

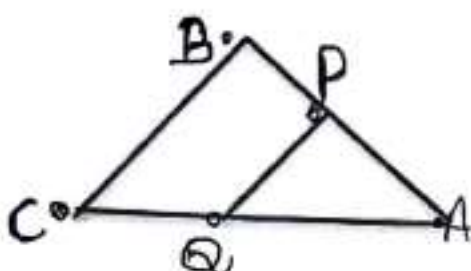
CLASS – X
MID TERM EXAM – (2025 – 26)
SUBJECT – MATHEMATICS
SET – A1

Time Allowed: 3 Hours**Max. Marks: 80****General Instructions:**

1. This Question Paper has 5 Sections A-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 subparts of the values of 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E .

A1	QUESTIONS
Q	SECTION - A
1	If $k + 2$, $4k - 6$ and $3k - 2$ are three consecutive terms of an A.P then value of k is a) -4 b) -3 c) 3 d) 4
2	Two dice are thrown simultaneously .The probability that the sum of the two numbers appearing on the top of the dice is less than 12 is (a) $\frac{1}{36}$ (b) $\frac{35}{36}$ (c) 0 (d) 1
3	A three digit natural number is chosen . Find the probability that all digits are same . (a) $\frac{1}{100}$ (b) $\frac{99}{100}$ (c) $\frac{11}{900}$ (d) 0
4	The 13 th term from the end of the A.P : $-11, -8, -5, \dots, 79$ is : (a) -40 (b) 40 (c) 43 (d) 58

5	The mean and median of given set of observations is 10 and 11 respectively, then the value of mode is a) 10.5 b) 8 c) 13 d) 21
6	In the formula, $\bar{x} = a + \frac{\sum f_i u_i}{\sum f_i} \times h$ for finding the mean of grouped frequency distribution, u_i is (a) $\frac{x_i - a}{h}$ (b) $\frac{x_i + a}{h}$ (c) $\frac{x_i}{h}$ (d) $h(x_i - a)$
7	If the roots of the equation $ax^2 + bx + c = 0$, $a \neq 0$ are real, then which of the following relation is true? (a) $b^2 > \frac{ac}{4}$ (b) $b^2 < ac$ (c) $ac = \frac{b^2}{4}$ (d) $ac \leq \frac{b^2}{4}$
8	The discriminant of the quadratic equation $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$ is (a) ± 8 (b) 8 (c) $100 - 4\sqrt{3}$ (d) 64
9	If the sum of the zeroes of the quadratic polynomial $P(x) = 2x^2 - k\sqrt{2}x + 1$ is $\sqrt{2}$, then the value of k is (a) $\frac{1}{2}$ (b) $\sqrt{2}$ (c) 2 (d) -2
10	The pair of equations $6x - 3y + 10 = 0$ and $2x - y + 9 = 0$ represent two lines which are (a) intersecting at one point (b) coincident (c) intersecting at two points (d) parallel
11	The condition for a pair of linear equations to have a unique solution is (a) $\frac{a_1}{a_2} = \frac{b_1}{b_2}$ (b) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ (c) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ (d) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$
12	If two positive integers a and b are expressible in the form $a = 18p^2q^4$ and $b = 20p^3q^2$; p and q are prime numbers, then LCM(a, b) is (a) $12p^2q^2$ (b) $180p^3q^4$ (c) $180p^2q^2$ (d) $2p^2q^2$
13	If the HCF of 65 and 117 is expressible in the form $65m - 117$, then the value of m is (a) 4 (b) 2 (c) 1 (d) 3

