Grade 10
Unit 08

Maths

Course Outline

Formative 3

- **Quadratic Equations**
- **Coordinate Geometry**
- **Constructions**
- **Probability**

MAT
(Monthly Achievement Tests)

Short Code: 447311

Test ID: NMM10U080

SOUVENIR INFOTECH

Guide Lines

1.Each set consists of:

50 | Warm-up/Foundation Questions

30 | Regular Questions

20 | Thinking Ability Questions

2.The time allocation and instructions regarding the questions are printed clearly in the beginning of each question types. The answers should be written or tick marked as per the instructions given. It is suggested to use pencil initially, so as to enable you to reuse the practice papers.

3. **According to the new pattern of CBSE these practice papers will be very useful especially for syllabus related Quiz, Debates, Visuals related checking and Orals etc.,**

4.After marking the answers, the scores of students can be checked and for marks obtained guidelines are given along with the question solving instructions. Follow those instructions and if, you are fully satisfied with your performance then check for your expected grades as per the CBSE guidelines as given on the back of each set.

5.Remember that this is only a guideline not the finally worked out result. You can further improve your performance by increase your practice.

6.For your convenience please follow following essential examiner's advices:

a.Answer all the questions
b.Read all the Options carefully
c.Understand and use correct scientific language in your responses.

We from SOUVENIR INFOTECH **wish skillful learning for your bright future.**

Before going for the test, look at least :

1. First of all go through the syllabus of the test according to the **Course Outline** provided at the front page of each MAT.
2. After going through the syllabus once or twice or even more time as per your satisfaction, first of all do the Warm-up questions. If you score A+ grade in those 50 questions go to the next level otherwise go through the chapter again.
3. The box for **Specific Information** is very useful as it adds to your concept building. Try to fill specific information in the proper way so that you will get the maximum benefit of it.
4. **Let's Chat** portion will help you to prepare for oral assessment. Through this you can increase your capacity to interact on a particular topic related to your syllabus.
5. The **Extra Diet** portion is also there to enhance you knowledge through visulization of concept. This portion provides you added knowledge on various related concepts.
6. The information related to time factor is there to enhance your time management skills.
7. From the examiners point of view it is always advised to use Pencil for initial efforts. The use of pen is fruitful only when the final effort comes.

Examiner's Tips:

- Read the question carefully. Make sure you understand exactly what is required.
- If you find that you are unable to do a part of a question, do not give up. The next part may be easier and may provide a clue to what you might have done in the part you found difficult.
- Note the number of marks per question as guide to the depth of response needed.
- Underline or note the key words that tell you what is required.
- Underline or note data as you read the question.
- Structure your answer carefully.
- Show all steps in calculations. Include equations you use and show the substitution of data. remember to work according to units given.
- Make sure that your answers contain suitable significant figures (wherever necessary) and must include units in numericals.
- Draw diagrams and graphs carefully.
- Read data from graphs carefully; note scales and prefixes on axes.
- Keep your eye on the clock but don't panic.
- If you have time at the end, use it. Check that your descriptions and explanations make sense. Consider whether there is anything you could add to an explanation or description. Repeat calculations to ensure that you have not made a mistake.

50 Warm-up/Foundation Questions

Opening Window

To enlighten your fundamental/basic topic knowledge.

A+. If you score 45 or above marks, move to the next section confidently.

A. If you score between 40 and 45 marks, it is satisfactory. Bit more knowledge will bring excellent result.

B. If you score below 40, kindly go through the topic more seriously.

Section A (50 marks) **Time given – 50 minutes + 5 minutes for revision**

Questions 1 to 50 carry 1 mark each.

For each question, four options are given, one of them is the correct answer. Make your choice and write its name (a, b, c or d) in the answer box provided.

1. What point on x-axis is equidistant from the points $A(7,6)$ and $B(-3,4)$?

(a) (0, 4) (b) (–4, 0)

(c) (3, 0) (d) (0, 3)

T – 1 min
S – Co-ordinate geometry

Ans.

2. Solve for x $\frac{x}{x+1}+\frac{x+1}{x}=\frac{34}{15}$.

(a) $\frac{3}{2}, \frac{-7}{2}$ (b) $9, \frac{4}{2}$

(c) 4, 7 (d) $\frac{3}{2}, \frac{-5}{2}$

T – 1 min
S – Quadratic equation

Ans.

3. Find two consecutive odd positive integers sum of whose squares is 265.

(a) 13, 14 (b) – 12, 11

(c) 7, 8 (d) 5, 6

T – 1 min
S – Quadratic equation

Ans.

