Delhi Public School, Jammu
Final Assignment, 2016-17

Subject: Math's

Class: 11th

Q1) Write the following sets in set builder form:

$\{1, 4, 9, 16, 25, ...\}$.

Q2) Find the domain of the function $\sqrt{x-1}$.

Q3) In a survey of 700 students in a college,180 were listed as drinking Limca , 275 as drinking Miranda and 95 were listed as both drinking Limca and Miranda. Find how many students were drinking neither Limca nor Miranda.

Q4) If U= {1, 2,3,4,5,6,7,8,9}, A= {2,3,4} , B={1,5,6,7,8,9}. Verify that

   i) $(A \cup B)' = A'\cap B'$

   ii) $(A \cap B)' = A' \cup B'$

Q5) Find the domain and range of $f(x) = \dfrac{3}{2-x^2}$.

Q6) In a survey of 55 students , it was found that 25 had taken Mathematics, 22 had taken Physics and 21 had taken Chemistry,12 had taken Mathematics and Physics,10 had taken Mathematics and Chemistry and 8 had taken Physics and Chemistry. If 12 students had taken none of the three subjects, find the number of students who had taken all the three subjects. Also find the number of students who have taken

   (a) Only Mathematics
   (b) Only Physics
   (c) Only Chemistry

Q7) Prove by Induction that $x^{2n-1}+y^{2n-1}$ is divisible by $x+y$ for all $n\varepsilon N$.

Q8) Prove by Induction that for all $n\varepsilon N$, $1^2+2^2+3^2+4^2+........................+n^2 = \dfrac{n(n+1)(2n+1)}{6}$.

Q9) Find $\sin(x/2), \cos(x/2)$ and $\tan(x/2)$ when $\tan x = -\dfrac{4}{3}$, x lies in quadrant II.

Q10) Prove that

   i) $\text{Cos}^2 A + \text{Cos}^2(A+\dfrac{2\pi}{3}) + \text{Cos}^2(A -\dfrac{2\pi}{3}) = 3/2$.

   ii) $\text{Cos}^2(\pi/4 - \theta) - \text{Sin}^2(\pi/4 - \theta) = \text{Sin}2\theta$

   iii)   Q1) Find the argument of $\dfrac{1}{1+i}$.

   iv)   Q2) Find the conjugate of $(1+i)^2$.

   v)   Q4) Find real θ such that $\dfrac{3+2i\sin\theta}{1-2i\sin\theta}$ is purely real.

   vi)   Q5) Find the polar form of $\dfrac{-16}{1+i\sqrt{3}}$.

Q11) Exhibit graphically the solution set of the linear inequations:

  2x+3y≥6, 4x+6y≤24, -3x + 2y≤ 3 , x-2y≤2,x≥0 ,y≥0.

Q12) How many liters of water will have to be added to 1125 liters of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content.

Q13)   If (1/8!) + (1/9!) = (x/10!) , find x.

Q14)   How many three digit numbers can be formed using the digits 1 to 9 if no digit is repeated?

Q15)   An experiment consists of tossing a coin and then tossing it second time if a head occurs. If a tail occurs on the first toss, then a die is tossed once. Find the sample space.

Q16)   Find $(a+b)^4 - (a-b)^4$. Hence ,evaluate $(\sqrt{3}+\sqrt{2})^4 - (\sqrt{3}-\sqrt{2})^4$.

Q17)   In how many of the distinct permutations of the letters in MISSISSIPPI do the four I's not comes together?

Q18)   A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways can this be done when the committee consists of

   i)   Exactly 3 girls

ii)   At least 3 girls.

Q19) In a class of 60 students ,30 opted for NCC, 32 opted for NSS and 24 opted for both NCC and NSS . If one of these students is selected at random find the probability that

i)   The student opted for NCC or NSS.
ii)   The student has opted neither NCC nor NSS.
iii)   The student has opted NSS but not NCC.

Q20) Out of 100 students ,two sections of 40 and 60 are formed .If you and your friend are among the 100 students , what is the probability that

i)   You both enter the same section.
ii)   You both enter the different sections.

Q21) If origin is the centroid of the triangle PQR with vertices P(2a,2,6) , Q(-4,3b,-10) and R(8,14,2c), then find the values of a,b and c.

Q22) Find the equation of the circle passing through the points (2,3) and (-1,1) and whose centre is on the line x-3y-11=0.

Q23) Find the equation of the parabola having vertex at (0,0) , passing through (2,3) and axis is along x-axis.

Q24) Find the coordinates of the foci,the vertices, the length of major axis ,the minor axis, the eccentricity and the length of latus rectum of the ellipse $36x^2+4y^2=144$.

Q25) If p and q are the lengths of perpendiculars from the origin to the line $x\cos\theta - y\sin\theta = k\cos2\theta$ and $x\sec\theta + y\csc\theta = k$, respectively, prove that $p^2+4q^2=k^2$.

Q26) Find the coordinates of the foot of perpendicular from the point (-1,3) to the line 3x-4y-16=0.

Q27) Prove that the product of the lengths of perpendiculars drawn from the points $(\sqrt{a^2-b^2},0)$ and $(-\sqrt{a^2-b^2},0)$ to the line $\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta = 1$ is b^2 .

Q28) Differentiate xsinx by using First principle.

Q29) Differentiate the following functions w.r.t x

i) $x^5(3-6x^{-9})$
ii) $\frac{\sec x - 1}{\sec x + 1}$

Q30) If a,b,c and d are in G.P, show that $(a^2+b^2+c^2)(b^2+c^2+d^2)=(ab+bc+cd)^2$.

Q31) If a and b are the roots of $x^2 - 3x + p = 0$ and c , d are the roots of $x^2- 12x+q=0$,where a , b ,c and d forms a G.P . Prove that (q+p):(q-p) = 17:15

Q32) If the coefficients of a^{r-1},a^r,a^{r+1} in the binomial expansion of $(1+a)^n$ are in A.P, prove that $n^2-n(4r+1)+4r^2-2=0$.

Q33) Find the mean and variance for the following frequency distribution:

Classes	0-30	30-60	60-90	90-120	120-150	150-180	180-210
Frequencies	2	3	5	10	3	5	2