Grade 09
Unit 01

Maths

Course Outline

- Number System
- Polynomials

MAT

(Monthly Achievement Tests)

Short Code: 447310

Test ID: NMM09U010

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 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

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. Solve $12^2 \times 12^{-5} =$

T – 1 min
S – Number systems

(a) 12^3 (b) $\frac{1}{12^3}$

(c) -12^3 (d) None of these

Ans.

2. Divide $6\sqrt{15} \div 3\sqrt{5}$

T – 1 min
S – Number systems

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

(c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{\sqrt{3}}$

Ans.

3. Express .09090909 ... in the form $\frac{p}{q}$ where P and q are integers $q \neq 0$.

T – 1 min
S – Number systems

(a) $\frac{1}{3}$ (b) $\frac{1}{7}$

(c) $\frac{1}{9}$ (d) $\frac{1}{11}$

Ans.

4. Simplify the following expression $(\sqrt{3} + \sqrt{2})^2$.

T – 1 min
S – Number systems

(a) $3 + 2\sqrt{6}$ (b) $5 + 2\sqrt{6}$

(c) $3 + 2\sqrt{6}$ (d) $4 + \sqrt{6}$

Ans.

5. Simplify $4^{3/2}$

T – 1 min
S – Number systems

(a) 8 (b) 7

(c) 6 (d) 5

Ans.

6. Write the coefficient of x^2 in $5x^2 - 11x + 15$.

(a) -11 (b) 5

(c) 15 (d) None of these

T – 1 min
S – Polynomials

Ans.

7. Find the zero of the polynomial $x^2 - 2x + 5$.

(a) 0 (b) 1

(c) -2 (d) 5

T – 1 min
S – Polynomials

Ans.

8. Find the remainder when $x^3 + 3x^2 + 2x + 1$ is divided by $x - 1$.

(a) 7 (b) 5

(c) 3 (d) 9

T – 1 min
S – Polynomials

Ans.

9. $3x^2 + x + 5$ is _____ polynomial.

(a) cubic (b) linear

(c) quadratic (d) none of these

T – 1 min
S – Polynomials

Ans.

10. Write the degree of the polynomial $5x^3 - 3x^2 + x + 1$.

(a) 6 (b) 5

(c) 3 (d) 2

T – 1 min
S – Polynomials

Ans.

11. Find the coefficient of x° in $-x^3 + 4x^2 + 7x - 2$.

(a) -1 (b) 4

(c) 7 (d) -2

T – 1 min
S – Polynomials

Ans.

12. Find $x^2 - y^2$ when $x = 2$, $y = 1$.

(a) 3 (b) 2

(c) 1 (d) 5

Polynomials

T – 1 min
S – Polynomials

Ans.

13. Multiply $2\sqrt{2}$ with $3\sqrt{2}$.

(a) 12 (b) 10

(c) 6 (d) 4

T – 1 min
S – Number systems

Ans.

14. Find one rational number between $\frac{1}{3}$ and $\frac{1}{2}$

(a) $\frac{1}{6}$ (b) $\frac{7}{12}$

T – 1 min
S – Number systems

(c) $\frac{5}{12}$ (d) None of these.

Ans.

15. Find the product of $(x+1)(x+1)$ using appropriate identities.

(a) x^2+2x+1 (b) x^2+x+1

(c) x^2+2x-1 (d) None of these.

T – 1 min
S – Polynomials

Ans.

16. $x-1$ is a _____ polynomial.

(a) cubic (b) linear

(c) quardic (d) none

T – 1 min
S – Polynomials

Ans.

17. Find the zero of the polynomial $p(x)=3x$

(a) 1 (b) 3

(c) 0 (d) None of these

T – 1 min
S – Polynomials

Ans.

18. In the following options which one is a polynomial of one variable.

(a) $3t^2+3t+1$ (b) $x+y+z$

(c) $3x+4y$ (d) p^2+q^2.