4. What is the probability of an impossible event?

(a) 0 (b) 1

(c) 1/2 (d) None of these

T – 1 min
S – Probability

Ans.

5. Find the discriminant of the quadratic equation $2x^2 - 4x + 3 = 0$.

(a) –4 (b) –8

(c) 4 (d) 6

T – 1 min
S – Quadratic equation

Ans.

6. One card is drawn at random from a well-shuffled deck of 52 cards. What is the probability of drawing a queen of red cards?

(a) $\frac{1}{13}$ (b) $\frac{2}{13}$

(c) $\frac{1}{26}$ (d) $\frac{3}{13}$

T – 1 min
S – Probability

Ans.

7. Find the value of a for which the quadratic equation of $4y^2 - 3ay + 1 = 0$ has equal roots.

(a) $\pm\frac{2}{3}$ (b) $\pm\frac{4}{7}$

(c) $\pm\frac{1}{3}$ (d) $\pm\frac{4}{3}$

T – 1 min
S – Quadratic equation

Ans.

8. In a throw of a dice, the probability of getting a 4 is

(a) $\frac{2}{3}$ (b) $\frac{1}{6}$

(c) $\frac{1}{3}$ (d) $\frac{5}{6}$

T – 1 min
S – Probability

Ans.

9. The co-ordinate of the centroid of ΔABC with vertices $A(-1,0), B(5,-2)$ and $C(8,2)$ is

(a) (12, 0) (b) (6, 0)

(c) (0, 6) (d) (4, 0)

T – 1 min
S – Co-ordinate geometry

Ans.

10. What is the probability of sure event?

(a) 1/2 (b) 0

(c) 1 (d) None of these

T – 1 min
S – Probability

Ans.

11. In tossing 3 coins, the probability of getting at least 2 head is

(a) $\frac{1}{2}$ (b) $\frac{2}{3}$

(c) $\frac{1}{3}$ (d) $\frac{1}{4}$

T – 1 min
S – Probability

Ans.

12. We throw a dice once. What is the probability of getting a number greater than 3.

(a) 1/2 (b) 1/3

(c) 1/6 (d) 2/3

T – 1 min
S – Probability

Ans.

13. Roots of the quadratic equation $3x^2 - 2\sqrt{6}\,x + 2 = 0$ are

(a) $\sqrt{2/3}, \sqrt{2/3}$ (b) $\sqrt{3/2}, \sqrt{3/2}$

(c) $\sqrt{1/3}, \sqrt{1/3}$ (d) $\sqrt{4/3}, \sqrt{4/3}$

T – 1 min
S – Quadratic equation

Ans.

14. For which values of k, the equation $9x^2 - kx + 81$ has equal roots ?

(a) ± 24 (b) ± 32

(c) ± 54 (d) ± 46

T – 1 min
S – Quadratic equation

Ans.

15. Find the roots of the quadratic equation $\sqrt{2}\,x^2 + 7x + 5\sqrt{2} = 0$.

(a) $5/\sqrt{2}, \sqrt{2}$ (b) $-5/\sqrt{2}, -\sqrt{2}$

(c) $5\sqrt{2}, \sqrt{2}$ (d) $5/\sqrt{2}, 2$

T – 1 min
S – Quadratic equation

Ans.

16. Find the value of k for which $x = 1$ is a root of the equation $x^3 + kx + 3 = 0$.

(a) 4 (b) –4

(c) –3 (d) 2

T – 1 min
S – Quadratic equation

Ans.

17. A motorboat whose speed is 9 km/hr in still water, goes 15 km downstream and comes back in a total time of 3 hours 45 minutes. Find the speed of the stream.

(a) 2 km/hr (b) 3 km/hr

(c) 5 km/hr (d) 4 km/hr

T – 1 min
S – Quadratic equation

Ans.

18. Find the discriminate of the quadratic equation $9x^2 - 2x + 8 = 0$.

(a) –4 (b) –8

(c) 4 (d) none

T – 1 min
S – Quadratic equation

Ans.

19. Find the roots of the quadratic equation $\sqrt{5}\,x^2 + 9x + 8\sqrt{2} = 0$.

(a) $8/\sqrt{2}, \sqrt{2}$ (b) $-8/\sqrt{2}, -\sqrt{2}$

(c) $9\sqrt{2}, \sqrt{2}$ (d) none

T – 1 min
S – Quadratic equation

Ans.

20. Find the roots of the equation, $5x^2 - 2x - 2 = 0$.

(a) $\frac{1+\sqrt{11}}{5}, \frac{1-\sqrt{11}}{5}$ (b) $\frac{2+\sqrt{22}}{5}, \frac{2-\sqrt{22}}{5}$

(c) $\frac{4+\sqrt{11}}{5}, \frac{4-\sqrt{11}}{5}$ (d) none of these

T – 1 min
S – Quadratic equation

Ans.

