chapter – 1 (Real Numbers)

- The LCM of the smallest prime number and the smallest odd composite number is
(a) 10 (b) 6 (c) 9 (d) 18
- If the prime factorisation of 2520 is $2^3 \times 3^a \times b \times 7$, then the value of $a + 2b$ is
(a) 12 (b) 10 (c) 9 (d) 7
- Given $\text{HCF}(2520, 6600) = 120$, $\text{LCM}(2520, 6600) = 252 \times k$, then the value of k is
(a) 165 (b) 550 (c) 990 (d) 1650
- If two positive integers p and q are written as $p = x^2y^2$ and $q = xy^3$, x and y are prime numbers, then $\text{HCF}(p, q)$ is:
(a) xy (b) xy^2 (c) x^3y^3 (d) x^2y^2

For the following question, two statements are given – one labelled Assertion(A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below:

- Both A and R are true and R is the correct explanation of the assertion.
- Both A and R are true but R is not the correct explanation of the assertion.
- A is true, but R is false.
- A is false, but R is true.

- Assertion (A):** The HCF of two numbers is 16 and their product is 3072. Then their $\text{LCM} = 162$
Reason (R): If a and b are two positive integers, then $\text{HCF}(a, b) \times \text{LCM}(a, b) = a \times b$
- Show that 12^n cannot end with 0 for any natural number n .
- Prove that $\sqrt{3}$ is an irrational number.
- Prove that $7 - 2\sqrt{5}$ is an irrational number.
- Show that the number $5 \times 11 \times 17 + 3 \times 11$ is a composite number.
- Find the greatest number which divides 85 and 72 leaving remainders 1 and 2 respectively.

Case-Based Questions:

- 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 36, 84 and 108 respectively.

Based on the above information, answer the following questions:

- In each room the same number of participants are to be seated and all of them being in the same subject, Find the maximum number of participants that can be accommodated in each room.
- What is the minimum number of rooms required during the event?
- Find the LCM of 60, 84 and 108.

- We all know that morning walk is good for health. In morning walk, three friends Anjali, Heena and Nidhi step off together. Their steps measure 80 cm, 85 cm and 90 cm respectively.

Based on the above information, answer the following questions:

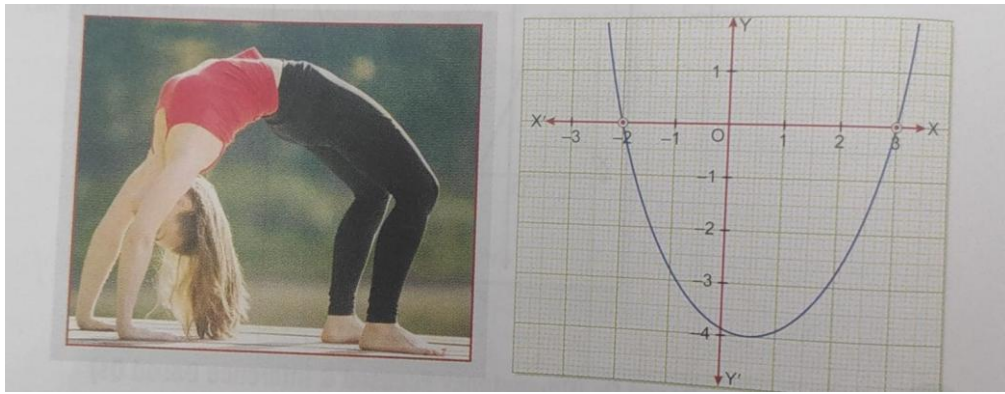
- Write the prime factorisation of 80, 85 and 90.
- What is the minimum distance each should walk so that they can cover the distance in complete steps?
- What is the minimum number of steps taken by any of three friends, when they meet again?

Chapter – 2 (Polynomials)

13. If the sum of the zeroes of the quadratic polynomial $p(x) = kx^2 + 2x + 3k$ is equal to the product of its zeroes, then the value of k is
(b) $-\frac{2}{3}$ (b) $\frac{2}{3}$ (c) $\frac{3}{2}$ (d) $-\frac{3}{2}$
14. The number of zeroes of a quadratic polynomial whose graph intersects the y -axis at exactly one point and does not intersect the x -axis is
(b) 0 (b) 1 (c) 2 (d) 3
15. If one zero of the polynomial $x^2 - 3kx + 4k$ be twice of the other, then the value of k is
(b) -2 (b) 2 (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$
16. The graph of $y = p(x)$ is given in the adjoining figure. Zeroes of the polynomial $p(x)$ are
(b) $-5, 7$ (b) $-\frac{5}{2}, -\frac{7}{2}$ (c) $-5, 0, 7$ (d) $-5, -\frac{5}{2}, -\frac{7}{2}, 7$
- For the following question, two statements are given – one labelled Assertion(A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below:
- (a) Both A and R are true and R is the correct explanation of the assertion.
(b) Both A and R are true but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.
17. **Assertion (A):** The graph of quadratic polynomial $p(x)$ always intersects x -axis at two points.
Reason (R): Degree of quadratic polynomial is 2.
18. Find the zeroes of the quadratic polynomial $p(x) = x^2 - 15$ and verify the relationship between the zeroes and the coefficients of polynomial.
19. Write the quadratic polynomial, the product and sum of whose zeroes are $-\frac{9}{2}$ and $-\frac{3}{2}$ respectively.
20. If α and β are the zeroes of $x^2 - x - 2$, form a quadratic polynomial whose zeroes are $2\alpha + 1$ and $2\beta + 1$.
21. If α and β are the zeroes of $x^2 - 5x + 6$, find the value of (i) $\alpha^2 + \beta^2$ (ii) $\alpha^2\beta + \beta^2\alpha$
22. Find the value of k such that the polynomial $x^2 - (k + 6)x + 2(2k - 1)$ has sum of its zeroes equal to half of their product.

