

PRINCE PUBLIC SCHOOL
HALF YEARLY EXAMINATION (2018-19)
SAMPLE PAPER - 2
MATHEMATICS
X

TIME ALLOWED: 3 HOURS

MAXIMUM MARKS: 80

General Instructions.

- 1. This question paper consists of 30 questions.**
- 2. All questions are compulsory.**
- 3. Question 1-6 in Section A are very short answer type questions carrying 1 mark each.**
- 4. Question 7-12 in Section B are short answer type - I questions carrying 2 marks each.**
- 5. Question 13-22 in Section C are short answer type-II questions carrying 3 marks each.**
- 6. Question 23-30 in Section D are long answer type questions carrying 4 marks each.**
- 7. There is no overall choice. However, internal choice has been provided. You have to attempt only one of the alternatives in all such questions.**
- 8. Use of calculator is not allowed.**

SECTION- A

- Q1.** If H.C.F of 75 and 151 is expressed in the form $75a - 149$, then find the value of a.
- Q2.** If zeroes of the polynomial $x^2 + (a+1)x + b$ are 2 and -3, then find the value of (a+ b).
- Q3.** What is the condition that the pair of linear equations $kx + 2y = 5$ and $3x + y = 1$ have unique solution?
- Q4.** If $x = 2$ and $x = 3$ are the roots of the equation $3x^2 - 2mx + 2n = 0$, then find the values of m and n.
- Q5.** What is the value of $\frac{\cos(90^\circ - \theta)\cos \theta}{\tan \theta} - 1$
- Q6.** If the mode of a distribution is 8 and its mean is also 8, then find median.

SECTION -B

- Q7.** Find the H.C.F of 960 and 432 by using Euclid's division lemma.
- Q8.** If α and β are zeroes of the quadratic polynomial $f(x) = 3x^2 - 5x - 2$, then evaluate $\alpha^3 + \beta^3$.
- Q9.** If the ten's digit of a number is twice the unit's digit. The number obtained on interchanging the digits is 36 less than the original number. Find the original number.
- Q10.** Solve the equation $4x^2 - 4a^2x + (a^4 - b^4) = 0$
- Q11.** If $\cot \theta = \frac{15}{8}$, evaluate $\frac{(2+2\sin \theta)(1-\sin \theta)}{(1+\cos \theta)(2-2\cos \theta)}$.
- Q12.** The mean of the following data is 14. Find the value of k.

Class	5	10	15	20	25
Frequency	7	k	8	4	5

SECTION – C

- Q13.** Prove that the square of any positive integer is of the form $5q$, $5q + 1$, $5q + 4$ for some integer q .
- Q14.** If α and β are zeroes of the quadratic polynomial $f(x) = 2x^2 - 5x + 7$, find the quadratic polynomial whose zeroes are $2\alpha + 3\beta$ and $3\alpha + 2\beta$.
- Q15.** 4 men and 6 boys can finish a piece of work in 5 days, while 3 men and 4 boys can finish it in 7 days. Find the time taken by 1 man alone or that by 1 boy alone.
- Q16.** In fig. 1 ABC is an equilateral triangle with $AD \perp BC$, then prove that $AD^2 = 3DC^2$.

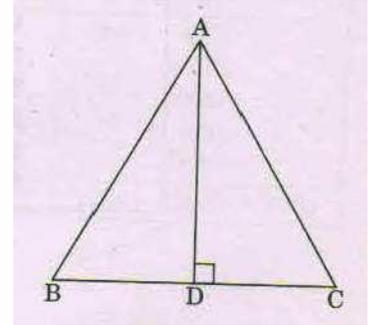


fig. 1

- Q17.** ₹ 6500 were divided equally among a certain number of persons. Had there been 15 more persons, each would have got ₹ 30 less. Find the original number of persons.
- Q18.** Prove that $\frac{1+\cos A}{\sin A} + \frac{\sin A}{1+\cos A} = 2 \operatorname{cosec} A$
- Q19.** The mean weight of 150 students in a class is 60 kg. The mean weight of boys is 70 kg while that of girls is 55 kg. Find the number of boys and girls in the class.
- Q20.** The king, queen and jack of diamond are removed from a deck of 52 playing cards and then well shuffled. Now one card is drawn at random from the remaining cards. Determine the probability that the card drawn is
- a) a face card b) a red card c) a king.
- Q21.** In fig. 2, DEFG is a square and $\angle BAC = 90^\circ$. Show that $DE^2 = BD \times EC$.

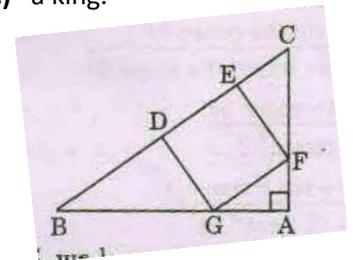


fig. 2

- Q22.** Cards marked with numbers 1, 3, 5... 49 are placed in a box and mixed thoroughly. One card is drawn from the box. Find the probability that the number on the card is
- a) divisible by 3 b) a composite number
- c) not a perfect square d) multiple of 3 and 5.

SECTION- D

- Q23.** Prove that $\frac{\sin \theta}{\cot \theta + \operatorname{cosec} \theta} = 2 + \frac{\sin \theta}{\cot \theta - \operatorname{cosec} \theta}$.
- Q24.** The numerator of a fraction is 3 less than denominator. If 2 is added to both numerator as well as denominator then sum of the new and original fraction is $\frac{29}{20}$. Find the fraction.

Q25. Prove that $\sqrt{3}$ is an irrational number. Hence, show that $5 - \sqrt{3}$ is also an irrational number.

Q26. Find all the zeroes of the polynomial $x^4 - 2x^3 - 7x^2 + 8x + 12$, if two of its zeroes are -1 and 2 .

Q27. Draw the graph of the following equations

$$2x - y = 1, \quad x + 2y = 13$$

a) find the solution of the equation from the graph.

b) shade the triangular region formed by the lines and the y -axis.

Q28. The median of the following data is 525. Find the values of x and y , if total frequency is 100.

Class Interval	Frequency
0 - 100	2
100 - 200	5
200 - 300	x
300 - 400	12
400 - 500	17
500 - 600	20
600 - 700	y
700 - 800	9
800 - 900	7
900 - 1000	4

Q29. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

Q30. Nasir was asked to divide a polynomial $p(x)$ by $4x + 3$. On division, he obtained the remainder $x - 2$ and quotient $2x + 2$. From his calculation, he found $p(x) = 8x^2 + 2x + 8$. His classmate Karuna immediately told that his division is wrong. Is Karuna's assertion correct? Also, write the correct polynomial $p(x)$. What value can be learnt from this action?