14	In the given figure, $PQ \parallel BC$, $PQ = 3$ cm, $BC = 9$ cm, $AC = 7.5$ cm, then length of AQ is  (a) 1.5 cm (b) 2.5 cm (c) 5 cm (d) 6 cm
15	It is given that $\triangle ABC \sim \triangle DFE$, $\angle A = 30^\circ$, $\angle C = 50^\circ$, $AB = 5$ cm, $AC = 8$ cm, $DF = 7.5$ cm. Then which of the following is true a) $DE = 12$ cm, $\angle F = 50^\circ$ b) $DE = 12$ cm, $\angle F = 100^\circ$ c) $EF = 12$ cm, $\angle D = 100^\circ$ d) $EF = 12$ cm, $\angle D = 30^\circ$
16	15th term of the A.P. $x - 7, x - 2, x + 3, \dots$ is (a) $x - 77$ (b) $x + 53$ (c) $x + 63$ (d) $x + 73$
17	If $\sin \theta = \frac{4}{a}$ then $\tan \theta$ is (a) $\frac{4}{\sqrt{a^2 - 16}}$ (b) $\frac{4}{a - 2}$ (c) $\frac{\sqrt{a^2 - 4}}{4}$ (d) $\frac{a - 2}{4}$
18	If $x = 2 \sin 60^\circ \cos 60^\circ$ and $y = \sin^2 30^\circ - \cos^2 30^\circ$ and $x^2 = k y^2$, the value of k is a) $\sqrt{3}$ b) $-\sqrt{3}$ c) 3 d) -3
19	DIRECTION: A statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option. (A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A) (B) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A) (C) Assertion (A) is true but reason (R) is false. (D) Assertion (A) is false but reason (R) is true. Statement A (Assertion): If $2 - \sqrt{3}$ is one of the zeroes of a quadratic polynomial, then the other zero will be $2 + \sqrt{3}$.

	Statement R(Reason) : In a quadratic polynomial with rational coefficients, irrational zeroes occur in conjugate pairs.
20	Assertion: The value of $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$ is 1 Reason: $\sin 90^\circ = 1$ and $\cos 90^\circ = 0$
	SECTION – B
21	Prove that $2\sqrt{3} - 1$ is an irrational number , given that $\sqrt{3}$ is an irrational number. OR The LCM of two numbers is 9 times their HCF .The sum of LCM and HCF is 500 . Find the HCF .
22	If α, β are zeroes of $x^2 + \frac{1}{6}x - 2$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$.
23	For what value(s) of m will the following pair of equations have infinite number of solutions ? $2x + 3y = 7$ $(m - 1)x + (m + 2)y = 3m$ OR Solve for x and y: $\sqrt{2}x + \sqrt{3}y = 5$ $\sqrt{3}x - \sqrt{8}y = -\sqrt{6}$
24	Find k if $\frac{4 - \sin^2 45^\circ}{\cot k \tan 60^\circ} = 3.5$
25	All the face cards are removed from a pack of playing cards. One card is selected from the remaining cards. What is the probability of a) getting an ace ? b) getting a 5 or a 10 ?
	SECTION – C
26	A circular field has a circumference of 360 km . Three cyclists start together and can cycle 60km , 72 km and 90 km a day , around the field . After how many days will they meet again at the starting point ?
27	Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.
28	Prove that $\frac{1 + \cos \theta + \sin \theta}{1 + \cos \theta - \sin \theta} = \frac{1 + \sin \theta}{\cos \theta}$ OR Prove that : $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = 1 + \sec A \operatorname{cosec} A$

29	If α, β are zeroes of the quadratic polynomial $p(x) = 2x^2 - 3x + 1$, form a quadratic polynomial whose zeroes are 3α and 3β. OR If α and β are zeroes of the quadratic polynomial $x^2 - 6x + a$; find the value of 'a' if $3\alpha + 2\beta = 20$.																
30	If $\tan A = \sqrt{2} - 1$, show that $\sin A \cos A = \frac{\sqrt{2}}{4}$																
31	The following table shows the number of patients of different age group who were discharged from the hospital in a particular month : <table><tr><th>Age(in years)</th><th>Number of Patients Discharged</th></tr><tr><td>5 - 15</td><td>6</td></tr><tr><td>15 - 25</td><td>11</td></tr><tr><td>25 - 35</td><td>21</td></tr><tr><td>35 - 45</td><td>23</td></tr><tr><td>45 - 55</td><td>14</td></tr><tr><td>55 - 65</td><td>5</td></tr><tr><td>Total</td><td>80</td></tr></table> Find the Mean of the above data .	Age(in years)	Number of Patients Discharged	5 - 15	6	15 - 25	11	25 - 35	21	35 - 45	23	45 - 55	14	55 - 65	5	Total	80
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SECTION - D																	
32	If the median of the distribution is 14.4 , find f_1 and f_2. <table><tr><th>Class Interval</th><td>0 -6</td><td>6 -12</td><td>12 -18</td><td>18-24</td><td>24-30</td><td>Total</td></tr><tr><th>Frequency</th><td>4</td><td>f_1</td><td>5</td><td>f_2</td><td>1</td><td>20</td></tr></table>	Class Interval	0 -6	6 -12	12 -18	18-24	24-30	Total	Frequency	4	f_1	5	f_2	1	20		
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Frequency	4	f_1	5	f_2	1	20											
33	The sum of the first and eighth term of an A.P. is 32 and their product is 60. Find the A.P. Also , find the sum of the first 20 terms of the A.P.																
34	State and prove the Basic Proportionality theorem.																
35	The speed of a boat in still water is 11 km/hr. It can go 12 km upstream and return downstream to the original point in 2 hours 45 minutes. Find the speed of the stream. OR																

