

DELHI PUBLIC SCHOOL
BLUE PRINT WEEKLY TEST
CLASS XI (MATHEMATICS)

S. NO.	TYPES OF QUESTIONS	NO. OF QUESTION	MARKS	TOTAL
1.	VERY SHORT ANSWER	6	1	6
2.	SHORT ANSWER	5	4	20
3.	LONG ANSWER WITH ONE VALUE BASED QUESTION	4	6	24
TOTAL		15		50

DELHI PUBLIC SCHOOL BAHADURGARH

TIME : 3 HRS

CLASS – XI (S.A 1)

M.M : 100

SAMPLE PAPER

SUBJECT – MATHEMATICS (SET – 1)

ROLL NO.....

General Instruction:

- 1) All questions are compulsory.
- 2) Questions 1 to 10 each carry 1 mark.
- 3) Question 11 to 22 each carry 4 marks.
- 4) Question 23 to 29 each carry 6 marks.
- 5) Calculator is not allowed.

SECTION A

1. If $n(A - B) = 40$, $n(B - A) = 50$, $n(A \cap B) = 20$. Then what is the value of $n(A \cup B)$?
2. What is the domain of the function $\frac{1}{\sqrt{x^2-9}}$?
3. What is the radian of an angle $7^\circ 30'$?
4. If $(x + 3y) + 4i = 2 + (2x - y)i$ then find the value of x & y .
5. Solve the inequality $2x + 5 < 7$, $3x + 4 > -8$ for real x .
6. Find the value of n if ${}^nC_{12} = {}^nC_8$.
7. Find the number of terms in the expansion $(x + a)^8 - (x - a)^8$.
8. Find the value of x so that the point $(5, 6, -3)$ is at a distance of 13 unit from the point $(-7, x, 0)$.

9. What is the equation of YZ-Plane?
 10. Find the mean of square of first n natural numbers.

SECTION B

11. Find the mean deviation about mean from the following data.

No. of Children	0 - 2	2 - 4	4 - 6	6 - 8	8 - 10	10 - 12
No. of Families	20	10	5	5	3	2

Also comment on the awareness of the couples about the family welfare programme.

12. Find the ratio in which the ZX-Plane divide the segment joining the points A(2, 3, 5) & B(3, 8, 6). Also find the co-ordinates of the points of the section.
 13. In a group of 75 persons, 50 speak French, 30 speak Spanish & 20 speak both. Find the number of persons who speak neither French nor Spanish.
 14. If $F(x) = \frac{1}{1-x}$. Find $F\{F(F(x))\}$.
 15. Prove that $\sec A + \tan A = \tan\left(\frac{\pi}{4} + \frac{A}{2}\right)$.
 16. Find the principal value & general solution of the equation $3\tan^2 A + 2\sqrt{3} \tan A - 3 = 0$.
 17. Prove that $n(n+1)(n+2)$ is multiple of 6 for all n natural numbers.
 18. Find the square root of $3 - 4i$.
 19. Find the solution for real x of following system of inequality $\frac{5x}{4} + \frac{3x}{8} > \frac{39}{8}$, $\frac{2x-1}{12} - \frac{x-11}{3} < \frac{3x+1}{4}$.
 20. In an examination a question paper consists of 12 question divided into two parts i.e part 1st and part 2nd containing 5 & 7 questions respectively. A student is required to attempt 8 question in all, selecting at least 3 from each part. In how many ways can a student select the questions?
 21. If the origin is the centroid of triangle PQR with vertices P(2a, 2, 6), Q(-4, 3b, -10) & R(8, 14, 2c) then find the value of a, b & c.
 22. Find n if the coefficients of 5^{th} , 6^{th} & 7^{th} terms in expansion of $(1+x)^n$ are in A.P.