T – 1 min
S – Polynomials

Ans.

19. $p(1)$ for the polynomial $p(x)=9x^3+2x^2-x+1$

(a) 11 (b) -11

(c) 9 (d) -10

T – 1 min
S – Polynomials

Ans.

20. Find x^3-y^3 when $x=2$ and $y=1$.

(a) 8 (b) 0

(c) 7 (d) 9

T – 1 min
S – Polynomials

Ans.

Fill in the blanks

21. Every rational number is a _____.

Number system

T – 1 min
S – Number systems

Ans.

22. $\sqrt{43}$ is an _____ number.

T – 1 min
S – Number systems

Ans.

23. A polynomial of three terms is called a _____ .

T – 1 min
S – Polynomials

Ans.

24. The degree of a non-zero constant polynomial is _____.

T – 1 min
S – Polynomials

Ans.

25. $x^2 - 2x + 5$ is a polynomial of degree _____.

T – 1 min
S – Polynomials

Ans.

26. The constant polynomial 0 is called the _____.

T – 1 min
S – Polynomials

Ans.

27. 0 is a _____ number.

T – 1 min
S – Number system

Ans.

28. A polynomial of two terms is called a _____.

T – 1 min
S – Polynomials

Ans.

29. _____ $= (ab)^p$

T – 1 min
S – Polynomials

Ans.

30. $(\sqrt[n]{a})^m =$ _____ .

T – 1 min
S – Number systems

Ans.

True or False

31. Every integer is a whole number.

T – 1 min
S – Number systems

Ans.

32. Every rational number is a whole number.

T – 1 min
S – Number systems

Ans.

33. Every whole number is a rational number.

T – 1 min
S – Number systems

Ans.

34. Every rational number is a real number.

T – 1 min
S – Number systems

Ans.

35. Every natural number is an integer.

T – 1 min
S – Number systems

Ans.

36. Every integer is a rational number.

T – 1 min
S – Number systems

Ans.

37. Every natural number is a whole number.

T – 1 min
S – Number systems

Ans.

38. Dividend = (Divisor × Quotient) + Remainder.

T – 1 min
S – Number systems

Ans.

39. $(x + a)(x + b) = x^2 + (a + b)x + ab$

T – 1 min
S – Polynomials

Ans.

40. A polynomial of degree one is called a linear polynomial.

T – 1 min
S – Polynomials

Ans.

Simple Questions

41. Add $2\sqrt{2}+5\sqrt{3}, 2\sqrt{2}-7\sqrt{3}$

T – 1 min
S – Number systems

Ans.

42. Divide $8\sqrt{24}$ by $2\sqrt{6}$

T – 1 min
S – Number systems

Ans.

43. Find the remainder when $4x^3-3x^2+2x-4$ is divided by $x-4$

T – 1 min
S – Polynomials

Ans.

44. Find the remainder when $x^3 - 4x^2 + 12x$ is divided by $x + \frac{1}{2}$.

T – 1 min
S – Polynomials

Ans.

45. Find the value of k if $x - 3$ is a factor of $k^2x^2 - kx - 2$

T – 1 min
S – Polynomials

Ans.

46. $(x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$

T – 1 min
S – Polynomials

Ans.

47. If the polynomials $ax^3 + 4x^2 + 3x - 4$ and $x^3 - 4x + a$ leave the same remainder when divided by $(x - 3)$ find the value of a

T – 1 min
S – Polynomials

Ans.

48. Factorize $x^3 + 13x^2 + 32x + 20$, if it is given that $x + 2$ is its factor using long division method.

T – 1 min
S – Polynomials

Ans.

Questions 49-50, Factorize each of the following expression.

49. $4\sqrt{3}x^2 + 5x - 2\sqrt{3}$

T – 2 min
S – Polynomials

Ans.

50. $5\sqrt{5}x^2 + 30x + 8\sqrt{5}$

Ans.

