Brain International School

Vikas Puri, New Delhi

REVISION SHEET

SUBJECT: MATHEMATICS **CLASS-X I** **TERM 1**

SECTION A MCQ

Q1 Number of proper subsets of a set containing 4 elements is

(a) 4^2 (b) $4^2 - 1$ (c) 2^4 (d) $2^4 - 1$

Q2 . Which of the following is not correct?

(a) N ⊂ R (b) N ⊂ Q (c) Q ⊂ R (d) N ⊂ T

Q3. On real axis if A = [1, 5] and B = [3, 9], then A – B is

(a) (5, 9) (b) (1, 3) (c) [5, 9) (d) [1, 3)

Q4. If n(A – B) = 10, n(B – A) = 23, n(A ∪ B) = 50, then n(A ∩ B) is

(a) 7 (b) 17 (c) 27 (d) 33

Q5 Let A and B are two disjoint sets and α be the universal set, then $A' \cup \left((A \cup B) \cap B'\right)$ is equal to

(a) ∅ (b) α (c) A (d) B

Q6 Let S = set of points inside the square, T = set of points inside the triangle and C = the set of points inside the circle. If the triangle and circle intersect each other and are contained in a square. Then

Q7. Let A = {1, 2, 3, 4, 5, 6} and R be the relation defined on A by R = {(x, y) : x, y ∈ A, x divides y}, then range of R is

(a) {2, 3, 4, 5, 6} (b) {1, 2, 3, 4, 5} (c) {2, 4, 6} (d) {1, 2, 3, 4, 5, 6}

Q8. Let A = {3, 5} and B = {7, 11} and R be the relation from A to B defined as R = {(a, b) : a ∈ A, b ∈ B, a – b is odd}, then

(a) R = A × B (b) R = ∅ (c) R ⊂ A × B (d) R ⊂ B × A

Q9 Given R = {(x, y) : x, y ∈ Z, y = x – 3}, then which ordered pair belongs to R?

(a) (1, 4) (b) (0, 3) (c) (5, 2) (d) (-4, 1)

Q10 If R = {(x, y) : x, y ∈ W, $x^2 + y^2 = 169$}, then domain of R is

(a) {0, 5, 12, 13} (b) {-13, -12, -5, 0, 5, 12, 13}

(c) {0, 1, 2, 3, ..., 13} (d) {0, ±1, ± 2, ..., ± 13}

Q11 If A = {a, b} and B = {x, y, z}, then the number of relations from B to A is

(a) 8 (b) 16 (c) 32 (d) 64

Q12. The value of $\sin(\pi + x).\sin(\pi - x).cosec^2 x$ is

(a) 0 (b) 1 (c) -1 (d) 2

Q13 The value of $3\sin\frac{\pi}{6}.\sec\frac{\pi}{3} - 4\sin\frac{5\pi}{6}.\cot\frac{\pi}{4}$ is

(a) -1 (b) 0 (c) 1 (d) 2

Q14. If $\sin\alpha = k\sin\beta$, then $\tan\left(\frac{\alpha-\beta}{2}\right).\cot\left(\frac{\alpha+\beta}{2}\right)$ is equal to

(a) $\frac{k-1}{k+1}$ (b) $\frac{k+1}{k-1}$ (c) $\frac{1+k}{1-k}$ (d) $\frac{1-k}{1+k}$

Q15 If $\sin x = \frac{1}{3}$, then the value of sin 3x is

(a) 1 (b) 0 (c) $\frac{23}{27}$ (d) $-\frac{23}{27}$

Q16 If $8x + i(2x - y) = 3 - 8i$ and x, y ∈ R, then the values of x and y are

(a) $x = \frac{3}{8}, y = \frac{35}{4}$ (b) $x = -\frac{3}{8}, y = \frac{35}{4}$

(c) $x = \frac{3}{8}, y = -\frac{35}{4}$ (d) $x = -\frac{3}{8}, y = -\frac{35}{4}$

