Grade 10
Unit 01

Maths

Course Outline

- Real Numbers
- Polynomials

MAT
(Monthly Achievement Tests)

Short Code: 447311

Test ID: NMM10U010

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 questions 1 to 20 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. 0.375 convert into a rational number

   (a) $\frac{375}{100}$ (b) $\frac{175}{100}$

   (c) $\frac{375}{1000}$ (d) $\frac{375}{10}$

   T – 1 min
   S – Real numbers

   Ans.

2. $2\sqrt{5}$ is

   (a) rational (b) irrational

   (c) decimal (d) none of these

   T – 1 min
   S – Real numbers

   Ans.

3. $\frac{33}{50}$ is

   (a) non-terminating (b) terminating decimal

   (c) non-terminating decimal (d) none of these

   T – 1 min
   S – Real numbers

   Ans.

4. Express $0.\overline{36}$ as fraction in simplest from

   (a) $\frac{14}{55}$ (b) $\frac{11}{30}$

   (c) $\frac{16}{99}$ (d) $\frac{2}{3}$

   T – 1 min
   S – Real numbers

   Ans.

5. Find HCF of 30, 72 and 432.

   (a) 4 (b) 2

   (c) 3 (d) 6

   T – 1 min
   S – Real numbers

   Ans.

6. Express $0.2\overline{54}$ as a fraction in simplest form

(a) $\frac{14}{55}$ (b) $\frac{14}{50}$

(c) $\frac{11}{30}$ (d) $\frac{16}{99}$

T – 1 min
S – Real numbers

Ans.

7. Find the LCM of 24, 36, 40.

(a) 540 (b) 360

(c) 1260 (d) 2520

T – 1 min
S – Real numbers

Ans.

8. HCF of 420 and 130 is

(a) 10 (b) 15

(c) 5 (d) none of these

T – 1 min
S – Real numbers

Ans.

9. The relationship with the given positive integers a and b, there exists unique integers q and r, where $0 \leq r \leq b$ is

(a) $a = br + q$ (b) $q = bq + r$

(c) $a = bq - r$ (d) none of these

T – 1 min
S – Real numbers

Ans.

10. LCM $\times$ HCF =

(a) product of two numbers

(b) quotient of two numbers

(c) addition of two numbers

(d) none of the above

T – 1 min
S – Real numbers

Ans.

11. If the HCF of 306 and 657 is 9, find LCM.

(a) 23338 (b) 22338

(c) 22668 (d) 33228

T – 1 min
S – Real numbers

Ans.

12. A polynomial of degree 2 is called

(a) linear polynomial

(b) quadratic polynomial

(c) cubic polynomial

(d) zero polynomial

T – 1 min
S – Polynomial

Ans.

13. Find the quadratic polynomial whose zeros are 3 and -5.

(a) $x^2 + 2x - 15$ (b) $x^2 + 2x + 15$

(c) $x^2 + 3x - 10$ (d) $x^2 + 3x + 10$

T – 1 min
S – Polynomial

Ans.

14. If α and β are the zeros of $2x^2 + 5x - 10$, then the value of $\alpha\beta$ is

(a) $\frac{-5}{2}$ (b) 5

(c) -5 (d) 2/5

T – 1 min
S – Polynomial

Ans.

15. Which of the following is a polynomial?

(a) $x^2 - 5x + 6\sqrt{x} + 3$ (b) $\sqrt{x} + \frac{1}{\sqrt{x}}$

(c) $x^{3/2} - x + x^{1/2}$ (d) none of these

T – 1 min
S – Polynomial

Ans.

16. Divide $2x^4 - 3x^3 - 5x^2 + 9x - 3$ by $x^2 - 3$

(a) $2x^2 - 3x + 1$ (b) $2x^2 + 3x + 1$

(c) $2x^2 + 3x - 1$ (d) $2x^2 + 3x - 1$

T – 1 min
S – Polynomial

Ans.

17. Find the zeroes of the quadratic polynomial $x^2 + 7x + 12$.

(a) $(-2, -5)$ (b) $(-3, -4)$

(c) (2, 5) (d) (3, 4)

T – 1 min
S – Polynomial

Ans.