Case-Based Questions:

23. In a pool at an aquarium, a dolphin jumps out of the water travelling at 20 cm per second. Its height above water level after t seconds is given by $h = p(t) = 20t - 16t^2$
Based on the above information, answer the following questions:
- (i) Find zeroes the polynomial $p(t) = 20t - 16t^2$
(ii) What would be the value of h at $t = 3/2$
(iii) How much distance did the dolphin cover before hitting the water level again?
(iv) After jumping out of water, at what time will the dolphin be at a height of 4 cm?
24. **Chakrasana**, also known as the Wheel Pose or **Urdhva Dhanurasana**, is a yoga pose that involves bending the spine backward into an arch. It can be observed from the image that this pose is related to representation of a quadratic polynomial.



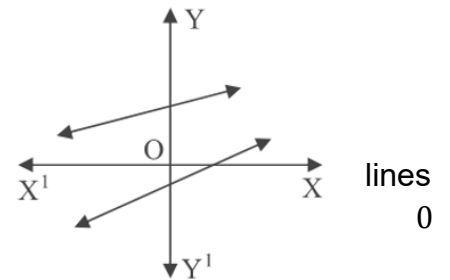
Based on the above information, answer the following questions:

- In the graph, $y = p(x)$, how many zeroes are there for the polynomial?
- Look at the graph and form a quadratic polynomial.
- At most how many zeroes a polynomial of degree n can have?
- Write an example of a quadratic polynomial which has no real zero.

Chapter – 3 (Pair of Linear Equations in two variables)

25. In the given figure, graphs of two linear equations are shown. The pair of these linear equations is

- Consistent with unique solution
- Consistent with infinitely many solutions
- Inconsistent
- Inconsistent but can be made consistent by extending these



26. The value of k for which the system of equations $3x - y + 8 =$ and $6x - ky + 16 = 0$ has infinitely many solutions is

- -2
- 2
- $\frac{1}{2}$
- $-\frac{1}{2}$

27. The pair of equations $ax + 2y = 9$ and $3x + by = 18$ represents parallel lines, where a, b are integers, if

- $a = b$
- $3a = 2b$
- $2a = 3b$
- $ab = 6$

28. The pair of linear equations $y = 0$ and $y = -6$ has

- A unique solution
- no solution
- Infinitely many solutions
- only solution $(0,0)$

29. For the following question, two statements are given – one labelled Assertion(A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below:

- Both A and R are true and R is the correct explanation of the assertion.
- Both A and R are true but R is not the correct explanation of the assertion.
- A is true, but R is false.
- A is false, but R is true.

Assertion (A): $3x + 4y + 5 = 0$ and $6x + ky + 9 = 0$ represent parallel lines if $k = 8$

Reason (R): $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ represent parallel lines

$$\text{if } \frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

30. Three years ago, Rashmi was thrice as old as Nazma. Ten years later, Rashmi will be twice as old as Nazma. How old are Rashmi and Nazma now?

31. The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there?

32. Draw the graph of the pair of equations $2x + y = 4$ and $2x - y = 4$. Write the vertices of the triangle formed by these lines and the y -axis. Also find the area of the triangle.
33. Solve for x and y : $217x + 131y = 913$ and $131x + 217y = 827$
34. In a competitive examination, one marks is awarded for each correct answer while $\frac{1}{2}$ mark is deducted for every wrong answer. Jayanti answered 120 questions and got 90 marks. How many questions did she answer correctly?

Case-Based Questions:

35. Essel World is one of India's largest amusement parks that offers a diverse range of thrilling rides, water attractions and entertainment options for visitors of all ages. The park is known for its iconic "Water kingdom" section, making it popular destination for family outings and fun-filled adventure. The ticket charge for the park are ₹ 150 per child and ₹ 250 per adult. On a day, the cashier of the park found that 300 tickets were sold and an amount of ₹ 55,000 were collected.