Q17 The value of $1 + i + i^2 + ... + i^n$ is

(a) positive (b) negative (c) 0 (d) cannot be determined

Q18 If $z = x + iy$ satisfies $|z + 1| = 1$, then
(a) x = 0 (b) $(x-1)^2 + y^2 = 1$ (c) y = 0 (d) $(x+1)^2 + y^2 = 1$
Q19. If $z = x + iy$ satisfies $|z + 1 - i| = |z - 1 + i|$, then
(a) y = x (b) y = -x (c) x – y + 1 = 0 (d) x + y – 1 = 0
Q20. Number of solutions of the equations $z^2 + |z|^2 = 0$ is
(a) 1 (b) 2 (c) 3 (d) infinitely many
Q21. If $\frac{1}{2}\left(\frac{3}{5}x + 4\right) \geq \frac{1}{3}(x - 6),\ x \in R$, then
(a) $x \in (-\infty, 120]$ (b) $x \in [120, \infty)$ (c) $x \in (-\infty, -120)$ (d) $x \in (120, \infty)$
Q22. If x is a negative integer, then the solution set of -12x > 30 is
(a) {-2, -1} (b) {..., -5, -4, -3} (c) {..., -5, -4, -3, -2} (d) {-2, -1, 0, 1, 2, ...}
Q23. The solution set of system of linear inequalities $2(x + 1) \leq x + 5,\ 3(x + 2) > 2 - x,\ x \in R$ is
(a) [-1, 3] (b) (-1, 3) (c) (-1, 3] (d) [-1, 3)
Q24. The solution set of $6 \leq -3(2x - 4) < 12,\ x \in R$ is
(a) (0, 1] (b) [1, 0) (c) (0, 1) (d) [0, 1]
Q25. The length of rectangle is double the breadth. If the minimum perimeter of the rectangle is 120cm, then
(a) breadth > 20cm (b) breadth < 20cm
(c) breadth ≥ 20cm (d) breadth ≤ 20cm
Q26. If $\frac{|x+1|}{x+1} > 0,\ x \in R$, then
(a) $x \in [-1, \infty)$ (b) $x \in (-1, \infty)$ (c) $x \in (-\infty, -1)$ (d) $x \in (-\infty, -1)$

Q27. The number of 3 digit odd numbers, when repetition of digits is allowed is
(a) 450 (b) 360 (c) 400 (d) 420
Q28. The number of numbers divisible by 5 and lying between 40,000 and 50,000 that can be formed from the digits, 0, 3, 4, 5, 8 and 9, when repetition of digits is not allowed is
(a) 431 (b) 48 (c) 432 (d) 84
Q29. The number of 4 digit numbers that can be formed with the digits 2, 3, 4, 7 and using each digit only once is
(a) 120 (b) 96 (c) 24 (d) 100
Q30. The sum of all the digits in unit place of all the numbers formed with the help of 3, 4, 5 and 6 taken all at a time is
(a) 432 (b) 108 (c) 36 (d) 18
Q31. A five digit number divisible by 3 is to be formed using the digits 0, 1, 3, 5, 7, 9 without repetitions. The total number of ways this can be done is
(a) 216 (b) 192 (c) 240 (d) 3125
Q 32 The number of terms in the expansion of $(x + a)^{53} + (x - a)^{53}$ after simplification is
(a) 106 (b) 26 (c) 27 (d) 53
Q 33 The number of terms in the expansion of $(x + a)^{46} - (x - a)^{46}$ after simplification is
(a) 23 (b) 24 (c) 46 (d) 92
Q 34 In a G.P. first term is $\frac{3}{4}$, common ratio is 2 and the last term is 384, then the number of terms of G.P. is
(a) 8 (b) 9 (c) 10 (d) 11
Q 35 The first and second terms of a G.P. are x^{-4} and x^m respectively. If its 8^{th} term is x^{52}, then the value of m is
(a) 8 (b) 6 (c) 4 (d) 2
Q36 If the first term of a G.P. is 27 and 8^{th} term is $\frac{1}{81}$, then the sum of its first 10 terms is
(a) $\frac{27}{2}\left(1 - \frac{1}{3^{10}}\right)$ (b) $\frac{81}{2}\left(\frac{1}{3^{10}} - 1\right)$ (c) $\frac{27}{2}\left(\frac{1}{3^{10}} - 1\right)$ (d) $\frac{81}{2}\left(1 - \frac{1}{3^{10}}\right)$
Q 37 The product of 5 terms of G.P. whose 3^{rd} term is 2 is
(a) 5^2 (b) 2^5 (c) 3^2 (d) 3^5

SECTION B 2 MARKERS

Q 38 Write the following intervals in set-builder form:

a) (-3, 0) b) [6, 12] c) (6, 12] d) [-23, 5)

Q 39 If A & B are two sets such that A$\subset B$, then what is A U B?

