

**Algebra Set A**  
**2012 March**  
**School Level 10th SSC**  
**Board Exam**  
**Maharashtra State Board**

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Q.P. SET CODE
<b>A</b>

# N 068-w

2012 III 15 1100 -N 068- MATHEMATICS (71) ALGEBRA—PAPER I (E)

Time :  $2\frac{1}{2}$  Hours

(Pages 7)

Max. Marks : 60

*Note* :— (i) All questions are compulsory.

(ii) Use of calculator is not allowed.

1. Attempt any six subquestions from the following : 6

(i) Find the arithmetic mean of 4 and 6.

(ii) Find the first term of the sequence, where :

$$t_n = 2n + 1.$$

(iii) In the quadratic equation  $a = 3$ ,  $b = 6$  and  $c = 4$ , then find the value of  $\alpha + \beta$ .

(iv) Write the quadratic equation

$$5x^2 + 7 = 3x$$

in the standard form.

P.T.O.

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- (v) Find the value of  $y$  in equation  $2x + y = 7$ , if  $x = 2$ .
- (vi) Write the sample space  $S$  if two coins are tossed simultaneously.
- (vii) Calculate mean  $(\bar{X})$  when  $\Sigma f_i x_i = 100$  and  $\Sigma f_i = 20$ .

2. Attempt any *five* subquestions from the following : 10

- (i) Write the first five terms of the following arithmetic progression where first term  $a = 3$ , common difference  $d = 4$ .
- (ii) Solve the following quadratic equation by factorisation method :

$$x^2 + 10x + 24 = 0.$$

- (iii) Find the value of the following determinant :

$$\begin{vmatrix} 4 & 3 \\ 2 & 7 \end{vmatrix}$$

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(iv) Find the ninth term of the A.P. :

3, 7, 11, 15, .....

(v) For a certain frequency distribution the value of mean is 101 and median is 100, find the value of mode.

(vi) If one root of the quadratic equation

$$x^2 - 11x + k = 0$$

is 9, then find the value of  $k$ .

3. Attempt any *four* subquestions from the following : 12

(i) Solve the following quadratic equation by completing square method :

$$x^2 - 5x - 36 = 0.$$

(ii) Solve the following simultaneous equations by Cramer's rule :

$$3x - y = 7,$$

$$x + 4y = 11.$$

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- (iii) The following data give the number of students using different modes of transport :

Modes of Transport	Number of Students
Bicycle	40
Bus	20
Walk	30

Represent the above data using pie diagram.

- (iv) Solve the following quadratic equation using formula method :

$$3x^2 + 7x + 4 = 0.$$

- (v) Find the value of  $k$  for which the given simultaneous equations have infinitely many solutions :

$$4x + y = 7.$$

$$16x + ky = 28.$$

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4. Attempt any *three* from the following subquestions :

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- (i) In a class of 100 students, 60 students drink tea, 50 students drink coffee and 30 students drink both. A student from this class is selected at random, find the probability that student takes at least one of the two drinks.
- (ii) In a certain G.P. if  $s_6 = 126$  and  $s_3 = 14$ , then find  $a$  and  $r$ .
- (iii) The product of four consecutive natural numbers is 5040. Find those numbers.
- (iv) Solve the following simultaneous equations using graphical method :

$$x + 3y = 7,$$

$$2x + y = -1.$$

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5. Attempt any *four* from the following subquestions : 20

(i) The weight of coffee (in gms) in 70 packets is given in the following table :

Weight (in gms)	No. of Packets
200—201	12
201—202	26
202—203	20
203—204	9
204—205	2
205—206	1

Hence determine the modal weight of coffee packet.

(ii) If 'A' and 'G' are the Arithmetic mean and Geometric mean respectively of two numbers, then prove that the numbers are :

$$A \pm \sqrt{(A + G)(A - G)}.$$

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(iii) A box contains 20 cards marked with numbers 1 to 20. One card is drawn from the box at random. What is the probability of the following events :

(a) that number on the card is a prime number

(b) the number on the card is a perfect square.

(iv) Sagar and Aakash ran 2 km race twice. Aakash completed the first round 2 minutes earlier than Sagar. In the second round Sagar increased his speed by 2 km/hour and Aakash reduced his speed by 2 km/hour. Sagar finished 2 minutes earlier than Aakash. Find their speeds of running in the first round.

(v) Represent the following data using histogram and hence draw Frequency Polygon :

Class	Frequency
5—10	20
10—15	30
15—20	50
20—25	40

By taking scale on y-axis 1 cm = 5 frequencies.