SECTION C

23. Find the mean, variance & standard deviation from flowing data table using step deviation method.

Diameter	33 - 36	37 - 40	41 - 44	45 - 48	49 - 52
No. of circles	15	17	21	22	25

24. Find the modulus and arguments of the complex number $\frac{1+2i}{1-3i}$.
 25. Using PMI prove that $3^{2n+2} - 8n - 9$ is divisible by 8 for all natural number n.
 26. Out of 30 students 15 passed in English, 12 passed in Maths, 8 in Science, 6 in English and Maths, 7 in Maths & Science, 4 in English & Science, 4 in all three. Find how many passed in
 (a) English & maths but not in science.
 (b) Maths and science but not in english.
 (c) Maths only.
 (d) More than one subject.
 (e) None of three subject.
 27. Prove that : $\frac{(1+\tan A + \cot A)(\sin A - \cos A)}{\sec^3 A - \operatorname{cosec}^3 A} = \sin^2 A \cdot \cos^2 A$
 28. Solve graphically:
 $x + y \geq 1$, $x \leq 5$, $y \leq 4$, $2x + 3y \leq 12$, $x, y \geq 0$
 29. A man has 6 friends. In how many ways he invites one or more of them to dinner.

Note : It is not permitted to write on question paper.

DELHI PUBLIC SCHOOL BAHADURGARH

TIME : 3 HRS

CLASS – XI (S.A 1)

M.M : 100

SAMPLE PAPER

SUBJECT – MATHEMATICS (SET – 2)

ROLL NO.....

General Instruction:

6) All questions are compulsory.

7) Questions 1 to 10 each carry 1 mark.

8) Question 11 to 22 each carry 4 marks.

9) Question 23 to 29 each carry 6 marks.

10)

Calculator is not allowed.

SECTION A

1. If $n(A - B) = 40$, $n(B - A) = 60$, $n(A \cap B) = 30$. Then what is the value of $n(A \cup B)$?
2. What is the domain of the function $\frac{1}{\sqrt{9-x^2}}$?
3. What is the radian of an angle $8^\circ 30'$?
4. If $(x + iy)(2 - 3i) = 4 + i$ then find the value of x & y .
5. Solve the inequality $37 - (3x + 5) \geq 9x - 8(x - 3)$ for real x .
6. Find the value of n if ${}^nC_{10} = {}^nC_{14}$.
7. Find the number of terms in the expansion $(1 + x)^{11} - (1 - x)^{11}$.
8. One end of a diameter of a sphere is $(0, 0, 0)$. If the centre is at $(-1, 2, 4)$. Find the other end of the diameter.
9. What is the equation of XZ-Plane?
10. Find the mean of cube of first n natural numbers.

SECTION B

11. Find the mean deviation about median from the following data.

No. of Children	0 - 2	2 - 4	4 - 6	6 - 8	8 - 10	10 - 12
No. of Families	20	10	5	5	3	2

Also comment on the awareness of the couples about the family welfare programme.

12. Find the ratio in which the YZ-Plane divide the segment joining the points $A(1, 2, 4)$ & $B(3, 8, 6)$. Also find the co-ordinates of the points of the section.
13. In a group of 150 persons, 70 speak French, 90 speak Spanish & 40 speak both. Find the number of persons who speak neither French nor Spanish.
14. If $F(x) = x^2 + 2x + 3$. Find $F(F(x))$.
15. Prove that $\frac{\sin A + \sin 2A}{1 + \cos A + \cos 2A} = \tan A$.
16. Find the principal value & general solution of the equation $2\sin^2 A = 3\cos A$.
17. Prove that $n(n + 1)(2n + 1)$ is multiple of 6 for all n natural numbers.
18. Find the square root of $-4 - 3i$.
19. Find the solution for real x of following system of inequality

$$\frac{7x-1}{3} - \frac{7x+2}{6} > x, \quad \frac{4x}{3} - \frac{9}{4} < x + \frac{3}{4}$$
20. From a class of 25 students, 10 are to be chosen for an excursion party. There are 3 students who decide that either all of them will join or none of them will join. In how many ways can the excursion party be chosen.