30

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. Find the coefficient of x^4 in $-7x^4 + 6x^3 + 3x^2 + 2$

T – 1 min
S – Polynomials

Ans.

52. Find the degree of the given polynomial $x^2 - 3x + 4$

T – 1 min
S – Polynomials

Ans.

53. Find the zero of the polynomial $lx + m$

T – 1 min
S – Polynomials

Ans.

54. Find the value of the polynomial $5x^2 + 4x^3 - 7$ at $x = 1$

T – 1 min
S – Polynomials

Ans.

55. Find the value of $32^{\frac{3}{5}}$.

T – 1 min
S – Number systems

Ans.

56. Evaluate $\sqrt{120} \times \sqrt{45}$

T – 1 min
S – Number systems

Ans.

57. Evaluate $\sqrt{\frac{1008}{63}}$

T – 1 min
S – Number systems

Ans.

58. Find the value of $(7)^{-5}\,(9)^{-5}$

T – 1 min
S – Number systems

Ans.

59. Evaluate $(2+\sqrt{3})(2-\sqrt{3})$

T – 1 min
S – Number systems

Ans.

60. Add $6\sqrt{3}+7+7\sqrt{3}+8\sqrt{2}$

T – 1 min
S – Number systems

Ans.

61. Write $\frac{p}{q}$ form of $0.2\overline{35}$

T – 1 min
S – Number systems

Ans.

62. Simplify $6\sqrt{8}\times 7\sqrt{3}$

T – 1 min
S – Number systems

Ans.

63. Simplify $\dfrac{7^{\frac{1}{3}}}{7^{\frac{1}{2}}}$

T – 2 min
S – Number systems

Ans.

64. Simplify $\dfrac{6^{\frac{1}{3}}}{3^{\frac{1}{3}}}$

T – 2 min
S – Number systems

Ans.

Questions 65-66, Use the identity $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ac$ and evaluate the following.

65. $(3x+4y+z)^2$

T – 2 min
S – Polynomials

Ans.

66. $(2a-3b-2c)^2$

T – 2 min
S – Polynomials

Ans.

Questions 67-68, Use the following identities:

$(a+b)^3 = a^3 + b^3 + 3ab(a+b)$

$(a-b)^3 = a^3 - b^3 - 3ab(a-b)$.

Evaluate the following:

67. $(4a+5b)^3$

T – 2 min
S – Polynomials

Ans.

68. $(2p-3q)^3$

T – 2 min
S – Polynomials

Ans.

Questions 69-70, Evaluate the following:

69. $(102)^3$

T – 2 min
S – Polynomials

Ans.

70. 99^3

T – 2 min
S – Polynomials

Ans.

Questions 71-72, Factorise the following:

71. $4x^2 + y^2 + z^2 - 4xy - 2yz + 4xz$

T – 2 min
S – Polynomials

Ans.

72. $8x^3 + y^3 + 12x^2y + 6xy^2$

T – 2 min
S – Polynomials

Ans.

73. Find 45×55

T – 2 min
S – Polynomials

Ans.

74. Find the factors of $\frac{9}{16}u^2 - \frac{4}{9}v^2$.

T – 2 min
S – Polynomials

Ans.

75. Simplify $(y+1)^3+(y-1)^3$

T – 2 min
S – Polynomials

Ans.

Questions 76-77, factorise the following using the given identity:
$$x^3+y^3+z^3-3xyz=(x+y+z)(x^2+y^2+z^2-xy-yz-zx)$$

76. $8a^3+27b^3+64c^3-72abc$

T – 4 min
S – Polynomials

Ans.

77. $2\sqrt{2}a^3+16\sqrt{2}b^3+c^3-12abc$

Ans.

Questions 78-80, Identify constant, linear, quadratic and cubic polynomials from the following.

78. $f(x)=2$

T – 3 min
S – Polynomials

Ans.

79. $g(x) = 2x^3 + 7x + 9$

Ans.