18. Find a quadratic polynomial. If the sum and product of whose zeroes are -7 and -2.

(a) $x^2 - 7x - 2$ (b) $x^2 - 7x + 2$

(c) $x^2 + 7x - 2$ (d) $x^2 + 2x - 7$

T – 1 min
S – Polynomial

Ans.

19. Every even integer is of the form of

(a) $2q + 1$ (b) $2q + 3$

(c) $2q$ (d) none of these

T – 1 min
S – Polynomial

Ans.

20. Find a cubic polynomial when the zeroes are 3, -1, $-1/3$.

(a) $3x^3 + 5x^2 - 11x + 3$ (b) $3x^3 + 5x^2 + 11x - 3$

(c) $3x^3 - 5x^2 + 11x + 3$ (d) $3x^3 - 5x^2 - 11x - 3$

T – 1 min
S – Polynomial

Ans.

Fill in the blanks :

21. The prime factorisation of a natural number is _____ except for the order of its factors

T – 1 min
S – Real numbers
Ans.

22. $\sqrt{2}$ is an _____.

T – 1 min
S – Real numbers
Ans.

23. The sum of two rationals is always _____.

T – 1 min
S – Real numbers
Ans.

24. _____ = divisor × quotient + Remainder.

T – 1 min
S – Real numbers
Ans.

25. $\frac{129}{2^2 5^7 7^5}$ is _____.

T – 1 min
S – Real numbers
Ans.

26. $\frac{1}{\sqrt{3}}$ is _____.

T – 1 min
S – Real numbers
Ans.

27. _____ are factorised as a product of primes.

T – 1 min
S – Real numbers
Ans.

28. A polynomial of degree of 3 is called _____ .

T – 1 min
S – Polynomial
Ans.

29. Where α and β are the zeros of $p(x) = ax^2 + bx + c$, $\alpha = 0$ then $\alpha\beta =$

T – 1 min
S – Polynomial
Ans.

30. Polynomial of degree 4 is called a _____.

T – 1 min
S – Polynomial

Ans.

True and False

31. Every composite number can be expressed as a product of primes.

T – 1 min
S – Real numbers

Ans.

32. The decimal expansion of every rational number is either terminating or non terminating repeating.

T – 1 min
S – Real numbers

Ans.

33. LCM $(a, b) \times$ HCF $(a, b) = a \times b$

T – 1 min
S – Polynomial

Ans.

34. $\sqrt{2}$ is irrational.

T – 1 min
S – Real numbers

Ans.

35. A quadratic polynomial whose zeros are α and β is given by $p(x) = x^2 + (\alpha + \beta)x + \alpha/3$.

T – 1 min
S – Polynomial

Ans.

36. The polynomial of degree 2 is called linear polynomial

T – 1 min
S – Polynomial

Ans.

37. Zero of the polemical $p(x)$ is $p(x) = 0$.

T – 1 min
S – Polynomial

Ans.

38. $3x + 5$ is a polynomial in x of degree 0.

T – 1 min
S – Polynomial

Ans.

39. Division algorithm for polynomial is $r(x) = q(x) \times g(x) + f(x)$.

T – 1 min
S – Polynomial

Ans.

40. The standard form of cubic polynomial is.
$x^3 - (\alpha + \beta + \gamma)\, x^2 + (\alpha\beta + \beta\gamma + \alpha\gamma)\, x + \alpha\beta\gamma = 0$

T – 1 min
S – Polynomial

Ans.

Simple Questions

41. Using Euclid's division algorithm to find the HCF of 396, 1080.

T – 1 min
S – Polynomial

Ans.

42. Given that HCF $(1152, 1664) = 128$, find LCM $(1152, 1664)$.

T – 1 min
S – Real numbers

Ans.

43. Show that every positive odd integer is of the form $(4q + 1)$ or $(4q + 3)$ for some integer q.

T – 1 min
S – Real numbers

Ans.

44. Find the HCF and LCM of 18 and 24 by the prime factorisation method.

T – 1 min
S – Real numbers

Ans.

45. Find a cubic polynomial whose zeros are α, β and γ such that $(\alpha + \beta + \gamma) = 6$, $(\alpha\beta + \beta\gamma + \gamma\alpha) = -1$ and $\alpha\beta\gamma = -30$

T – 1 min
S – Real numbers

Ans.

