



INDIAN SCHOOL DARSAIT
DEPARTMENT OF MATHEMATICS



Subject : Mathematics Topic : Revision Date of Worksheet :1/6/2019

Resource Person: Premela Issac

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Name of the Student : _____ Class & Division : XI Roll Number : ____

S.NO	Questions	Marks
1.	If $A = \{x : x \text{ is a natural number}\}$ $B = \{x : x \text{ is an even natural number}\}$ $C = \{x : x \text{ is an odd natural number}\}$ $D = \{x : x \text{ is a prime number}\}$ <ul style="list-style-type: none">• Find i) $A \cap B$ ii) $C \cap D$.	1
2.	Are the following pair of sets equal $A = \{2, 3\}$, $B = \{x : x \text{ is solution of } x^2 + 5x + 6 = 0\}$	1
3.	In a survey of 25 students it was found that 15 had taken Mathematics, 12 had taken Physics and 11 had taken Chemistry, 15 had taken Chemistry and Mathematics, 9 had taken mathematics and physics, 4 had taken Physics and Chemistry and 3 had taken all the three subjects. Find the number of Students who had taken: (a) Only Chemistry (b) Only Mathematics (c) Only one of the Subjects. (d)	4
4.	Write the set $\left\{\frac{1}{3}, \frac{3}{5}, \frac{5}{7}, \frac{7}{9}, \frac{9}{11}, \frac{11}{13}\right\}$ in set builder form.	1
5.	If $U = \{1, 2, 3, 4, 5, 6, 7\}$, $A = \{2, 4, 6\}$ and $B = \{3, 5\}$ and $C = \{1, 2, 4, 7\}$ determine the following sets; i) $A \cup (B \cap C)$ ii) $(B - A) \cup (A - C)$ ii)	4
6.	In a town of 10000 families, it was found that 40% families buy newspaper A, 20% families buy newspaper B, 10% families buy newspaper C, 5% families buy newspaper A and B, 3% families buy newspaper B and C and 4% families buy newspaper A and C. If 2% families buy all the three newspapers. Determine the number of families which buy i) Newspaper A only ii) B only iii) A and B but not C iv) None A, B and C.	6
7.	Draw a Venn – diagram to represent the sets $A - B$ and $B - A$.	1



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8. Prove by the principle of Mathematical Induction that
 $1.2 + 2.3 + 3.4 + \dots = n(n+1) = \frac{n(n+1)(n+2)}{3}$ 4
9. Using Principle of Mathematical Induction prove that:
 $1.3 + 2.4 + 3.5 + \dots = n(n+2) = \frac{n(n+1)(2n+7)}{6}$ 3
10. Prove by Induction that the sum $S_n = n^3 + 3n^2 + 5n + 3$ is divisible by 3 for all $n \in \mathbb{N}$ 4
11. By using Principle of Mathematical Induction prove the following for all $n \in \mathbb{N}$: 4

$$1 + \frac{1}{1+2} + \frac{1}{1+2+3} + \frac{1}{1+2+3+4} + \dots + \frac{1}{1+2+3+4+\dots+n} = \frac{2n}{n+1}$$
12. By using Principle of Mathematical Induction prove the following for all $n \in \mathbb{N}$: 6

$$\frac{1}{1.4} + \frac{1}{4.7} + \frac{1}{7.10} + \dots + \frac{1}{(3n-2)(3n+1)} = \frac{3}{3n+1}$$
13. Prove the following by the principle of mathematical induction: 6

$$\frac{1}{1 \times 3} + \frac{1}{3 \times 5} + \frac{1}{5 \times 7} + \dots + \frac{1}{(2n-1)(2n+1)} = \frac{n}{2n+1}, \forall n \in \mathbb{N}.$$
14. Prove by the principle of Mathematical Induction that $x^{2n} - y^{2n}$ is divisible by $x + y$ 4
15. Evaluate $\sin \left[-\frac{11\pi}{3} \right]$ 6
16. Find the degree measure of the angle subtended at the centre of a circle of radius 100cm by an arc of length 22cm. (use $\pi = 22/7$) (Express the answer in degree and minutes). 6
17. If $\tan x = \frac{-5}{12}$, x lies in the second quadrant; find $\sec x$. 1
18. Find the values of $\cos \theta$ and $\tan \theta$, if $\sin \theta = \frac{-3}{5}$ and $\pi < \theta < \frac{3\pi}{2}$ 1
19. Prove that $\sin(-420^\circ) + \cos(-660^\circ) \sin(330^\circ) = -1$ 4
20. If A, B, C are in A.P, then prove that $\frac{\sin A - \sin C}{\cos C - \cos A} = \cot B$ 4
21. If $\tan x = \frac{3}{4}$, $\pi < x < \frac{3\pi}{2}$, find the value of $\sin \frac{x}{2}$, $\cos \frac{x}{2}$ and $\tan \frac{x}{2}$ 3
22. Prove that $\cos^2 x + \cos^2 \left(x + \frac{2\pi}{3} \right) = \frac{3}{2}$ 3