Based on the above information, answer the following questions:

- (i) If the number of children visited be ₹ x and the number of adults visited be y , then write the given situation algebraically.
- (ii) How many children visited the amusement park that day?
- (iii) How many adults visited the amusement park that day?
- (iv) How much amount will be collected if 250 children and 100 adults visit the amusement park?
36. It is common that Governments revise travel fares from time to time based on various factors such as inflation (a general increase in prices and fall in the purchasing value of money) on different types of vehicles like auto, Rickshaws, taxis, Radio cab etc. The auto charges in a city comprise of a fixed charge together with the charge for the distance covered. Study the following situations:

Situation 1: In city A, for a journey of 10 km, the charge paid is Rs 75 and for a journey of 15 km, the charge paid is Rs 110.

Situation 2: In a city B, for a journey of 8km, the charge paid is Rs91 and for a journey of 14km, the charge paid is Rs 145.

Based on the above information, answer the following questions:

- (i) If the fixed charges of auto rickshaw be ₹ x and the running charges be ₹ y km/hr, then write the pair of linear equations representing the situation.
- (ii) Find the fixed charge and the running charges.
- (iii) Find the amount to be paid if a person travels a distance of 50 km.

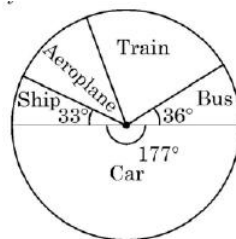
Chapter – 14 (Probability)

37. Two friends were born in the year 2000. The probability that they have the same birthday is
 (g) $\frac{1}{365}$ (b) $\frac{364}{365}$ (c) $\frac{1}{366}$ (d) $\frac{365}{366}$
38. Two dice are rolled together. The probability of getting sum of numbers on the two dice is 2,3 or 5 is
 (d) $\frac{7}{36}$ (b) $\frac{11}{36}$ (c) $\frac{5}{36}$ (d) $\frac{4}{9}$
39. A box contains cards numbered 6 to 55. A card is drawn at random from the box. The probability that the drawn card has a number which is a perfect square is
 (d) $\frac{7}{50}$ (b) $\frac{7}{55}$ (c) $\frac{1}{10}$ (d) $\frac{5}{49}$

40. The probability of guessing the correct answer to a certain question in a test is $\frac{x}{12}$. If the probability of not guessing the correct answer is $\frac{2}{3}$, then the value of x is
 (a) 2 (b) 3 (c) 4 (d) 6
41. For the following question, two statements are given – one labelled Assertion(A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below:
- (a) Both A and R are true and R is the correct explanation of the assertion.
 (b) Both A and R are true but R is not the correct explanation of the assertion.
 (c) A is true, but R is false.
 (d) A is false, but R is true.
- Assertion (A):** The probability that a leap year has 53 Sundays is $\frac{2}{7}$
Reason (R): The probability that a non-leap year has 53 Sundays is $\frac{5}{7}$
42. A game consists of tossing a one-rupee coin 3 times and noting its outcome each time. Hanif wins if all the tosses give the same result i.e., three heads or three tails, and loses otherwise. Calculate the probability that Hanif will lose the game.
43. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball at random from the bag is three times that of a red ball, find the number of blue balls in the bag.
44. If a number x is chosen at random from the numbers $-3, -2, -1, 0, 1, 2, 3$. What is the probability that $x^2 \leq 4$?
45. A card is drawn at random from a well shuffled deck of 52 playing cards. Find the probability of getting neither a red card nor a queen.
46. Two dice are thrown at the same time and the product of numbers appearing on them is noted. Find the probability that the product is a prime number.

Case-Based Questions:

47. In a survey on holidays, 120 people were asked to state which type of transport they used on their last holiday. The following pie chart shows the results of the survey. Observe the pie chart and answer the following questions:



- (i) In one person is selected at random, find the probability that he/she travelled by bus or ship.
 (ii) Which is the most favourite mode of transport and how many people used it?
 (iii) A person is selected at random. If the probability that he did not use train is $\frac{4}{5}$, find the number of people who used train.
 (iv) The probability that randomly selected person used aeroplane is $\frac{7}{60}$. Find the revenue collected by air company at the rate of ₹ 5000 per person.
48. Blood group describes the type of blood a person has. It is a classification of blood based on the presence or absence of inherited antigenic substances on the surface of red blood cells. Blood types predict whether a serious reaction will occur in a blood transfusion. In a sample of 50 people, 21 had type O blood, 22 had type A, 5 had type B and rest had type AB blood group.

Based on the given situation, answer the following questions:

- (i) What is the probability that a person chosen at random had type O blood?
- (ii) What is the probability that a person chosen at random had type AB blood group?
- (iii) What is the probability that a person chosen at random had neither type A nor type B blood group?
- (iv) What is the probability that person chosen at random had either type A or type B or type O blood group?