SUB: MATHEMATICS   **M.MARKS: 80**
CLASS: X   **TIME: 3 HRS.**

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.

2. Section A has 20 MCQs carrying 1 mark each

3. Section B has 5 questions carrying 02 marks each.

4. Section C has 6 questions carrying 03 marks each.

5. Section D has 4 questions carrying 05 marks each.

6. Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1 mark each respectively.

7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3marks and 2 Questions of 2 marks has been provided.

8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

	SECTION A	Marks
1	The HCF and LCM of two numbers are 33 and 264 respectively. When the first number is completely divided by 2 the quotient is 33. The other number is: (a) 66 (b) 130 (c) 132 (d) 196	1
2	The solution of the equations x – y = 2 and x + y = 4 is: (a) 3 and 5 (b) 5 and 3 (c) 3 and 1 (d) –1 and –3	1
3	Graphically, the pair of equations 7x – y = 5; 21x – 3y = 10 represents two lines which are (a) intersecting at one point (b) parallel (c) intersecting at two points (d) coincident	1
4	Which of the following equations has two distinct real roots? (a) $2x^2+3\sqrt{2}x + 9/4 = 0$ (b) x + x - 5 = 0 (c) $x^2 + 3x + 2\sqrt{2} = 0$ (d) $5x^2 - 3x + 1 = 0$	1
5	The 10th term from the end of the A.P. -5, -10, -15,…, -1000 is (a) -955 (b) -945 (c) -950 (d) -965	1

6	The distance between the point P(1, 4) and Q(4, 0) is (a) 4 (b) 5 (c) 6 (d) $3\sqrt{3}$	
7	The line $3x + y – 9 = 0$ divides the line joining the points (1, 3) and (2, 7) internally in the ratio (a) 3 : 4 (b) 3 : 2 (c) 2 : 3 (d) 4 : 3	1
8	If $\triangle ABC \sim \triangle DEF$, AB = 4 cm, DE = 6 cm, EF = 9 cm and FD = 12 cm, find the perimeter of ABC. (a) 18 cm (b) 20 cm (c) 21 cm (d) 22 cm	1
9	If ½ is a root of the quadratic equation $x^2-mx-5/4=0$, then value of m is: (a) 2 (b) -2 (c) -3 (d) 3	1
10	The largest number which divides 60 and 75, leaving remainders 8 and 10 respectively, is (a) 260 (b) 75 (c) 65 (d) 13	1
11	If $\sin A + \sin^2 A = 1$, then the value of the expression $(\cos^2 A + \cos^4 A)$ is (a) 1 (b) 1/2 (c) 2 (d) 3	1
12	If $\cos X = a/b$, then $\sin X$ is equal to: (a) $\frac{\sqrt{b^2-a^2}}{b}$ (b) $\frac{\sqrt{b^2-a^2}}{a}$ (c) $\frac{b}{\sqrt{b^2-a^2}}$ (d) $\frac{a}{\sqrt{b^2-a^2}}$	1
13	If n is an even number then which of following is multiple of 2 (a)n + 1 (b) n +2 (c) n – 1 (d)n – 2	1
14	If 7 times the 7th term of an A.P. is equal to 11 times its 11th term, then 18th term is (a) 18 (b) 9 (c) 77 (d) 0	1