21. Find the distance of the centroid of triangle ABC whose vertices are (a, 0, 0), (0, b, 0) and (0, 0, c) from the origin.
22. Find n if the coefficients of 2^{nd} , 3^{rd} & 4^{th} terms in expansion of $(1 + x)^n$ are in A.P.

SECTION C

23. Find the mean, variance & standard deviation from following data table using short cut method.

Diameter	33 – 36	37 - 40	41 - 44	45 -48	49 – 52
No. of circles	15	17	21	22	25

24. Find the modulus and arguments of the complex number $\frac{1+i}{1-i} - \frac{1-i}{1+i}$
25. Using PMI prove that $(41^n - 14^n)$ is divisible by 27 for all natural number n.
26. Out of 50 students 17 passed in English, 13 passed in Maths, 15 in Science, 9 in English and Maths, 4 in Maths & Science, 5 in English & Science, 3 in all three. Find how many passed in
- English & maths but not in science.
 - English and science but not in maths.
 - English only.
 - More than one subject.
 - None of three subject.
27. Prove that :
- $$\frac{\sec A}{\operatorname{cosec}^2 A} - \frac{\operatorname{cosec} A}{\sec^2 A} = (1 + \cot A + \tan A) (\sin A - \cos A)$$
28. Solve graphically:
- $$x + 5y \geq 5, 4x + y \geq 4, x \leq 4, y \leq 3, x + y \leq 5.$$
29. A box contains a hundred rupee note, a ten rupee note, a five rupee note & four different coins. How many different amount can be drawn from it.

Note : It is not permitted to write on question paper.

GENERAL INSTRUCTIONS:

- 1) All the questions are compulsory.
- 2) Section A carries questions of 1 mark each; Section B carries questions of 4 marks each and section C carries questions of 6 marks each.
- 3) Carefully write the set no. and proper question nos. in the answer sheet provided to you.
- 4) Use of calculators, log tables etc. is not permitted.

SECTION – A

Q.1) Find the value of $\cos(75^\circ)$.

Q.2) If ${}^nC_9 = {}^nC_8$; find ${}^nC_{17}$.

Q.3) If $A = \{1, 2, 3\}$, then find $P(A)$.

Q.4) Find the coordinates of a point on Y-axis which are at a distance of $5\sqrt{2}$ from the point $P(3, -2, 5)$.

Q.5) Find dy/dx if $y = \sin(\sqrt{\cos x})$.

Q.6) Evaluate $\lim_{x \rightarrow 0} (\sqrt{1+x} - 1) / x$.

SECTION – B

Q.7) Find the range and domain of the function $f(x) = \sqrt{36 - x^2}$.

Q.8) The coefficients of three consecutive terms in the expansion of $(1 + a)^n$ are in the ratio 1:7:42. Find n.

OR

Find the middle term in the expansion of $(x/3 + 9y)^{10}$.

Q.9) Using section formula of prove that the points $(-4, 6, 10)$, $(2, 4, 6)$ and $(14, 0, -2)$ are collinear.

Q.10) The sum of first three terms of a G.P. is 16 and the sum of the next three terms is 128.

Find the first term and the common ratio.

OR

Find the sum to n terms of the series with n^{th} term; $n^2 + 2^n$.

Q.11) Prove by PMI that: $2 \cdot 7^n + 3 \cdot 5^n - 5$ is divisible by 24.

Q.12) Prove by PMI that: $1 \cdot 2 + 2 \cdot 2^2 + 3 \cdot 2^3 + \dots + n \cdot 2^n = (n-1) 2^{n+1} + 2$.

Q.13) IF p is the length of perpendicular from the origin to the line whose intercepts on the axes are a and b, then show that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$.

OR

Find the coordinates of the foci, the vertices, the length of major axis and the length of latus rectum of the ellipse: $4x^2 + 9y^2 = 36$.