	It can take 12 hours to fill a swimming pool using 2 pipes. If the pipe with larger diameter is used for 4 hours and the pipe with smaller diameter for 9 hours, only half the pool can be filled. How long would it take for each pipe to fill the pool separately?						
	SECTION – E Instructions: Q36 TO Q38 are case based questions . Each question has 3 parts with choice in one part .						
36	In the construction of a school , laborer stacked bricks to form a staircase-like structure. The bottom row has 50 bricks, and each row above has 2 bricks less than the row below it. On the basis of above informaton answer the following questions:  1. Identify the sequence of the number of bricks in the stack and the n^{th} term of the sequence ? 2. How much shorter is the 12^{th} row than the 4^{th} row ? 3. (a)What is the total number of bricks used for 10 rows? Or 3.(b)How many rows can be constructed with 560 bricks?						
37	A test consists of True or False questions . One mark is awarded for every correct answer while $\frac{1}{4}$ is deducted for every wrong answer . A student knew correct answers of some of the questions. Rest of the questions he attempted by guessing. He answered 120 questions and got 90 marks. <table><tr><td>Type of questions</td><td>Mark given for correct answer</td><td>Marks deducted for wrong answers</td></tr><tr><td>True/False</td><td>1</td><td>0.25</td></tr></table> On the basis of above information answer the following questions:	Type of questions	Mark given for correct answer	Marks deducted for wrong answers	True/False	1	0.25
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True/False	1	0.25					

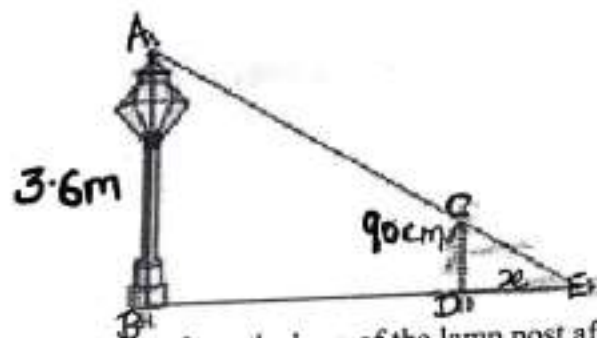
1. How many number of questions did he guess ,considering all the guesses are wrong .
2. How many maximum marks can a student score ?
3. a) If answer to all questions attempted by guessing were wrong ,then how many questions were answered correctly to score 95 marks ?

OR

3. b)) If answer to all questions attempted by guessing were wrong and answered 80 questions correctly , then how many marks will he get ?

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On one day , a poor girl of height 90 cm is looking for a lamp – post for completing her homework as in her area power is not there and she finds the same distance away from her home , she is walking away from the base of a lamp – post at a speed of 1.2 m/s . The lamp is 3.6 m above the ground as shown in the figure given below. On the basis of above information , answer the questions given below :



1. Find her distance from the base of the lamp post after 4 seconds .
2. Prove that $\triangle ABE \sim \triangle CDE$.
3. (a) Find the length of her shadow after 4 seconds .

OR

- (b) Find the ratio AC: CE .