15	The zeroes of the quadratic polynomial $x^2 + 99x + 127$ are (a) both positive (b) both negative (c) one positive and one negative	1
	(d) both equal	
16	A quadratic polynomial, whose zeroes are −3 and 4, is (a) $x^2 − x + 12$ (b) $x^2 + x + 12$ (c) $(x^2/2) − (x/2) − 6$ (d) $2x^2 + 2x − 24$	1
17	In triangle ABC, $\angle BAC = 90°$ and $AD \perp BC$. Then (a) $BD . CD = BC^2$ (b) $AB . AC = BC^2$ (c) $BD . CD = AD^2$ (d) $AB . AC = AD^2$	1
18	A quadratic equation $ax^2 + bx + c = 0$ has no real roots, if (a) $b^2 − 4ac > 0$ (b) $b^2 − 4ac = 0$ (c) $b^2 − 4ac < 0$ (d) $b^2 − ac < 0$	1
19	**Directions:** (a) If both Assertion and Reason are correct and Reason is the correct explanation of Assertion. (b) If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion. (c) If Assertion is correct but Reason is incorrect. (d) If Assertion is incorrect but Reason is correct. **Assertion**: sinA is the product of sin & A. **Reason:** The value of $\sin\theta$ increases as θ increases.	1
20	**Assertion:** The mid-point of the line segment joining the points A (3, 4) and B (k, 6) is P (x, y) and $x + y − 10 = 0$, the value of k is 7. **Reason:** Mid-point of line segment is $[(x_1+x_2)/2,(y_1+y_2)/2]$	1
	SECTION B	
21	Which term of the progression 4, 9, 14, 19, … is 109?	2
22	Find the roots of the following quadratic equations, if they exist, by the method of completing the square: (i) $2x^2 − 7x +3 = 0$ (ii) $2x^2 + x − 4 = 0$	2
23	Write the discriminant of quadratic equation $(x+4)^2=3(x-4)$.	2

| 24	Three vertices of a parallelogram taken in order are (-1, 0), (3, 1) and (2, 2) respectively. Find the coordinates of fourth vertex.	2
	OR	
	In which quadrant the point P that divides the line segment joining the points A(2, -5) and B(5,2) in the ratio 2 : 3 lies?	
25	If 3 cot A = 4, check whether $(1 – \tan^2 A)/(1 + \tan^2 A) = \cos^2 A – \sin^2 A$ or not.	2

	OR	
	Evaluate $2\sec^2 A + 3\cosec^2 A - 2\sin A \cos A$ if $A = 45^0$.	

	SECTION C	
26	Prove that $2 + \sqrt{5}$ is irrational.	3
27	Solve the following pair of equations: 49x + 51y = 499 51x + 49 y = 501	3
28	A father's age is three times the sum of the ages of his two children. After 5 years, his age will be two times of the sum of their ages. Find the present age of the father.	3
	OR	
	Anuj had some chocolates, and he divided them into two lots a and b. he sold the first lot at the rate of ₹2 for 3 chocolates and the second lot at the rate of ₹1 per chocolate, and got a total of ₹400. if he had sold the first lot at the rate of ₹1 per chocolate, and the second lot at the rate of ₹4 for 5 chocolates, his total collection would have been ₹460. find the total number of chocolates he had.	
29	Find the ratio in which y-axis divides the line segment joining the points A(5, -6), and B(-1, -4). Also find the coordinates of the point of division.	3
30	Express the trigonometric ratios sin A, sec A and tan A in terms of cot A.	3
	OR	
	If $x = p \sec \theta + q \tan \theta$ and $y = p \tan \theta + q \sec \theta$, then prove that $x^2 – y^2 = p^2 – q^2$.	
31	How many terms of the AP : 24, 21, 18, . . . must be taken so that their sum is 78?	3

	SECTION D	
32	If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first **n** terms.	5
	OR	
	In an AP of 50 terms, the sum of first 10 terms is 210 and the sum of its last 15 terms is 2565.	

33	State and Prove Basic Proportionality Theorem.	5
	OR	
	Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that $\triangle ABC \sim \triangle PQR$.	
34	If $\sin \theta + \cos \theta = \sqrt{3}$, then prove that $\tan \theta + \cot \theta = 1$.	5
	OR	
	If $x = p \sec \theta + q \tan \theta$ and $y = p \tan \theta + q \sec \theta$, then prove that $x^2 - y^2 = p^2 - q^2$.	
35	Find the value of p for which the quadratic equation $(2p + 1)x^2 - (7p + 2)x + (7p - 3) = 0$ has equal roots. Also find these roots	5

