PRINCE PUBLIC SCHOOL HALF YEARLY EXAMINATION (2019-20) SAMPLE PAPER-2 **MATHEMATICS**

X

TIME ALLOWED: 3 HOURS

MAXIMUM MARKS: 80

General Instructions

- 1. This question paper consists of 40 questions. All questions are compulsory.
- 2. Questions 1-20 in Section- A are very short type questions carrying 1 mark each.
- 3. Questions 21-26 in Section-B are short answer type questions carrying 2 marks each.
- 4. Question 27-34 in Section C are short answer type-II questions carrying 3 marks each.
- 5. Question 35-40 in Section D are long answer type questions carrying 4 marks each.
- 6. There is no overall choice.
- 7. 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.** Find the value of p for which the $4x^2 + 8x p = 0$ has real roots ______ **Q3.** If α , β and γ are zeroes of the polynomial $p(x) = ax^3 + bx^2 + cx + d$, then $\frac{1}{\alpha} + \frac{1}{\beta} + \frac{1}{\gamma} = 0$
- **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.** In \triangle ABC, D and E are points on the sides AB and AC respectively such that DE||BC. If AD= 4 cm, DB = (x-4) cm, AE = 8 cm and EC = (3x - 19) cm, find the value of x
- **Q6**. If the mode of a distribution is 8 and its mean is also 8, then find median.
- **Q7.** Write the decimal expansion of $\frac{25}{40}$
- **Q8.** Mean of 3 observations is 20. If first, second and third are increased by 2,3,4 respectively, then find the new mean.
- **Q9.** The value of k for which the equation $x^2 + 2(k+1)x + k^2 = 0$ has equal roots is ______.
- **Q10**. What is the value of $\frac{\cos(90^{\circ} \theta)\cos\theta}{\tan\theta}$ 1
- **Q11.** If x = 2 and m = 3, the equation is $3x^2 2kx + 2m = 0$, find k._____
- Q12. The wickets taken by a bowler in 12 cricket matches are 3, 7, 4, 6, 0, 6, 1, 3, 2, 3, 4, 5. Find the mode of the data.
- Q13. Among 52 cards, there are 12 face cards. Probability that a card drawn at random is not a face card is ...
- **Q14.** If two integers a and b are written as $a=x^3y^2$ and $b=xy^4$, x, y are prime numbers, then L.C.M(a,b) =
- Q15. The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in a lot is .
- **Q16.** If zeroes of the polynomial x^2 + (a+1)x + b are 2 and -3, then find the value of (a+ b).
- Q17. Find the mode.

Class	1 -3	3 - 5	5 - 7	7 - 9	9 - 11
Frequency	14	16	4	4	2

- **Q18.** By dividing $p(x) = x^3 + 4$ by x + 1, the remainder is _____. **Q19.** If $\triangle ABC \sim \triangle DEF$ and $AB = \frac{1}{3}DE$, then find $ar(\triangle ABC)$: $ar(\triangle DEF)$.____.
- **Q20.** What is the condition that the pair of linear equations kx + 2y = 5 and 3x + y = 1 have unique solution?

SECTION -B

- Q21. Find the H.C.F of 960 and 432 by using Euclid's division lemma.
- **Q22.** If α and β are zeroes of the quadratic polynomial $f(x) = 3x^2 5x 2$, then evaluate $\alpha^3 + \beta^3$.

Q23. 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.

Q24. Solve the equation $4x^2 - 4a^2x + (a^4 - b^4) = 0$

Q25. If $\cot \theta = \frac{15}{8}$, evaluate $\frac{(2 + 2\sin\theta)(1 - \sin\theta)}{(1 + \cos\theta)(2 - 2\cos\theta)}$

Q26. 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

Q27. 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.

OR

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.

Q28. 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 $3\alpha + 2\beta$.

Q29. Prove that the square of any positive integer is of the form 5q, 5q + 1, 5q + 4 for some integer q.

OF

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

Q30. The runs made by players in some cricket are given below

Class interval	0-10	10 - 20	20 - 30	30 – 40	40 – 50
Frequency	5	25	p	18	7

If median is 24, find the value of p. To discourage youngsters from watching T.V for hours together, how will you encourage youngsters to play outdoor games.

Q31. 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

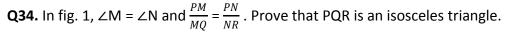
c) a king

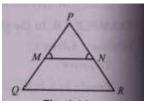
Q32. Find the solution of the pair of equations $\frac{x}{10} + \frac{y}{5} - 1 = 0$ and $\frac{x}{8} + \frac{y}{6} = 15$. Hence, find λ , if $y = \lambda x + 5$.

Q33. Prove that $\frac{1+\cos A}{\sin A} + \frac{\sin A}{1+\cos A} = 2 \ cosec A$

OR

Determine the value of x such that $2cosec^230^\circ + xsin^260^\circ - \frac{3}{4}tan^230^\circ = 10$.





SECTION-D

fig. 1

Q35. Draw the graph of the following equations, 2x - y = 1, 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.

Q36. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

Q37. 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	у
700 -800	9
800 -900	7
900- 1000	4

OR

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.

Q38. 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

c) not a perfect square

b) a composite number

d) multiple of 3 and 5.

OR

Cards marked with numbers 5 to 50, are placed in a box and mixed thoroughly. If one card is drawn at random from the box, find the probability that it bears

a) a prime number less than 20

c) a multiple of 5 or 6

b) a perfect square number

d) a prime number.

Q39. Find all the zeroes of the polynomial x^4 - $2x^3$ - $7x^2$ + 8x + 12, if two of its zeroes are -1 and 2.

Q40. Prove $\frac{tan\theta}{1-cot\theta} + \frac{cot\theta}{1-tan\theta} = 1 + sec\theta cosec\theta$.