

AUTUMN BREAK PRACTICE HOMEWORK

Class X — Mathematics (English Medium)

Duration: 10 Days
Subject: Mathematics (041)
Academic Year: 2026-27

General Instructions for Students:

- Solve all daily practice problems in a separate 100-page Homework Notebook.
- Show step-by-step calculations, accurate formulas, and neat diagrams where required.
- Revise key concepts and formulas daily before answering the questions.

DAY 1: Real Numbers

Chapter 1

Key Concept: $\text{HCF}(a, b) \times \text{LCM}(a, b) = a \times b$ | Fundamental Theorem of Arithmetic

Q1. Express 140 and 156 as a product of their prime factors using prime factorization method.

Q2. Given that $\text{HCF}(306, 657) = 9$, find the $\text{LCM}(306, 657)$. Show full calculation.

Q3. Prove that $3 + 2\sqrt{5}$ is an irrational number, given that $\sqrt{5}$ is irrational.

DAY 2: Polynomials

Chapter 2

Key Concept: Sum of zeroes $(\alpha + \beta) = -b/a$ | Product of zeroes $(\alpha\beta) = c/a$

Q1. Find the zeroes of the quadratic polynomial $x^2 - 2x - 8$ and verify the relationship between the zeroes and coefficients.

Q2. Find a quadratic polynomial whose sum and product of zeroes are -3 and 2 respectively.

Q3. If α and β are the zeroes of the polynomial $p(x) = 2x^2 - 5x + 7$, evaluate the expression $\alpha^2 + \beta^2$.

DAY 3: Pair of Linear Equations in Two Variables

Chapter 3

Key Concept: Unique soln: $a_1/a_2 \neq b_1/b_2$ | Infinitely many: $a_1/a_2 = b_1/b_2 = c_1/c_2$ | No soln: $a_1/a_2 = b_1/b_2 \neq c_1/c_2$

Q1. Solve the following pair of linear equations by Substitution Method:
 $7x - 15y = 2$ and $x + 2y = 3$.

Q2. For what value of k will the following pair of linear equations have infinitely many solutions?
 $2x + 3y = 7$ and $(k-1)x + (k+2)y = 3k$.

Q3. 5 pencils and 7 pens together cost ₹ 50, whereas 7 pencils and 5 pens together cost ₹ 46. Find the cost of one pencil and one pen.

DAY 4: Quadratic Equations

Chapter 4

Key Concept: Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ | Discriminant $D = b^2 - 4ac$

Q1. Find the roots of the quadratic equation $2x^2 - 7x + 3 = 0$ by factorisation method.

Q2. Find the nature of the roots of $2x^2 - 4x + 3 = 0$. If real roots exist, find them using the quadratic formula.

Q3. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, it would have taken 3 hours more to cover the same distance. Find the speed of the train.

DAY 5: Arithmetic Progressions (AP)

Chapter 5

Key Concept: n -th term $a_n = a + (n - 1)d$ | Sum $S_n = (n/2)[2a + (n - 1)d]$ **Q1.** Find the 31st term of an AP whose 11th term is 38 and the 16th term is 73.**Q2.** How many two-digit numbers are divisible by 3? Find their sum.**Q3.** Find the sum of the first 40 positive integers divisible by 6.**DAY 6: Triangles**

Chapter 6

Key Concept: Basic Proportionality Theorem (Thales Theorem) | Criteria for Similarity (AAA, SAS, SSS)**Q1.** State and prove the **Basic Proportionality Theorem (BPT)** with a neat labeled diagram.**Q2.** In $\triangle ABC$, $DE \parallel BC$ such that $AD = x$, $DB = x - 2$, $AE = x + 2$, and $EC = x - 1$. Find the value of x .**Q3.** A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower.**DAY 7: Coordinate Geometry**

Chapter 7

Key Concept: Distance = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ | Section Formula: $((m x_2 + n x_1)/(m + n), (m y_2 + n y_1)/(m + n))$ **Q1.** Find the point on the x-axis which is equidistant from **(2, -5)** and **(-2, 9)**.**Q2.** Find the ratio in which the line segment joining the points A(1, -5) and B(-4, 5) is divided by the x-axis. Also find the coordinates of the point of division.

DAY 8: Introduction to Trigonometry

Chapter 8

Key Concept: $\sin^2\theta + \cos^2\theta = 1$ | $1 + \tan^2\theta = \sec^2\theta$ | $1 + \cot^2\theta = \operatorname{cosec}^2\theta$ **Q1.** If $15 \cot A = 8$, find $\sin A$ and $\sec A$.**Q2.** Evaluate: $(2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ)$.**Q3.** Prove the identity: $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$.**DAY 9: Circles & Area Related to Circles**

Chapter 10 & 11

Key Concept: Tangents from external point are equal | Area of sector = $(\theta/360^\circ) \times \pi r^2$ **Q1.** Prove that the lengths of tangents drawn from an external point to a circle are equal.**Q2.** Find the area of a sector of a circle with radius 6 cm if angle of the sector is 60° . (Use $\pi = 22/7$)**Q3.** A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding minor segment.**DAY 10: Statistics & Probability**

Chapter 13 & 14

Key Concept: Mean $\bar{x} = \sum f_i x_i / \sum f_i$ | $P(E) = (\text{Number of favorable outcomes}) / (\text{Total outcomes})$ **Q1.** A box contains 3 blue, 2 white, and 4 red marbles. If a marble is drawn at random from the box, what is the probability that it will be (i) white? (ii) blue? (iii) not red?**Q2.** Two dice are thrown at the same time. Find the probability of getting (i) a doublet, (ii) a sum of 8 on the two top faces.