In order to conduct Sports Day activities in your School, lines have been drawn with chalk powder at a distance of 1 m each, in a rectangular shaped ground ABCD, 100 flowerpots have been placed at a distance of 1 m from each other along AD, as shown in given figure below. Niharika runs 1/4 th the distance AD on the 2nd line and posts a green flag. Preet runs 1/5 th distance AD on the eighth line and posts a red flag.
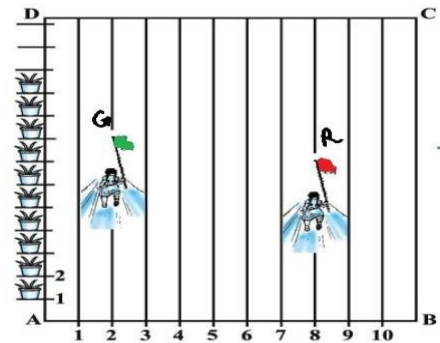
1. What is the distance between both the flags?

    a) √11

    b) √61

    c) √51

    d) √41

2. Find the position of red flag.

    a) (20,8)

    b) (8,20)

    c) (8,0.2)

    d) (8,0)

3. If Rashmi has to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag?

    a) (5, 22.5)

    b) (10,22)

    c) (2,8.5)

    d) (2.5,20)

4. If Joy has to post a flag at one-fourth distance from green flag ,in the line segment joining the green and red flags, then where should he post his flag?
   a) (3.5,24)

   b) (0.5,12.5)

   c) (2.25,8.5)

   d) (25,20)

---

37 | 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: | 4

Name of the city	Distance travelled (Km)	Amount paid (Rs.)
City A	10	75
	15	110
City B	8	91
	14	145

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.

Refer situation 1

1. If the fixed charges of auto rickshaw be Rs x and the running charges be Rs y km/hr, the pair of linear equations representing the situation is

a) $x + 10y = 110$, $x + 15y = 75$

b) $x + 10y = 75$, $x + 15y = 110$

c) $10x + y = 110$, $15x + y = 75$

d) $10x + y = 75$, $15x + y = 110$

2. A person travels a distance of 50km. The amount he has to pay is a)

Rs.155

b) Rs.255

c) Rs.355

d) Rs.455

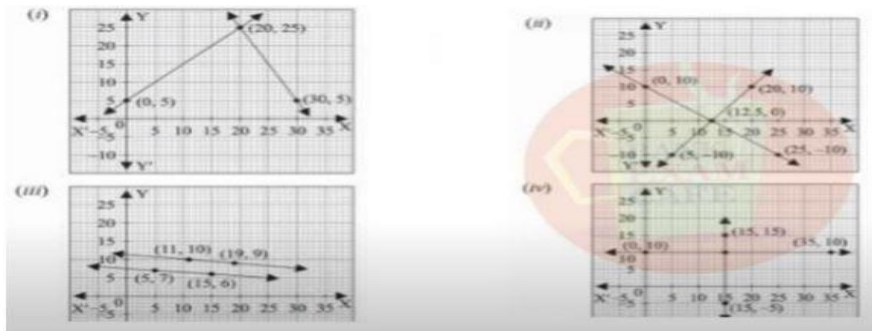3. What will a person have to pay for travelling a distance of 30km? a)

Rs.185

b) Rs.289

c) Rs.275

d) Rs.305

4.The graph of lines representing the conditions are: (situation 2)

| 38	An asana is a body posture, originally and still a general term for a sitting meditation pose, and later extended in hatha yoga and modern yoga as exercise, to any type of pose or position, adding reclining, standing, inverted, twisting, and balancing poses. In the figure, one can observe that poses can be related to representation of quadratic polynomial.	4

1.

The shape of the poses shown is
a) Spiral
b) Ellipse
c) Linear
d) Parabola

2. The graph of parabola opens downwards, if _ a) a ≥ 0
b) a = 0
c) a < 0
d) a > 0

3. In the graph, how many zeroes are there for the polynomial?

a) 0
b) 1
c) 2
d) 3
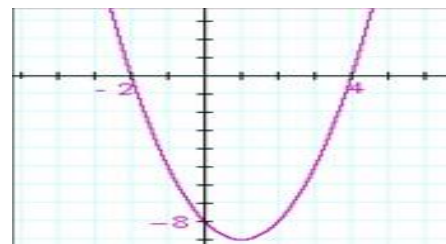
4. . The two zeroes in the above shown

graph are :

a) 2, 4
b) -2, 4
c) -8, 4
d) 2, -8