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23. Prove that i) $\tan 4x = \frac{4 \tan x (1 - \tan^2 x)}{1 - 6 \tan^2 x + \tan^4 x}$ 3
24. $(\cos \theta + \cos \phi)^2 + (\sin \theta - \sin \phi)^2 = 4 \cos^2 \frac{\theta + \phi}{2}$ 3
25. Find the principal solutions of the equation $2 \sin^2 \theta = 3 \cos \theta$ 4
26. Find the slope and y – intercept of the line whose equation is $2x + 4y - 7 = 0$. 1
27. Find the equations of the straight lines passing through the point (3, 2) which makes an angle 45° with the line $x - 2y = 3$. 6
28. Find the value of k for which the line $(k - 3)x - (4 - k^2)y + k^2 - 7k + 6 = 0$ is parallel to the y-axis. 1
29. Find the distance between the parallel lines $3x - 4y + 7 = 0$ and $3x - 4y + 5 = 0$. 1
30. i) Find the value of x for which the points (x , 1), (2 , 1) and (4,5) are collinear. 4
ii) Find the point on the x – axis, which is equidistant from the points (7 , 6) and (3 , 4).
31. Find the equation of a line drawn perpendicular to the line $\frac{x}{4} + \frac{y}{6} = 1$ through the point where it meets y – axis. 4
32. Find the distance of the point (2 , 3) from the line $2x - 3y + 9 = 0$ measured along a line $x - y + 1 = 0$. 4
33. In triangle ABC with vertices A (1 , 2), b (4 , 5) and C (0 , -3). Find the equation of the perpendicular from A to BC. 4
34. Find the equation of the lines through the point (3 , 2) which makes an angle of 45° with the line $x - 2y = 3$. 4
35. Find the distance of the point (2 , 3) from the line $2x - 3y + 9 = 0$ measured along a line $x - y + 1 = 0$. 4
36. In triangle ABC with vertices A (1 , 2), B (4 , 5), C (0 , -3). Find the equation of the perpendicular from A to BC. 4
37. If p and q are the lengths of perpendiculars from the origin to the lines $x \cos \theta - y \sin \theta = k \cos 2 \theta$ and $x \sec \theta + y \operatorname{cosec} \theta = k$ respectively, prove that $p^2 + 4q^2 = k^2$. 6



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- 38 Find the image of the point (3 , 8) with respect to the line $x + 3y = 7$ assuming the line to be a plane mirror. 6
- 39 Determine the point in XY plane which is equidistant from three points A(2 , 0, 3), b (0 , 3 , 2) and C (0, 0, 1). 4
- 40 Find the ratio in which the line segment joining the points (1, 2, 3) and (-3, 4, 5) is divided by xy plane. Also find the coordinate of the point of division. 4
- 41 The centroid of a triangle with vertices (-2, 1, 3), (-2, a, -5) and (4 , 7, b) is origin. Find value of a and b. 1
- 42 The vertices of a triangle are A (0, 7, 10), B (-1, 6, 6) and C(-4, 9, 6). Show that ABC is an isosceles right angled triangle. 1
- 43 Write the domain and range of signum function 1
- 44 Determine the domain and range
a) $f(x)=\sqrt{16-x^2}$ b) $f(x) = -|x|$ 4
- 45 A relation R is defined on the set Z of integers as follows:
 $(x,y)\in R$ if and only if $x^2 + y^2 = 25$
Express R as set of ordered pairs and hence find the domain. 1
- 46 Let $A =\{x, y, z\}$ and $B=\{1,2\}$.Find the number of relations from A to B. 1
- 47 If $f(x) = x^2+ x - 1$ and $g(x) = 4x - 7$ be real valued functions then find:
 $(f+g)(2),(f -g)(7),fg(-5)$ and $f/g (4)$ 4
- 48 Solve $5x - 3 < 3x + 1$ when x is a real number 1
- 49 Solve the following system of inequalities graphically:
 $x + 2y \leq 8, x + y \geq 4, x - y \leq 0, x \geq 0, y \geq 0$ 6
- 50 Solve graphically:
 $3x + 2y \leq 150, x + 4y \leq 80, x \leq 15, x \geq 0$ 6