Fill in the blanks

21. $2x^2 - 3x + 1 = 0$ is _____ equation.

T – 1 min
S – Quadratic equation

Ans.

22. _____ is called the discriminant.

T – 1 min
S – Quadratic equation

Ans.

23. The sum of the probability of all the elementary events of an experiment is _____ .

T – 1 min
S – Probability

Ans.

24. The probability of an event is greater than or equal to _____ and less than or equal to _____ .

T – 1 min
S – Probability

Ans.

25. $\left(\frac{m_1m_2 + m_2x_1}{m_1 + m_2}, \frac{m_1y_2 + m_2y_1}{m_1 + m_2}\right)$ is known as _____ .

T – 1 min
S – Co-ordinate geometry

Ans.

26. In probability, the outcomes of the experiment are _____ .

T – 1 min
S – Probability

Ans.

27. The distance of a point $P(x, y)$ from the origin is _____ .

T – 1 min
S – Probability

Ans.

28. The formula for finding the roots of quadratic equation is known as the _____.

T – 1 min
S – Quadratic equation

Ans.

29. The probability of an event E is a number $P(E)$ such that _____ .

T – 1 min
S – Probability

Ans.

30. An action which results in some outcomes is called an _____.

T – 1 min
S – Probability

Ans.

True or False

31. If $b^2 - 4ac < 0$, the equations has no real roots.

T – 1 min
S – Quadratic equation

Ans.

32. $x + 12$ is a quadratic equation.

T – 1 min
S – Quadratic equation

Ans.

33. $P(E) + P(\bar{E}) = 1$

T – 1 min
S – Probability

Ans.

34. $\bar{E}$ is called the complementary events.

T – 1 min
S – Probability

Ans.

35. The distance formula $= \sqrt{(x_2 - y_{2)}^2 + (x_1 - y_1)^2}$.

T – 1 min
S – Co-ordinate geometry

Ans.

36. If $b^2 - 4ac < 0$, the equation has no real roots.

T – 1 min
S – Quadratic equation

Ans.

37. $x = \alpha$ is a solution of the quadratic equation.

T – 1 min
S – Quadratic equation

Ans.

38. Quadratic formula $= \dfrac{-b\sqrt{b^2 - 4ac}}{2a}$.

T – 1 min
S – Quadratic equation

Ans.

39. An event having only one outcome is called impossible event.

T – 1 min
S – Probability

Ans.

40. The probability of an event which is sure to occur is 0.

T – 1 min
S – Probability

Ans.

Simple questions

41. In what ratio does the point $P(2, -5)$ divide the line segment joining $A(-3, 5)$ and $B(4, -9)$?

T – 1 min
S – Co-ordinate geometry

Ans.

42. Find the distance between the point $P(-4,7)$ and $Q(2,-5)$.

T – 1 min
S – Co-ordinate geometry

Ans.

For questions 43-45. A card is drawn at random from a well-shuffled deck of 52 cards. Find the probability that the card drawn is:

43. A king or a jack

T – 3 min
S – Probability

Ans.

44. A non-ace

Ans.

45. Neither a king nor a queen

Ans.

For questions 46-48. Which of the following are quadratic equations?

46. $5x^2 - 9 = 0$

T – 3 min
S – Quadratic equation

Ans.

47. $2x^2 - 5x = x^2 - x + 3$

Ans.

48. $x^2 - 3\sqrt{x} + 1.$

Ans.

49. A dice is thrown once. What is the probability of getting a prime number ?

T – 1 min
S – Probability

Ans.

50. A bag contains 5 red and 4 black balls. A ball is drawn at random from the bag. What is the probability of getting a black ball ?

T – 1 min
S – Probability

Ans.

30 Regular Questions

Opening Window

To enlighten your regular knowledge of topic. If you score more than 55 marks here, you have achieved this level brilliantly. Move to the next level of test papers.

Section B (60 marks) **Time given – 45 minutes + 5 minutes for revision**

Questions 51 to 80 carry 2 marks each.

For Questions 51-53 Which of the following are the solutions of $x^2 - 5x + 6 = 0$?

51. $x = 2$

T – 3 min
S – Quadratic equation

Ans.

52. $x = -1$

Ans.

53. $x = \frac{1}{2}$

Ans.

54. Find the value of k for which $x = 3$ is a solution of the equation $2x^2 - kx - 3 = 0$.

T – 1 min
S – Quadratic equation

Ans.

