

Convent School

(2026 – 27)

Set - A

Unit Test 1
Class 10
Mathematics

Time: 45 Min.Name: ANKIT YADAV

Roll no: _____ MM: 20

General Instructions:

1. This Question paper contains - four sections A, B, C, and D. Each section is compulsory.
2. Section A has 4 MCQ's based questions of 0.5 mark each.
3. Section B has 2 Very Short Answer (VSA)-type questions of 1 mark each.
4. Section C has 5 Short Answer (SA)-type questions of 2 marks each.
5. Section D has 2 Long Answer (LA)-type questions of 3 marks each.
6. Write neatly and clearly in the space provided.
7. Do not cut or fill the circle given on upper and bottom of paper.

8. Write the option in capital letters :**Section A : Write down the correct option for the given questions.**Q1. The minimum value of x for the inequation $5x - 4 \geq 18 - 6x$ is:

- A. 2 B. 22 C. -22 D. -2

ANS: A ✓

0.5 /0.5

Rough work:

Q2. If the quadratic equation $kx^2 + kx + 1 = 0$ has real and equal roots, the value of k is :

- A. 0 B. 4 C. 0 and 4 D. 0 or 4

ANS: C ✓

0.5 /0.5

Rough Work:

0000054

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Q3. If $x^2 - 4x = 5$, the value of x is :

- A. 5 B. -1 C. 5 or -1 D. 5 and -1

ANS: ✓

0.5 / 0.5

Rough Work:

Q4. The lengths of a rectangle is 3 m more than its width. If its area is 180 m^2 ; the length of the rectangle is :

- A. 12 m B. 9m C. 15m D. 10m

ANS: ✓

0.5 / 0.5

Rough Work:

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Section B : Write down the correct answer from the given options.

Q5. The sum of the ages of Rohan and his father is 35 years, whereas the product of their ages is 150.

Assertion (A) : Rohan's age is 5 years.

Reason (R) : If Rohan's age is x years then $x(35 - x) = 150$

option

- A. A is true, R is false.
- B. A is false, R is true.
- C. Both A and R are true and R is correct reason for R.
- D. Both A and R are true and R is incorrect reason for R.

ANS: ☒ C ✓

1.0 /1

Rough Work:

Q6. Inequation $5 - 2x \geq x - 10$, where $x \in \mathbb{N}$ (Natural numbers)

Assertion (A): $5 - 2x \geq x - 10 \Rightarrow -3x \geq -15 \Rightarrow x \geq 5$

$\therefore$ Solution set = $\{5, 6, 7, 8, \dots\}$

Reason (R): $5 - 2x \geq x - 10 \Rightarrow 5 + 10 \geq 3x \Rightarrow x \leq 5$

$\therefore$ Solution set = $\{1, 2, 3, 4, 5\}$

- A. A is true, R is false.
- B. A is false, R is true.
- C. Both A and R are true and R is correct reason for A.
- D. Both A and R are true and R is incorrect reason for A.

ANS: ☒ B ✓

1.0 /1

Rough Work:

Section C : has 5 Short Answer (SA)-type questions of 2 marks each.

Q7. Solve the following inequation, write the solution set and represent it on the real number line.

$$2x - \frac{5}{3} < \frac{3x}{5} + 10 \leq \frac{4x}{5} + 11, x \in \mathbb{R}$$

/2

Answer:

$$2x - \frac{5}{3} < \frac{3x}{5} + 10 \leq \frac{4x}{5} + 11, x \in \mathbb{R}$$

$$2x - \frac{5}{3} < \frac{3x}{5} + 10$$

$$2x - \frac{3x}{5} < 10 + \frac{5}{3}$$

$$\frac{7x}{5} < \frac{35}{3}$$

$$21x < 175$$

$$x < 8.4$$

$$\frac{3x}{5} + 10 \leq \frac{4x}{5} + 11$$

$$\frac{3x}{5} - \frac{4x}{5} \leq 11 - 10$$

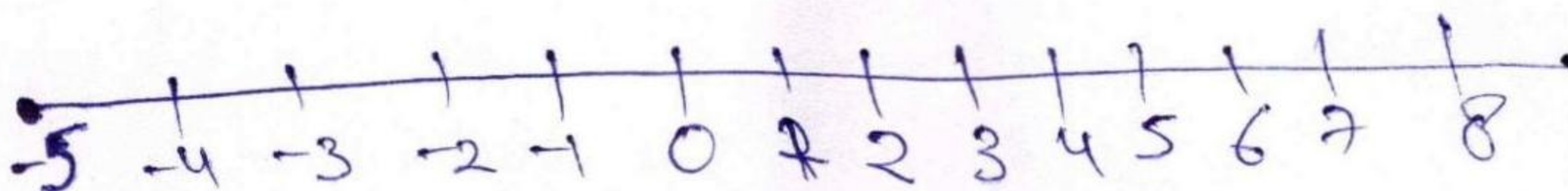
$$\frac{3x - 4x}{5} \leq 1$$

$$-\frac{x}{5} \leq 1$$

$$x \geq -5$$

$$-5 \leq x < 8.4$$

$$\{x: x \in \mathbb{R} \text{ and } -5 \leq x < 8.4\}$$



Marks	2.0
Teacher's feedback	Correct method. The exact upper bound is $25/3 \approx 8.333\dots$, not 8.4. Final solution set should be $[-5, 25/3)$.