Q.46–Q.47 Write the decimal form of those which have terminating decimal expansion with actual division.

46. $\frac{41}{1000}$

T – 1 min
S – Real numbers

Ans.

47. $\frac{17}{90}$

T – 1 min
S – Real numbers

Ans.

48. Find the zeros of the polynomial $f(x) = x^2 + 7x + 12$ and verify the relation between its zero and coefficients.

T – 1 min
S – Polynomial

Ans.

49. Find the quadratic polynomial, if the sum and product of whose zeros are $\sqrt{2}$ and -12 respectively.

T – 1 min
S – Polynomial

Ans.

50. The quadratic polynomial whose zeros are $\frac{3}{5}$ and $-\frac{1}{2}$ is

T – 1 min
S – Polynomial

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.

51. Show that $2\sqrt{3}$ is irrational.

T – 2 min
S – Real numbers

Ans.

52. Express the given number as a fraction in simplest form $0.3\overline{65}$.

T – 2 min
S – Real numbers

Ans.

Q.53–Q.55 Find without actual division whether each of the rational numbers given below is terminating or non-terminating repeating decimal.

53. $\frac{33}{50}$

T – 1 min
S – Real numbers

Ans.

54. $\frac{31}{2^2 \times 5^3}$

T – 2 min
S – Real numbers

Ans.

55. $\dfrac{121}{2^2 \times 3^2 \times 7^5}$

T – 1 min
S – Real numbers

Ans.

56. Divide $3x^2 + 5x - 1$ by $(x + 2)$ and verify the division algorithm.

T – 2 min
S – Real numbers

Ans.

Q. 57–Q.59 Use Euclid's algorithm to find the HCF of the following.

57. 420, 130

T – 1 min
S – Real numbers

Ans.

58. 10224, 1608

T – 1 min
S – Real numbers

Ans.

59. 1152, 1664

T – 1 min
S – Real numbers

Ans.

Q. 60-61. Find HCF of the following using Euclid's division lemma

60. 20, 150

T – 1 min
S – Real numbers

Ans.

61. 64, 148

T – 1 min
S – Real numbers

Ans.

62. Write the decimal of those which have terminating decimal expansion $\frac{31}{2^2 \times 5^3}$.

T – 2 min
S – Real numbers

Ans.

63. If a is a non-zero rational and $\sqrt{b}$ is irrational, then show that $a\sqrt{b}$ is irrational.

T – 2 min
S – Real numbers

Ans.

Q.64 to Q.66 Verify the relationship between the zeros and coefficients of the polynomial

64. $2x^2 + 5x - 12$

T – 1 min
S – Polynomial

Ans.

65. $x^2 - 2$

T – 1 min
S – Polynomial

Ans.

66. $5u^2 + 10u$

T – 1 min
S – Polynomial

Ans.

Q. 67-69. Find a quadratic polynomial each with the given number as the sum and product of its zeros respectively.

67. $\frac{-1}{4}, \frac{1}{4}$

T – 1 min
S – Polynomial

Ans.

68. $-5, 6$

T – 1 min
S – Polynomial

Ans.

69. $(0, \sqrt{5})$

T – 1 min
S – Polynomial

Ans.

70. Find a cubic polynomial whose zeros are $-2, -3$ and -1.

T – 2 min
S – Polynomial

Ans.

71. Divide $3x^2 + 5x - 1$ by $(x + 2)$ and verify the division algorithm.

T	– 2 min
S	– Polynomial

Ans.

For Questions 72–73. Find the zeros of the quadratic polynomial and verify the relation between its zeros and coefficients.

72. $x^2 + 3x - 10$.

T	– 2 min
S	– Polynomial

Ans.

73. $x^2 - 5$

T	– 1 min
S	– Polynomial

Ans.

74. Find the quadratic polynomial, the sum and product of whose zeros are 0 and – 9 respectively.

T	– 1 min
S	– Polynomial

Ans.

75. Divide the following and verify the division algorithm: $13 - 17x - 5x^2$ by $3 - 5x$.

T	– 2 min
S	– Polynomial

Ans.

76. Find a cubic polynomial whose zeros are $3, \frac{1}{2}$ and -1.

T – 2 min
S – Polynomial

Ans.