55. Find the distance of the point $P(6, -6)$ from the origin.

T	– 1 min
S	– Co-ordinate geometry

Ans.

56. Find the co-ordinates of the point which divides the line segment joining the points $A(4, -3)$ and $B(9, 7)$ in the ratio 3 : 2.

T	– 2 min
S	– Co-ordinate geometry

Ans.

57. A coin is tossed once. What is the probability of getting a head?

T	– 1 min
S	– Probability

Ans.

58. A dice is thrown once. What is the probability of getting a number other than 4?

T	– 1 min
S	– Probability

Ans.

For questions 59-60. Find the distance between the points.

59. $A(1,-3)$ and $B(4,-6)$

T	– 2 min
S	– Co-ordinate geometry

Ans.

60. $P(a+b, a-b)$ and $Q(a-b, a+b)$

Ans.

For questions 61-63. Solve each of the following quadratic equation using factorisation.

61. $5x^2 + 4x = 0$

T – 3 min
S – Quadratic equation

Ans.

62. $x^2 + 12x + 35 = 0$

Ans.

63. $x^2 = 18x - 77$

Ans.

For questions, 64-66. A dice is throw once. What is the probability that is shows?

64. 3

T – 3 min
S – Probability

Ans.

65. An odd number.

Ans.

66. Number greater than 4.

Ans.

67. Find the distance between the points $P(a\sin\alpha, a\cos\alpha)$ and $Q(a\cos\alpha, -a\sin\alpha)$.

T – 2 min
S – Co-ordinate geometry

Ans.

68. The line segment joining the points $(3, -4)$ and $(1, 2)$ is trisected at the points $P(p, -2)$ and $Q\left(\frac{5}{3}, q\right)$. Find the values of p and q.

T – 2 min
S – Co-ordinate geometry

Ans.

For questions 69-71. Find the roots of the equation using quadratic formula.

69. $6x^2 + 11x + 3 = 0$

T – 6 min
S – Quadratic equations

Ans.

70. $3x^2 + 11x + 10 = 0$

Ans.

71. $6x^2 + x - 12 = 0$

Ans.

For questions 72-73. Solve the following.

72. $x^2 - 8 = 0$

T – 4 min
S – Quadratic equations

Ans.

73. $x^2 - 8x + 16 = 0$

Ans.

74. Solve the following using quadratic formula.
$x^2 - 2ax + (a^2 - b^2) = 0$

T – 2 min
S – Quadratic equations

Ans.

75. For what values of k the quadratic equation $2x^2 + kx + 3 = 0$ has equal roots ?

T – 2 min
S – Quadratic equations

Ans.

76. A king, queen and jack of clubs are removed from a deck of 52 playing cards and then one card is selected from the remaining cards. Find the probability of getting a king.

T – 2 min
S – Probability

Ans.

77. A dice is loaded so that the probability of face i is proportional to i. $i = 1,2,..6$. Find the probability of an even number occurring when the dice is rolled.

T	– 2 min
S	– Probability

Ans.

78. Find the area of a triangle whose vertices are $(1, -1)$, $(-4, 6)$ and $(-3, -5)$.

T	– 2 min
S	– Co-ordinate geometry

Ans.

79. Find the value of k of the points $A(2,3)$, $B(4,k)$ and $C(6,3)$ are collinior.

T	– 2 min
S	– Coordinate geometry

Ans.

80. Draw a pair of tangents to a circle of radius 6cm which are inclined to each other at an angle of 75.

T	– 2 min
S	– Constructions

Ans.

20 Thinking Ability Questions

Opening Window

To enlighten your regular knowledge of topic. If you score more than 50 marks here, you have achieved this level brilliantly. Move to the next level of test papers.

Section C (60 marks) **Time given – 45 minutes + 5 minutes for revision**

For questions 81-83. Find the roots of the following equations. Using quadratic equation.

81. $36x^2 - 12ax + a^2 - b^2 = 0$

T – 6 min
S – Quadratic equations

Ans.

82. $2x^2 + 5\sqrt{3}x + 6 = 0$

Ans.

83. $x^2 + 6x + 6 = 0$

Ans.

84. Draw a circle of radius 2 cm with centre O and take a point P outside the circle such that $OP = 4.5$ cm. From P draw to tangents to the circle.

T	– 2 min
S	– Construction of circle

Ans.

85. A card is drawn at random from a pack of 52 playing cards. Find the probability that the card drawn is neither a queen nor a jack.

T	– 2 min
S	– Probability

Ans.

86. Solve $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

T – 2 min
S – Quadratic equations

Ans.