Q 40 Which of the following pairs of sets are disjoint?

a) {1, 2, 3, 4} and {x: x is a natural number and $4 \leq x \leq 6$}

b) {a, e, i, o, u} and {c, d, e, f}

c) {x: x is an even integer} and {x: x is an odd integer}

Q 41 using sets U = {x;x≤ 10 and $x \in N$} A={1,3,5,7,9} B={2,4,6,8} And C= {2,3 ,4,5,6}

Verify that A$\cap (B' \cup C') = A\cap (B \cap C)'$

Q 42. A relation R is defined from a set A ={2,3,4,5} to a set B ={3,6,7,10} as follows

(x, y)ε R$\Rightarrow$ x is relatively prime to y.

Q 43 Determine their range f : a$\twoheadrightarrow$ R. F(x)=x^2+1, where A={-1,0,2,4}

Q 44. Let F : R$\twoheadrightarrow$R be given by f(x)=x^2+3. Find

(i) {x: f(x)=28} (ii) the pre images of 39 and 2 under f.

Q 45. Find the domain of each of the following functions given by

(i) $f(x) = \frac{1}{\sqrt{1-\cos x}}$ (ii) $f(x) = \frac{1}{\sqrt{x+|x|}}$

Q 46 Show that tan 3x tan 2x tanx = tan3x – tan2x – tanx

Q 47 Prove the following: a) $\frac{\cos(\pi+x)\ cos(-x)}{\sin(\pi-x)\ \cos(\frac{\pi}{2}+x)} = cot^2 x$ b) $cos^2 2x - cos^2 6x$ = sin4x sin8x

Q 48. the angles of a triangle are in A.P. the number of degrees in the least is to the number of radians in the greatest is 60:π. Find the angles in degrees

Q 49 A horse is tied to a post by a rope . if the horse moves along a circular path always keeping the rope Tight and describe 88 mtrs when it has traced out 72° at the centre . find the length of the rope.

Q 50 If $Z_1 = 2 - i,\ Z_2 = 1 + i$, find $\left|\frac{Z_1+Z_2+1}{Z_1-Z_2+1}\right|$.

Q 51. Let $Z_1 = 2 - i, Z_2 = -2 + i$. Find:

(i) Re($\frac{Z_1 Z_2}{\bar{z_1}}$) (ii) Im($\frac{1}{Z_1 \bar{z_1}}$).

Q 52 If (a+ib)(c+id)(e+if)(g+ih)=A+iB then show that $(a^2 + b^2)(c^2 + d^2)(e^2 + f^2)(g^2 + h^2) = A^2 + B^2$.

Q 53 If (1+ i)(1 + 2i)(1 + 3i)....(1+ni) = (x + iy) show that $2 \times 5 \times 10 \times \ldots \times (1 + n^2) = x^2 + y^2$

Q54. The marks obtained by a student of Class XI in first and second terminal examination are 62 and 48, respectively. Find the number of minimum marks he should get in the annual examination to have an average of at least 60 marks.

Q 55. Find all pairs of consecutive odd natural numbers, both of which are larger than 10, such that their sum is less than 40.

Q 56 Find r, if $5\ {}^{4}_{r}p = 6\ {}_{r-1}{}^{5}p$

Q 57 Find the number of different 8-letter arrangements that can be made from the letters of the word DAUGHTER so that (i) all vowels occur together (ii) all vowels do not occur together.

Q 58 If $\frac{n!}{2!(n-2)!}$ and $\frac{n!}{4!(n-4)!}$ are in ratio 2:1. Find n.