Q.14) The perpendicular from the origin to a line meets it at the point $(-2, 9)$. Find the equation of the line.

Q.15) Find the equation of a circle passing through the points (2,3) and (-1,1) and whose centre is on the line $x - 3y - 11 = 0$.

Q.16) Evaluate $\lim_{x \rightarrow 0} \frac{(e^{5x} - 1) \{\log(1+2x)\}}{x^2}$ **OR**

Evaluate $\lim_{x \rightarrow 0} f(x)$ and $\lim_{x \rightarrow 1} f(x)$ if $f(x) = \begin{cases} 2x + 3, & x \leq 0 \\ 3(x + 1), & x > 0 \end{cases}$

Q.17) In a class of 60 students, 30 opted for Maths, 32 opted for English and 24 opted for both. If one student is selected at random, find the probability that (i) he has opted neither Maths nor English. (ii) he has opted English but not Maths.

Q.18) A solution is kept between 68°F and 77°F . What is the range in temperature in degree Celsius (C) if conversion formula is given by $F = \frac{9}{5}C + 32$?

Q.19) Insert 5 numbers between 8 and 26 such that the resulting sequence is an A.P..

SECTION – C

Q.20) If $\tan x = \frac{3}{4}$, x lies in 3^{rd} quadrant, find the values of $\sin x/2$, $\cos x/2$ and $\tan x/2$.

OR

Find the general solutions of the equation, $\cos x + \cos 2x + \cos 3x = 0$.

Q.21) Prove that $\cos^2 x + \cos^2 \left(x + \frac{\pi}{3}\right) + \cos^2 \left(x - \frac{\pi}{3}\right) = 3/2$.

Q.22) How many numbers greater than 1000000 can be formed by using the digits 1,2,0,2,4,2,4?

Q.23) Solve the following system of inequalities graphically;

$$x + 2y \leq 8, 2x + y \leq 8, x \geq 0, y \geq 0.$$

Q.24) Find dy/dx by first principle method, (i) $y = x^3 - 27$ (ii) $y = \cot x$.

Q.25) Find the probability that when a hand of 7 cards is drawn from a well shuffled deck of 52 cards, it contains (i) all kings, (ii) 3 kings, (iii) at least 3 kings.

OR

Three letters are dictated to three persons and an envelope is addressed to each of them. The letters are inserted into the envelopes at random such that each envelope contains exactly one letter. Find the probability that at least one letter is inserted in its proper envelope.

Q.26) A college awarded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men and only three men got medals in all the three sports, how many received medals in exactly two of the three sports? Why do you think that medals or prizes should be awarded to winners? Explain in two sentences.

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GENERAL INSTRUCTIONS:

- 1) All the questions are compulsory.
- 2) Section A carries questions of 1 mark each; Section B carries questions of 4 marks each and section C carries questions of 6 marks each.
- 3) Carefully write the set no. and proper question nos. in the answer sheet provided to you.
- 4) Use of calculators, log tables etc. is not permitted.

SECTION – A

- Q.1) Solve for integer x ; $3x + 7 < 5 + x$.
- Q.2) If ${}^nC_{10} = {}^nC_9$; find nC_2 .
- Q.3) If $A' = \{a, b, c\}$ and $U = \{a, c, d, b, e\}$, then find $P(A)$.
- Q.4) Find the coordinates of centroid of the triangle whose vertices are (a, b, c) , (d, e, f) and (g, h, k) .
- Q.5) Find dy/dx if $y = \log(\sqrt{\sin x})$.

Q.6) Evaluate $\lim_{x \rightarrow 0} \frac{\cos 2x - 1}{\cos x - 1}$.

