



**INDIAN SCHOOL DARSAIT**  
**SAMPLE PAPER, SEPTEMBER 2019**  
**MATHEMATICS (041)**



Class: XI	Max. Marks: 80
Date: 8-09-2019	Time: 3 hrs

**General Instructions:**

- (i) *All questions are compulsory.*
- (ii) *This question paper contains 29 questions.*
- (iii) *Question 1-20 in section A are multiple choice questions carrying 1 mark each.*
- (iv) *Question 20-26 in section B are short - answer type questions carrying 2 marks each.*
- (v) *Question 26-32 in section C are long- answer-I type questions carrying 4 marks each.*
- (vi) *Question 32-36 in section D are long – answer-II type questions carrying 6 marks each.*
- (vii)

<b>SECTION-A</b>		
<i>Questions 1 to 20 carry 1 mark each.</i>		
1.	The number of subsets of a set containing n elements is: A) n                      B) $2^n - 1$ C) $n^2$ D) $2^n$	1
2.	For any two sets A and B, $A \cap (A \cup B) =$ A) A                      B) B                      C) $\emptyset$ D) None of these.	1
3.	If $A = \{1, 3, 5, B\}$ and $B = \{2, 4\}$ , then: A) $4 \in A$ B) $\{4\} \subset A$ C) $B \subset A$ D) None of these.	1
4.	The domain of the function $f(x) = \sqrt{x-1} + \sqrt{3-x}$ is: A) $[1, \infty)$ B) $(-\infty, 3)$ C) $(1, 3)$ D) $[1, 3]$	1
5.	The range of the function $f(x) =  x-1 $ is : A) $(-\infty, 0)$ B) $[0, \infty)$ C) $(0, \infty)$ D) R	1
6.	If $4 \sin^2 \theta = 1$ , then the values of $\theta$ are: A) $2n\pi \pm \frac{\pi}{3}, n \in \mathbb{Z}$ B) $n\pi \pm \frac{\pi}{3}, n \in \mathbb{Z}$ C) $n\pi \pm \frac{\pi}{6}, n \in \mathbb{Z}$ D) $2n\pi \pm \frac{\pi}{6}, n \in \mathbb{Z}$	1
7.	If $\cot \theta - \tan \theta = \sec \theta$ , then $\theta$ is equal to: A) $2n\pi + \frac{3\pi}{2}, n \in \mathbb{Z}$ B) $n\pi + (-1)^n \frac{\pi}{6}, n \in \mathbb{Z}$ C) $n\pi + \frac{\pi}{2}, n \in \mathbb{Z}$ D) None of these	1
8.	If $\cot \theta + \tan \theta = 2$ , then $\sin \theta =$	1

	A) $\pm \frac{1}{\sqrt{2}}$ B) $\pm \frac{1}{\sqrt{3}}$ C) $\pm \frac{1}{2}$ D) $\pm 1$	
9.	If $A+B=2\pi$ , then $\sin A =$ A) $-\sin B$ B) $\sin B$ C) $\cos A$ D) $-\cos A$	1
10.	The maximum value of $\sin^2(120^\circ + \theta) + \sin^2(120^\circ - \theta)$ is : A) $\frac{1}{2}$ B) $\frac{3}{2}$ C) $\frac{1}{4}$ D) $\frac{3}{4}$	1
11.	If $x^n - 1$ is divisible by $x - k$ , then the least positive integral value of $k$ is : A) 1                      B) 2                      C) 3                      D) 4	1
12.	The solution of the inequality $-2 < 2 - 3x < 4$ is: A) $x < \frac{3}{4}$ B) $x > \frac{3}{4}$ C) $x \leq \frac{3}{4}$ D) $x \geq \frac{3}{4}$	1
13.	The slope of a line perpendicular to the line with slope $\frac{1}{\sqrt{3}}$ is : A) $\frac{1}{\sqrt{3}}$ B) $\sqrt{3}$ C) $-\sqrt{3}$ D) $-\frac{1}{\sqrt{3}}$	1
14.	Distance between the lines $5x + 3y - 7 = 0$ and $15x + 9y + 14 = 0$ is : A) $\frac{35}{\sqrt{34}}$ B) $\frac{1}{3\sqrt{34}}$ C) $\frac{35}{3\sqrt{34}}$ D) $\frac{35}{2\sqrt{34}}$	1
15.	The value of $\lambda$ for which the lines $3x + 4y = 5$ , $5x + 4y = 4$ and $\lambda x + 4y = 6$ meet at a point is : A) 2                      B) 1                      C) 4                      D) 3	1
16.	If the sum of $p$ terms of an A.P is $q$ and the sum of $q$ terms is $p$ , then the sum of $p + q$ terms is : A) 0                      B) $p - q$ C) $p + q$ D) $-(p + q)$	1
17.	If the sum of $n$ terms of an A.P be $3n^2 - n$ and its common difference is 6, then its first term is: A) 2                      B) 3                      C) 1                      D) 4	1
18.	If the sum of $n$ terms of an A.P is $2n^2 + 5n$ , then its $n$ th term is : A) $4n - 3$ B) $3n - 4$ C) $4n + 3$ D) $3n + 4$	1
19.	The ratio in which the line joining $(2, 4, 5)$ and $(3, 5, -9)$ is divided by the $yz$ -plane is: A) 2:3                      B) 3:2                      C) -2:3                      D) 4:-3	1
20.	The ratio in which the line joining the points $(a, b, c)$ and $(-a, -b, -c)$ is divided by the $xy$ -plane is: A) $a:b$ B) $b:c$ C) $c:a$ D) $c:b$	1
<b>SECTION-B</b>		
<i>Questions 20 to 26 carry 2 marks each.</i>		
21.	In a survey it was found that people encourage their wards for science streams/commerce streams and it looks commonly at school/college levels. There are 40 students in CHEMISTRY class and 60 students in PHYSICS. Find the number of students which are either in PHYSICS OR CHEMISTRY class in the following cases;  i) The two classes meet at the same hour.  ii) The two classes meet at different hours and 20 students are enrolled in both subjects.	2