Q8. Find three consecutive largest positive integers such that the sum of one-third of first, one-fourth of second and one-fifth of third is at most 20. /2

Answer:

Let the three consecutive positive integers be $n, n+1, n+2$

$$\frac{n}{3} + \frac{n+1}{4} + \frac{n+2}{5} = 20$$

$$\frac{20n + 15(n+1) + 12(n+2)}{60} = 20$$

$$20n + 15n + 15 + 12n + 24 = 20 \times 60$$

$$47n + 39 = 1200$$

$$47n = 1200 - 39$$

$$47n = 1161$$

$$n = \frac{1161}{47}$$

Marks	1.0
Teacher's feedback	Good setup and algebra, but you used "=" instead of "≤" and stopped at a non-integer k. Use inequality and take floor: k=24, so the integers are 24, 25, 26.

Q9. A hotel bill for a number of people for overnight stay is ₹ 4800. If there were 4 people more, the bill each person had to pay, would have reduced by ₹ 200. Find the number of people staying overnight.

/2 ✓

Answer:

Let the no of people be n

Total Bill be 4800

$$\Rightarrow \frac{4800}{n}$$

4 people more = $n+4$

Each person had to pay = 200 less

$$\text{ATQ} \therefore \frac{4800}{n} - \frac{4800}{n+4} = 200$$

$$\frac{4800(n+4) - 4800n}{n(n+4)} = 200$$

$$4800n + 19200 - 4800n = 200(n^2 + 4n)$$

$$19200 = 200n^2 + 800n$$

$$0 = 200n^2 + 800n - 19200$$

$$0 = 200(n^2 + 4n - 96)$$

$$0 = n^2 + 4n - 96$$

$$0 = n^2 + (12 - 8)n - 96$$

$$0 = n^2 + 12n - 8n - 96$$

$$0 = n(n+12) - 8(n+12)$$

$$0 = (n-8)(n+12)$$

$$n = 8$$

no. of people are 8.

Marks	2.0
Teacher's feedback	Solution is correct. Equations are set up properly, algebra is accurate, and the negative root is rightly discarded. Number of people is 8.

Q10. A plane left 30 minutes later than the scheduled time and in order to reach its destination 1500 km away in time, it has to increase its speed by 250 km/hr from its usual speed. Find its usual speed.

/2

Answer:

Time = $t+30$
 $D = 1500$
 $S = 250+t$
 $S = \frac{D}{T}$
 $\frac{250+t}{1} = \frac{1500}{t+30}$
 $250+t(t+30) = 1500$
 $250t + 7500 + t^2 + 30t = 1500$
 $t^2 + 280t + 6000 = 0$

X

X

X

Marks	0.0
Teacher's feedback	Units and model are incorrect: 30 minutes should be 0.5 h. Variable definitions are inconsistent, and $(250+t)(t+30)=1500$ is invalid. Correct setup: $1500/(v+250) = 1500/v - 0.5$, giving $v = 750$ km/h.

X

Q11. If $7 \geq -2x + 1 > -7$; find the sum of greatest and smallest values of $x \in \mathbb{I}$.

/2

Answer:

$$7 \geq -2x + 1 > -7$$

$$7 \geq -2x + 1$$

$$7 - 1 \geq -2x$$

$$6 \geq -2x$$

$$-3 \leq x$$

$$-2x + 1 > -7$$

$$-2x > -7 - 1$$

$$-2x > -8$$

$$x < 4$$

$$-3 \leq x < 4$$

$$-3 \leq x < 4$$

$$\{-3, -2, -1, 0, 1, 2, 3\}$$

$$\text{greatest} \Rightarrow 3$$

$$\text{Smallest} = -3$$

$$3 + (-3) = 0$$

$$3 - 3 = 0$$

Sum of greatest and smallest is 0.

Marks	2.0
Teacher's feedback	Correct solution. Inequality handling and integer set identification are accurate; the sum of greatest and smallest values is correct.

Section D: has 2 Long Answer (LA)-type questions of 3 marks each.

Q12. Without solving the equation comment upon the nature of the roots.

/3

$$25X^2 - 10X + 1 = 0$$

Answer:

$$25x^2 - 10x + 1 = 0$$

$$a = 25, b = -10, c = 1$$

$$D = b^2 - 4ac$$

$$= 100 - 4 \times 25 \times 1$$

$$= 100 - 100$$

$$0 = 0$$

The roots are Real and Equal.

Marks	2.0
Teacher's feedback	Discriminant computed correctly. However, you didn't state the nature of the roots. Since $D = 0$, the quadratic has real and equal (repeated) roots. Add this conclusion to earn full marks.

2.0 von 3.0

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Q13. Find the value of the x, if the following equation have equal roots :

/3

$$(m-2)x^2 - (5+m)x + 16 = 0$$

Answer:

$$(m-2)x^2 - (5+m)x + 16 = 0$$

$$D = 0$$

$$a = m-2, \quad b = -(5+m), \quad c = 16$$

$$D = 0$$

$$b^2 - 4ac = 0$$

$$(-(5+m))^2 - 4(m-2)16 = 0$$

$$(5+m)^2 - 64m + 128 = 0$$

$$(25 + m^2 + 10m) - 64m + 128 = 0$$

$$+25 + m^2 + 10m - 64m + 128 = 0$$

$$m^2 - 54m + 153 = 0$$

$$m^2 - (51+3)m + 153 = 0$$

$$m^2 - 51m - 3m + 153 = 0$$

$$m(m-51) - 3(m-51) = 0$$

$$m = 3 \text{ OR } 51$$

Marks	3.0
Teacher's feedback	Correct solution and values of m. Note: b should be $-(5+m)$, though b^2 makes the sign irrelevant here.

16.0/20.0

Usha Rani 08:18, 26.07.2026

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