SECTION – B

- Q.7) Find the range and domain of the function $f(x) = \sqrt{16 - x^2}$.
- Q.8) The coefficients of $(r-1)^{\text{th}}$, r^{th} and $(r+1)^{\text{th}}$ terms in the expansion of $(x+1)^n$ are in the ratio 1:3:5. Find n and r . **OR**
Find the middle term in the expansion of $(3 - x^3/6)^8$.
- Q.9) A point R with x coordinate 4 lies on the line segment joining the points $P(2, -3, 4)$ and $Q(8, 0, 10)$. Find the coordinates of the point R .
- Q.10) Find the sum of integers from 1 to 100 that are divisible by 2 or 5. **OR**
Find the sum to n terms of the series with n^{th} term; $(2n-1)^2$.
- Q.11) The sum of first p terms of an A.P. is equal to the sum of first q terms, then find the sum of first $(p+q)$ terms.
- Q.12) Prove by PMI that $\frac{1}{2.5} + \frac{1}{5.8} + \frac{1}{8.11} + \dots + \frac{1}{(3n-1)(3n+2)} = \frac{n}{6n+4}$, $\forall n \in N$.

- Q.13) Prove by PMI that: $3^{2n+2} - 8n - 9$ is divisible by 8 $\forall n \in N$.
- Q.14) A line perpendicular to the line segment joining the points $(1, 0)$ and $(2, 3)$ divides it in the ratio 1:n. Find the equation of the line

OR

Find the coordinates of the foci, the vertices, the eccentricity and the length of latus rectum of the hyperbola: $4y^2 - 9x^2 = 36$.

- Q.15) Find the distance of the point $(3, -5)$ from the line $3x - 4y - 26 = 0$.

Q.16) Find the equation of a parabola with vertex (0,0), passing through (5,2) and symmetric with respect to y – axis..

Q.17) Evaluate $\lim_{x \rightarrow 0} \frac{(e^{-4x} - 1) \{\log(1+4x)\}}{-x^2}$ **OR**

Evaluate $\lim_{x \rightarrow 0} f(x)$, if $f(x) = \begin{cases} \frac{|x|}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$

Q.18) In a class of 60 students, 30 opted for Maths, 32 opted for English and 24 opted for both. If one student is selected at random, find the probability that (i) he has opted neither Maths nor English. (ii) he has opted English but not Maths.

Q.19) How many litres of water will have to be added to 225 litres of the 45 % solution of acid so that the resulting mixture will contain more than 20% but less than 30% acid content?

Why acid should not be sold without supervision? Explain the reason in two sentences.

SECTION – C

Q.20) If $\sin x = -1/4$, x lies in 3rd quadrant, find the values of $\sin x/2$, $\cos x/2$ and $\tan x/2$.

OR

Find the general solutions of the equation, $\sin 2x - \sin 4x + \sin 6x = 0$.

Q.21) Prove that:

$$(\cos x + \cos y)^2 + (\sin x - \sin y)^2 = 4 \cos^2 \frac{(x+y)}{2}.$$

Q.22) How many 6 digit numbers can be formed from the digits 0,1,3,5,7 and 9 which are divisible by 10 and no digit is repeated. Also find the number of odd numbers.

Q.23) Solve the following system of inequalities graphically;

$$x + 3y \leq 9, 3x + y \leq 9, x \geq 0, y \geq 0.$$

Q.24) Find dy/dx by first principle method, (i) $y = \frac{1}{x}$ (ii) $y = \tan x$.

(3+3)

Q.25) Find the probability that when a hand of 7 cards is drawn from a well shuffled deck of 52 cards, it contains (i) 2 aces, (ii) at most 2 aces, (iii) 3 aces.

(2+2+2)

OR

If 4 digit numbers greater than 5000 are randomly formed from the digits 0,1,3,5,7, what is the probability of forming a number divisible by 5 when, the repetition is not allowed.

Q.26) In a survey it was found that 21 people liked tea, 26 people liked coffee and 29 liked soft drink, 14 people liked tea and coffee, 12 liked coffee and soft drink, 14 liked tea and soft drink and 8 liked all the three drinks. Find how many liked soft drink only?