For Questions 77–78, let $p(x) = x^2 - 2x + 3$. Find

77. $p(3)$

T – 2 min
S – Polynomial

Ans.

78. $p(1)$

T – 2 min
S – Polynomial

Ans.

79. Find a quadratic polynomial whose zeros are 2 and -1.

T	– 2 min
S	– Polynomial

Ans.

80. Find a quadratic polynomial, the sum and product of whose zeros are -2 and 3.

T	– 2 min
S	– Polynomial

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**

Thinking Ability Ques

81. Prove that $\sqrt{3}$ is irrational.

T – 2 min
S – Real numbers

Ans.

82. Show that $4 - \sqrt{3}$ is irrational.

T – 2 min
S – Real numbers

Ans.

83. If P is a prime number, then prove that $\sqrt{p}$ is irrational.

T – 2 min
S – Real numbers

Ans.

84. Find the HCF and LCM of 18 and 24 by the prime factorisation method.

T	– 2 min
S	– Real numbers

Ans.

85. Express $0.\overline{6}$ as a rational number in simplest form.

T	– 2 min
S	– Real numbers

Ans.

86. Find the LCM of 1152, and 1664 using prime factorisation.

T	– 2 min
S	– Real numbers

Ans.

87. Explain, Euclid's division algorithm.

T	– 2 min
S	– Real numbers

Ans.

88. Find all the zeros of the polynomial $f(x) = 2x^4 - 3x^3 - 5x^2 + 9x - 3$ it being given that two of its zero are $\sqrt{3}$ and $-\sqrt{3}$.

T	– 2 min
S	– Real numbers

Ans.

89. Use Euclid's algorithm to find HCF of 4052 and 12576

T	– 2 min
S	– Real numbers

Ans.

90. Find a quadratic polynomial, the sum and product of whose zeros are –5 and –6 respectively.

T	– 2 min
S	– Polynomial

Ans.

91. Find a cubic polynomial whose zeros are 3, 5 and -2.

T – 2 min
S – Polynomial

Ans.

Q. 92-93. Verify the relationship between the zeros and coefficients of the polynomial.

92. $3x^2 - 7x - 6$

T – 2 min
S – Polynomial

Ans.

93. $8x^2 - 4$

T – 2 min
S – Polynomial

Ans.

Q. 94-96 Verify the division algorithm

94. $2x^2 + x - 15$ by $x + 3$

T	– 2 min
S	– Polynomial

Ans.

95. $6 + 19x + x^2 - 6x^3$ by $2 + 5x - 3x^2$

T	– 2 min
S	– Polynomial

Ans.

96. $5x^3 - 13x^2 + 21x - 14$ by $x^2 - 2x + 3$

T	– 3 min
S	– Polynomial

Ans.

97. $4x^3 - 8x^2 + 8x + 1$ when divided by a polynomial $g(x)$ gives $2x - 1$ as quotient and $x + 3$ as remainder, find $g(x)$.

T	– 3 min
S	– Real numbers

Ans.

98. Find the cubic polynomial whose zeros are α, β, γ such that (i) $\alpha + \beta + \gamma = 1$, $\alpha\beta + \beta\gamma + \gamma\alpha = -10, \alpha\beta\gamma = 8$.

T – 3 min
S – Polynomial

Ans.

99. Divide the following and verify the division algorithm. $3x^3 - 4x^2 + 7x - 12$ by $x^2 - x + 2$.

T – 3 min
S – Polynomial

Ans.

100. Find a cubic polynomial whose zeros are $3, \frac{1}{2}$ and -1.

T – 3 min
S – Polynomial

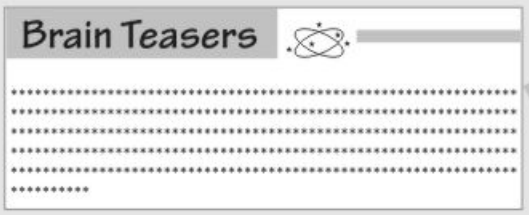
Ans.

Tools at a glance

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

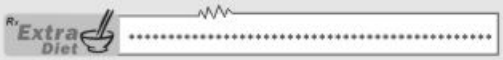
Let's Chat, the feature with suggestive topics for discussion so as to improve your capacity to debate on various topics.

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