87. Solve : $\frac{4}{x} - 3 = \frac{5}{2x+3}, x \neq 0; \frac{-3}{2}$

T – 2 min
S – Quadratic equations

Ans.

88. Draw a circle of radius 5 cm. Take a point P on it. Without using the centre of the circle construct a tangent at the point P.

T – 2 min
S – Construction of circle

Ans.

89. Solve :
$9x^2 - 9(a+b)x + (2a^2 + 5ab + 2b^2) = 0$

T – 2 min
S – Quadratic equations

Ans.

90. The hypotenuse of a right-angled triangle is 6 cm more than twice the shortest side. If the third side is 2 cm less than the hypotenuse, find the sides of the triangle.

T	– 2 min
S	– Quadratic equations

Ans.

91. A card is drawn at random from a well-shuffled pack of 52 cards. Find the probability that the card drawn is neither a red card nor a queen.

T	– 2 min
S	– Probability

Ans.

92. Solve $\frac{x}{x+1}+\frac{x+1}{x}=\frac{34}{15}$, $x \neq -1$ and $x \neq 0$.

T – 2 min
S – Quadratic equations

Ans.

93. The time taken by a man to cover 300 km on a scooter was $1\frac{1}{2}$ hours more than the time taken by him during the return journey. If the speed in returning be 10 kmph more than the speed in going, find his speed in each direction.

T – 2 min
S – Quadratic equations

Ans.

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

T	– 2 min
S	– Quadratic equations

Ans.

95. Find the roots of the following equation.

$$\frac{1}{x+4}-\frac{1}{x-7}=\frac{11}{30}, x \neq -4, 7$$

T	– 2 min
S	– Quadratic equations

Ans.

96. A card is drawn at random from a well-shuffled pack of 52 cards. Find the probability that the card drawn is neither a red card nor a queen.

T	– 3 min
S	– Probability

Ans.

97. A bag contains 6 red balls, 8 white balls, 5 green balls and 3 black balls. One ball is drawn at random from the bag. Find the probability that the ball drawn is (i) white (ii) red or black (ii) not green (iv) neither white nor black.

T	– 3 min
S	– Probability

Ans.

98. Draw a circle of radius 5.8 cm from a point 8 cm away from its center connnect the pair of tangents to the circle and measure their lengths.

T	– 3 min
S	– Quadratic equations

Ans.

99. Construct a triangle of circles 4cm, 5cm, and 6cm and then a triangle similar to it what sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

T	– 3 min
S	– Quadratic equations

Ans.

100. If $A(-4,-5)$, $B(-5,7)$, $C(-1,6)$ and $D(4,5)$ are the verticles of a Quadrilateral. Find the area of Quadrilatires *ABCD*.

T	– 1 min
S	– Quadratic equations

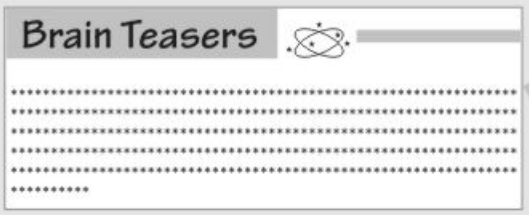
Ans.

Tools at a glance

Opening Window with instructions for your potential analysis and guideline to improve your performance.

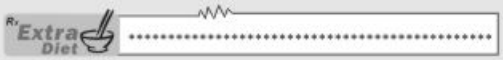
Let's Chat, the feature with suggestive topics for discussion so as to improve your capacity to debate on various topics.

Box with time break-up of questions **(T)** and its concept (**S**, i.e., subject)



Brain Teasers i.e., Questions with difference to make the concepts of students crystal clear. These are the questions with higher difficulty levels to check the grip of the students over the concepts.

Extra Diet, the web link, the notation: www._____ to provide additional information regarding the concept for more clarity of thoughts.



CBSE GRADING PATTERN

As the new pattern includes **CCE** (Continuous and Comprehensive Evaluation) which will be run in two terms i.e., from April to September and October to March. Thus the school will conduct four **Formative** and two **Summative** Assessments.

However, the most generalised version of grades is given below:

MARKS PERCENTAGE	GRADE	GRADE POINT	CATEGORY
91 to 100	A1	10	Exceptional
81 to 90	A2	9	Excellent
71 to 80	B1	8	Very Good
61 to 70	B2	7	Good
51 to 60	C1	6	Ordinary (Fair)
41 to 50	C2	5	Average
33 to 40	D	4	Below Average
21 to 32	E1	3	Improvement Needed
Below 20	E2	Below 2	Unsatisfactory