Q 59. Prove that $\frac{(2n)!}{n!}$=1×3×5×……×(2n-1)2^n.

Q 60. How many three digit even numbers are there with 3 digits such that if 5 is one of the digits, 7 is the next digits.

Q 61. Expand (i) $(\sqrt[3]{x} - \sqrt[4]{a})^6$

Q 62 The 4th term of a GP. is square of its second term, and the first term is — 3. Determine its 7th term.

Q 63 Find a GP. For which sum of the first two terms is — 4 and the fifth term is 4 times the third term.

/Q 64 If the 4th, 10th and 16th terms of a GP. Are x, y and z, respectively. Prove that x, y, z are in GP**.**

Q 65 Find four numbers forming a geometric progression in which the third term is greater than the first term by 9, and the second term is greater than the 4th by 18.

SECTION C 3 MARKERS

Q 66 If the p^{th}, q^{th}& r^{th} terms of a G.P. Are a, b and c, respectively**.** Prove that $a^{q-r}\ b^{r-p}\ c^{p-q} = 1$

Q 67 If the first and the nth term of a G.P. are a and b, respectively, and if P is the product of n terms, prove that $P^2 = (ab)^n$.

Q 68 Find the sum of sequence 7, 77, 777, 7777,... to n terms

Q 69 Which is larger $(1.01)^{1000000}$ or 10,000?

Q70 Using binomial theorem, prove that 6^n–5n always leaves remainder 1 when divided by 25.

Q 71. The principal wants to arrange 5 students on the platform such that the boy "SALIM" occupies the second position such that the girl "SITA" is always adjacent to the girl "RITA". How many such arrangements are possible.

Q 72. How many four digits numbers divisible by 4 can be made with the digits 1,2,3,4,5 if the repetition of the digits is not allowed.

Q 73 A tea party is arranged for 16 persons along two sides of a long table with 8 chairs on each side. Four persons wish to sit on one particular and two on the other sides. In how many ways can they be seated.

Q 74. 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 ?

Q 75. Solve for ; $\frac{|x-2|-1}{|x-2|-2} \leq 0$

Q76. Solve the following system of inequalities:

$\frac{x}{2x+1} \geq \frac{1}{4}, \frac{6x}{4x-1} < \frac{1}{2}$

Q 77 The cost and revenue functions of a product are given by C(x) = 20 x + 4000 and R(x) = 60x + 2000, respectively, where x is the number of items produced and sold. How many items must be sold to realise some profit?

Q 78. Solve the Following inequations :

(i) $\frac{1}{x-2} < 0$ (ii) $\frac{x-3}{x-5} > 0$ (iii) $\frac{2x+4}{x-1} \geq 5$

Q 79 Find multiplicative inverse of $(2+\sqrt{3i}\,)^2$

Q80 If $\frac{(a+i)^2}{2a-i}$ = P + iq show that $P^2 + q^2 = \frac{(a^2+1)^2}{4a^2+1}$

Q 81 If (1+ i)(1 + 2i)(1 + 3i)....(1+ni) = (x + iy) show that $2\times 5\times 10\times \ldots\times (1+n^2) = x^2+y^2$

Q 82 If α *and* β are two different complex nos with $|\beta|$=1 then find $\left|\frac{\beta-\alpha}{1-\bar{\alpha}\beta}\right|$

Q 83 If $(x + iy)^3 = u + iv$ then prove that $\frac{u}{x}+\frac{v}{y} = 4(x^2-y^2)$

Q 84. prove that $\cos\alpha + \cos\beta + \cos\gamma + \cos(\alpha+\beta+\gamma) = 4\cos\left(\frac{\alpha+\beta}{2}\right)\cos\left(\frac{\beta+\gamma}{2}\right)\cos\left(\frac{\alpha+\gamma}{2}\right)$

Q 85 prove that (i) $\frac{1+\sin2\theta+\cos2\theta}{1+\sin2\theta-\cos2\theta} = \cot\theta$ (ii) $\frac{\cos\theta}{1+\sin\theta} = \tan\left(\frac{\pi}{4}-\frac{\theta}{2}\right)$

