



ALGEBRA

Class 10 - Mathematics - I

Time Allowed: 2 hours

Maximum Marks: 40

General Instructions:

1. All questions are compulsory.
2. Use of a calculator is not allowed.
3. The numbers to the right of the questions indicate full marks.
4. In case of MCQs Q. No. 1(A) only the first attempt will be evaluated and will be given credit.

1. [8]
- (a) **Choose the correct alternative from given :**
- i. For the quadratic equation $x^2 + 10x - 7 = 0$, the values of a, b, c are: [1]
- a) $a = -1, b = 10, c = 7$ b) $a = 1, b = -10, c = -7$
- c) $a = 1, b = 10, c = -7$ d) $a = 1, b = 10, c = 7$
- ii. Find the value of the determinant $\begin{vmatrix} 5 & 3 \\ -7 & -4 \end{vmatrix}$. [1]
- a) -1 b) -41
- c) 1 d) 41
- iii. What is the sum of the first 10 natural numbers? [1]
- a) 65 b) 20
- c) 55 d) 11
- iv. The tax levied by the Central Government for trading within state is [1]
- a) UTGST b) IGST
- c) SGST d) CGST
- (b)
- i. The sum of father's age and twice the age of his son is 70. Use the given information to form a linear equation in two variables. [1]
- ii. Find the first term and common difference for an A.P., [1]
- 127, 135, 143, 151, ...
- iii. **Pawan Medicals** supplies medicines. On some medicines the rate of GST is 12%, then what is the rate of CGST and SGST? [1]
- iv. Two coins are tossed simultaneously. Write the number of sample points $n(S)$: [0]
- a) 8 b) 4
- c) 2 d) 6

2.

(a) Complete the following activities and rewrite it (any two) :

- i. Complete the following activity to find the 19th term of an A.P., 7, 13, 19, 25, ...: [2]

Activity:

Given A.P. : 7, 13, 19, 25, ...

Here first term $a = 7$; $t_{19} = ?$ $t_n = a + (\square)d \dots \dots$ (formula)

$$\therefore t_{19} = 7 + (19 - 1)\square$$

$$\therefore t_{19} = 7 + \square$$

$$\therefore t_{19} = \square$$

- ii. Find the value of the discriminant of the quadratic equation $2y^2 - y + 2 = 0$. [2]
- iii. Two coins are tossed simultaneously. Complete the following activity of writing the sample space (S) and expected outcomes of the events: [2]

i. Event A : to get at least one head.

ii. Event B : to get no head.

Activity:

If two coins are tossed simultaneously

$$\therefore S = \{ \square, HT, TH, \square \}$$

i. Event A : at least getting one head.

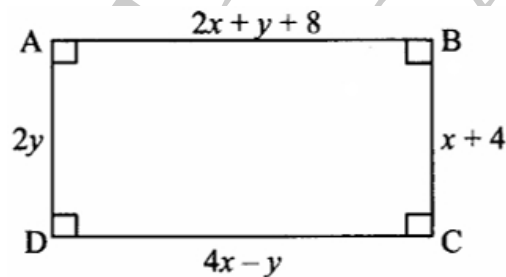
$$\therefore A = \{ HH, \square, TH \}.$$

ii. Event B : to get no head.

$$B = \{ \square \}$$

(b) Solve the following subquestions (any four) :

- i. $\square ABCD$ is a rectangle. Write two simultaneous equations using information given in the diagram, in the form of $ax + by = c$: [2]



- ii. Write the following equation in the form $ax^2 + bx + c = 0$, then write the values of a, b, c [2]
 $2y = 10 - y^2$.
- iii. Find the 23rd term of the following A.P.: 9, 4, -1, -6, -11, ... [2]
- iv. There are 9 tickets in a box, each bearing one of the numbers from 1 to 9. One ticket is drawn at random from the box. [2]

Event A: Ticket shows an even number.