22.	If $f(x) = x + 2$ and $g(x) = x^2 - 2x$ find $f \circ g, \dots, g \circ f$ .	2
23.	If $\sin x = \frac{3}{5}$ , $\cos y = \frac{-12}{13}$ , where $x$ and $y$ both lie in second quadrant, find the value of $\sin(x+y)$ .	2
24.	Find equation of the line parallel to the line $3x - 4y + 2 = 0$ and passing through the point $(-2, 3)$ .	2
25.	If $a, b, c$ are in A.P. ....prove that $(a+2b-c)(2b+c-a)(c+a-b) = 4ab$	2
26.	Find the ratio in which the join of $A(2,1,5)$ and $B(3,4,3)$ is divided by the plane $2x + 3y - 2z = 1$	2
<b>SECTION-C</b>		
<i>Questions 27 to 32 carry 4 marks each</i>		
27.	If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ $A = \{1, 2, 3, 4\}$ $B = \{2, 4, 6, 8\}$ and $C = \{3, 4, 5, 6\}$ Find: i) $(A \cup B)'$ ii) $B - (A \cup C)$ iii) Number of element in in $P(A)$ iv) Verify: $(A \cup B)' = A' \cap B'$	4
28.	If $f(x) = x^2 + x - 1$ and $g(x) = 4x - 7$ be real valued functions then find:  $(f+g)(2)$ , $(f-g)(7)$ , $fg(-5)$ .	4
29.	Prove that $\frac{1 - \cos 2A}{\sin 2A} = \tan A$ . Deduce the value of $\tan 22 \frac{1}{2}^\circ$ .	4
30.	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 $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$ .  <b>(OR)</b> If the lines $2x + y - 3 = 0$ , $5x + ky - 3 = 0$ and $3x - y - 2 = 0$ are concurrent, find the value of $k$ .	4
31.	The sum of $n$ terms of two arithmetic progression are in the ratio $(3n + 8) : (7n + 15)$ . Find the ratio of their 12 <sup>th</sup> terms.	4
32.	Find the equation of the set of points $P$ , the sum of whose distances from $A(4,0,0)$ and $B(-4,0,0)$ is equal to 10.	4
<b>SECTION-D</b>		
<i>Questions 32 to 36 carry 6 marks each</i>		
33.	In a survey of 25 students, it was found that 15 had taken Mathematics, 12 had taken Physics and 11 had taken Chemistry, 5 had taken Mathematics and Chemistry, 9 had taken Mathematics and Physics, 4 had taken Physics and Chemistry and 3 had taken all three subjects. Find the number of students that had i) only Chemistry ii) Mathematics and Physics but not Chemistry iii) only one of the subjects iv). at least one of the three subjects.	6

34.	Provethat: $\frac{\sin 5x - 2 \sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$ <p style="text-align: center;"><b>(OR)</b></p> Provethat: $\frac{\sin 3x + \sin 5x + \sin 7x + \sin 9x}{\cos 3x + \cos 5x + \cos 7x + \cos 9x} = \tan 6x$	6
35.	Prove by using the principle of mathematical induction for all $n \in \mathbb{N}$ : $3^{2n+2} - 8n - 9$ is divisible by 8.	6
36.	Draw the graph of the solution set of $x \leq 10, y \leq 4, x + 2y \geq 1, x - y \geq 4$ .	6