Q 86 show $\sqrt{2+\sqrt{2+\sqrt{2+2\cos8\theta}}} = 2\cos\theta$ (ii) $\frac{\sec8\theta-1}{\sec4\theta-1} = \frac{\tan8\theta}{\tan2\theta}$

Find range of each of the following

(i) f(x)= $\frac{1}{\sqrt{x-5}}$ (ii) f(x)= $\sqrt{16-x^2}$

(iii) f(x)= $\frac{x}{1+x^2}$ (iv) f(x)= $\frac{3}{2-x^2}$

Q 87 The relation f is defined by f(x)=$\begin{cases} x^2, 0 \le x \le 3 \\ 3x, 3 \le x \le 10 \end{cases}$

The relation g is defined by g(x)=$\begin{cases} x^2, 0 \le x \le 2 \\ 3x, 2 \le x \le 10 \end{cases}$

Show that f is a function and g is not a function.

Q 88. Let R be relation from Q to Q defined by R={(a, b): a, b∈ Q and a-b∈ Z}. Show that

(i) (a, a) ∈ R for all A∈ Q.

(ii) (a, b) ∈ R implies that (b, a) ∈ R.

(iii) (a, b) ∈ R and (b, c) ∈ R implies that (a, c) ∈ R.

Q 89 if A and B are two sets such that n(A) =17 , n(B) =23 And n(AUB)=38

Find S(i) n(A∩ B) Ans 2 (ii) n(A-B) ans 15 (iii) n(B-A) ans 21

Q 90 if total elements 50 , n(A) =30 , n(A∩ B)=12 and $n(AUB)' = 15$ then find (i) n(B)

(II) n(B-A) ans 17 , 5

Q 91in a class of 50 students , 30 students like maths , 25 like science and 16 like both . find the Number of students who like (i) either maths or science (ans 39) (ii) neither maths nor science (ans11)

Q 92 A and B are two sets such that n(A-B)=14+x, n(B-A)=3x and n(A∩ B) = x if n(A)=n(B). find x (ans 7)

SECTION D 5 MARKERS

Q 93 in class xi of a certain school , there are 20 students in a chemistry class and 30 students in a physics class . find the number of students which are either in chemistry class or In physics class in following cases

(i) the two classes meet at the same time (ans 50)

(ii) the two classes meet at different time and 10 students study both the subjects (ans 40)

Q 94 in a survey of 100 students , the number of students studying the various languages were found To be : English only 18 , English but not hindi 23 , eng and Sanskrit 8,eng 26, Sanskrit 48, skt and hindi 8 , no languages 24 . find

(i) how many students were studying hindi (ans 18)

(ii) how many students were studying English and hindi (ans 3)

Q 95 Out of 100 students, 15 passed in English, 12 passed in Mathematics, 8 in Science, 6 in English 7 & Mathematics, 7 in Mathematics 7 Science, 4 in English 7 Science, 4 in all the three. Find how many passed

1) in English & Mathematics but not in Science **2)** in Mathematics & Science but not in English.

3) in Mathematics only **4)** in more than one subject only.

Q 96. Find the domain and range of the following real functions:

(i) f(x)=-|x| (ii) f(x)=$\sqrt{9-x^2}$.

Q 97. find the range of each of the following functions:

/(i) f(x)=2-3x, x∈ $R, x > 0$.

(ii) f(x)=$x^2 + 2$, x is a real number.

(iii) f(x)=x, x is a real number.

Q 98 Prove that Cos 2x Cos $\frac{x}{2}$ – Cos 3x Cos $\frac{9x}{2}$ = Sin 5x Sin $\frac{5x}{2}$

Q 99 Prove that $cos^2x + cos^2(x+\frac{\pi}{3}) + cos^2(x-\frac{\pi}{3}) = \frac{3}{2}$

Q 100 If A+B = $\frac{\pi}{4}$ prove that (1+tan A)(1+tan B) = 2 (ii) (cotA-1)(CotB-1) =2