80. $p(x) = 2x^2 - x + 4$

Ans.

20

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**

81. Rationalise the denominator $\frac{1}{\sqrt{5}+\sqrt{2}}$

T – 2 min
S – Number systems

Ans.

82. Multiply $(3+\sqrt{5})$ by $(5+\sqrt{3})$

T – 2 min
S – Number systems

Ans.

83. Find $(\sqrt{7}+2)^2$

T – 2 min
S – Polynomials

Ans.

84. Find $(\sqrt{11}+\sqrt{6})(\sqrt{11}-\sqrt{6})$.

T – 2 min
S – Polynomials

Ans.

85. Evaluate $2^{\frac{4}{3}} \times 2^{\frac{1}{5}}$

T – 2 min
S – Number systems

Ans.

86. Find $t(-2)$ for the polynomial $t(x) = (x-1)(x-2)^2$

T – 2 min
S – Number systems

Ans.

87. Find the value of a ? If $x-a$ is a factor of the polynomial:
$x^6 - ax^5 + x^4 - ax^3 + 3x - a + 4$

T – 2 min
S – Polynomials

Ans.

88. Find the remainder when $f(x) = x^3 - 6x^2 + 2x - 4$ is divided by $1 - 3x$.

T – 2 min
S – Polynomials

Ans.

89. Find the factors of $6y^2 - 5y - 6$

T – 2 min
S – Polynomials

Ans.

90. Find the factors of $y^2 + 3\sqrt{3}y + 6$

T – 2 min
S – Polynomials

Ans.

91. Find the factors of $36s^2 + 48st + 16t^2$

T – 2 min
S – Polynomials

Ans.

92. If $3x + 2y = 12$ and $xy = 6$, find the value of $9x^2 + 4y^2$

T – 2 min
S – Polynomials

Ans.

93. Prove that $\frac{0.87 \times 0.87 \times 0.87 + 0.13 \times 0.13 \times 0.13}{0.87 \times 0.87 - 0.87 \times 0.13 + 0.13 \times 0.13} = 1$

T – 2 min
S – Polynomials

Ans.

94. Factorize $x^6 - 7x^3 - 8$

T – 2 min
S – Polynomials

Ans.

95. If $x^2 + \frac{1}{x^2} = 7$, find the value of $x^3 + \frac{1}{x^3}$

T – 2 min
S – Polynomials

Ans.

96. Factorize $9z^3 - 27z^2 - 100z + 300$, if it is given that $(3z + 10)$ is a factor of it.

T – 2 min
S – Polynomials

Ans.

97. If $f(x) = 2x^3 - 13x^2 + 17x + 18$ find $f(-3)$

T – 2 min
S – Polynomials

Ans.

98. If $x = \frac{4}{3}$ is a root of the polynomial $f(x) = 6x^3 - 11x^2 + kx - 20$, find the value of k

T	– 1 min
S	– Polynomials

Ans.

99. Show that $x = 1$ is a root of the polynomial $2x^3 - 3x^2 + 7x - 6$

T	– 1 min
S	– Polynomials

Ans.

100. Simplify $[(3 + \sqrt{23}) - \sqrt{23}]^2$

T	– 1 min
S	– Number systems

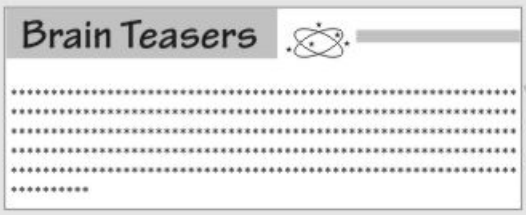
Ans.

Tools at a glance

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

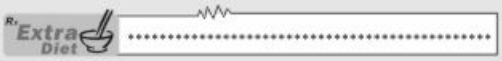
Let's Chat, the feature with suggestive topics for discussion so as to improve your capacity to debate on various topics.

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