Complete the following activity from the given information:

Activity:

$$S = \{ \square \}$$

$$n(S) = \square$$

$$A = \{\square\}$$

$$n(A) = \square$$

- v. The following table shows causes of noise pollution. Find the measure of central angles for each, to draw a pie diagram: [2]

construction	Traffic	Aircraft take offs	Industry
10%	50%	15%	25%

3. [9]

- (a) Complete the following activity and rewrite it (any one) :

- i. Represent the following data using histogram: [3]

Daily Income (₹)	No. of Workers
130 – 135	4
135 – 140	7
140 – 145	14
145 – 150	16

- ii. Fill in the boxes with the help of given information: [3]

Tax invoice of services provided (sample)								
Food Junction, Khed-Shivapur, Pune Invoice No. 58 Invoice No. 58								
Mob. No.7588580000, email-ahar.khed@yahoo.com								
GSTIN : 27AAAAA5555B1ZA								
Invoice Date: 25 Feb, 2020								
SAC	Food items	Qty	Rate (in ₹)	Taxable amount	CGST	SGST		
9963	Coffee	1	20	20.00	2.5%	₹ 0.50	2.5%	<input type="checkbox"/>
9963	Masala Tea	1	10	10.00	<input type="checkbox"/>	₹ 0.25	2.5%	<input type="checkbox"/>
9963	Masala Dosa	2	60	<input type="checkbox"/>	2.5%	<input type="checkbox"/>	2.5%	₹3.00
			Total	150.00		<input type="checkbox"/>		₹ 3.75
Grand Total								= ₹ 157.50

- (b) Solve the following subquestions (any two) :

- i. Construct a word problem on quadratic equation such that one of its answers is 20 (years, rupees, centimetres, etc.). Also solve it. [3]
- ii. The denominator of a fraction is 4 more than twice its numerator. Denominator becomes 12 times the numerator, if both the numerator and the denominator are reduced by 6. Find the fraction. [3]
- iii. Smt. Malhotra purchased solar panels for the taxable value of ₹ 85,000. She sold them for ₹90,000. The rate of GST is 5%. Find the ITC of Smt. Malhotra. What is the amount of GST payable by her? [3]

- iv. From three men and two women, environment committee of two persons is to be formed. To find the probabilities of the given events, complete the following activities. [3]

Event A: There must be at least one woman member.

Event B: Committee of one man and one woman to be formed.

Activity:

Let M_1, M_2, M_3 be three men and W_1, W_2 be two women. Out of these men and women environment committee of the 2 persons is to be formed.

$$S = \{M_1M_2, M_1M_3, M_2M_3, M_1W_1, M_1W_2, M_2W_1, M_2W_2, M_3W_1, M_3W_2, \square\}$$

$$\therefore n(S) = 10$$

Event A: There must be at least one woman member.

$$A = \{M_1W_1, M_1W_2, \square, M_2W_2, M_3W_1, M_3W_2, W_1W_2\}$$

$$\therefore n(A) = 7$$

$$P(A) = \frac{n(A)}{n(S)} \dots [\text{Formula}]$$

$$\therefore P(A) = \frac{7}{10}$$

Event B: Committee of one man and one woman to be formed.

$$B = \{M_1W_1, M_1W_2, M_2W_1, \square, M_3W_1, M_3W_2\}$$

$$\therefore n(B) = 6$$

$$\therefore P(B) = \frac{n(B)}{n(S)} \dots [\text{Formula}]$$

$$\therefore P(B) = \frac{6}{10}$$

$$\therefore P(B) = \frac{3}{5}$$

4. Solve the following subquestions (any two) : [8]

- (a) If 460 is divided by a natural number, then quotient is 2 more than nine times the divisor and remainder is 5. Find the quotient and divisor. [4]

- (b) Draw a pie diagram to represent the world population given in the following table: [4]

Country	Japan	England	India	China
Percentage of World Population	20	10	40	30

- (c) One person borrows ₹4,000 and agrees to repay with a total interest of ₹500 in 10 instalments. Each instalment being less than the preceding instalment by ₹10. What should be the first and the last instalments? [4]

5. Solve the following subquestions (any one) : [3]

- (a) The following frequency distribution table shows the distances travelled by some rickshaws in a day. [3]

Observe the table and answer the following questions:

Class (Daily distance travelled in km)	Continuous Class	Frequency Number of rickshaws	Cumulative Frequency less than type
60 – 64	59.5 – 64.5	10	10
65 – 69	64.5 – 69.5	34	10 + 34 = 44
70 – 74	69.5 – 74.5	58	44 + 58 = 102
75 – 79	74.5 – 79.5	82	102 + 82 = 184
80 – 84	79.5 – 84.5	10	184 + 10 = 194

85 – 89	84.5 – 89.5	6	194 + 6 = 200
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- i. Which is the modal class? Why?
 - ii. Which is the median class and why?
 - iii. Write the cumulative frequency (C.F.) of the class preceding the median class.
 - iv. What is the class interval (h) to calculate median?
- (b) Sum of the present ages of Manish and Savita is 31 years. Manish's age 3 years ago was 4 times the age of Savita at that time. Find their present ages. [3]

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