Q 101. prove that$Sin^2A=Cos^2(A-B) + Cos^2B - 2\cos(A-B)\,CosAcosB$

Q 102 if tan $(\alpha+\theta) = ntan(\alpha-\theta)$ show that (n+1)sin2$\theta = (n-1)sin2\alpha$ (apply C&D)

Q 103. IF sin$\alpha + sin\beta = a$ $and\ cos\alpha + cos\beta = b$ show that

(i) cos$(\alpha+\beta)$=$\frac{b^2-a^2}{b^2+a^2}$ (ii) sin$(\alpha+\beta)$=$\frac{2ab}{a^2+b^2}$

Q 104 prove that (i) cos20°$cos40°cos60°cos80° = 1/16$ (ii) sin10°$sin30°sin50°sin70° = 1/16$

(iii)tan20°$tan40°tan80° = tan60°$

Q 105. Find real θ such that, $\frac{3+2isin\theta}{1-2isin\theta}$ is purely real.

Q106 A manufacturer has 600 litres of a 12% solution of acid. How many litres of a 30% acid solution must be added to it so that acid content in the resulting mixture will be more than 15% but less than 18%?

Q 107 In how many ways can the letters of the word PERMUTATIONS be arranged if the

(i) words start with P and end with S, (ii) vowels are all together, (iii) there are always 4 letters between P and S?

Q 108. What is the number of ways of choosing 4 cards from a pack of 52 playing cards? In how many of these

(i) four cards are of the same suit, (ii) four cards belong to four different suits, (iii) are face cards,

(iv) two are red cards and two are black cards, (v) cards are of the same colour?

Q 109. The letters of the word "RANDOM" are written in all possible orders and these words are written out as in a dictionary. Find the rank of the word "RANDOM".

Q 110 Find the value of n so that $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ may be geometric mean between a and b.

Q 111 The sum of two numbers is 6 times their geometric means, show that numbers are in the ratio $(3+2\sqrt{2}):(3-2\sqrt{2})$

Q 112 Let S be the sum, P the product and R the sum of reciprocals of n terms in a GP. Prove that $P^2R^n = S^n$.

Q 113 If a and b are the roots of $x^2 - 3x + p = 0$ and c, d are roots of $x^2 - 12x + q = 0$, where a, b, c, d form a G.P. Prove that (q + p): (q- p) = 17: 15.

SECTION E CASE STUDY

Q114 In a city school during the admission to class XI, 18 students took English, 23 students took Hindi and 24 students took Sanskrit.

Of these, 13 took both Hindi and Sanskrit, 12 took both English and Hindi and 11 took both English and Sanskrit.

Due to the request made by some students, the school authorities decided that 6 students will be offered all the three languages.

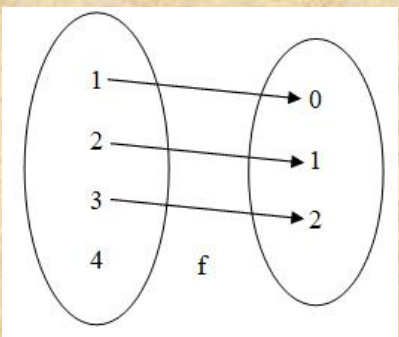
Based on the above information answer the following questions.

(i) Find the total number of students who took admission in class XI.
(ii) How many students took Sanskrit but not Hindi?
(iii) How many students took exactly one of the three subjects?
(iv) How many students took exactly two of the three subjects?
(v) How many students took Hindi but not Sanskrit?

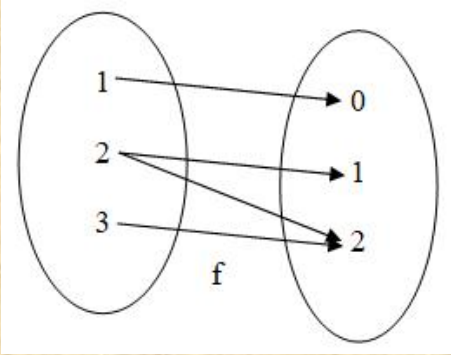
Q 115. Given a relation in x and y, we say 'y is a function of x' if for every element x in the domain, there corresponds exactly one element y in the range.

Based on the above information, attempt the following questions.

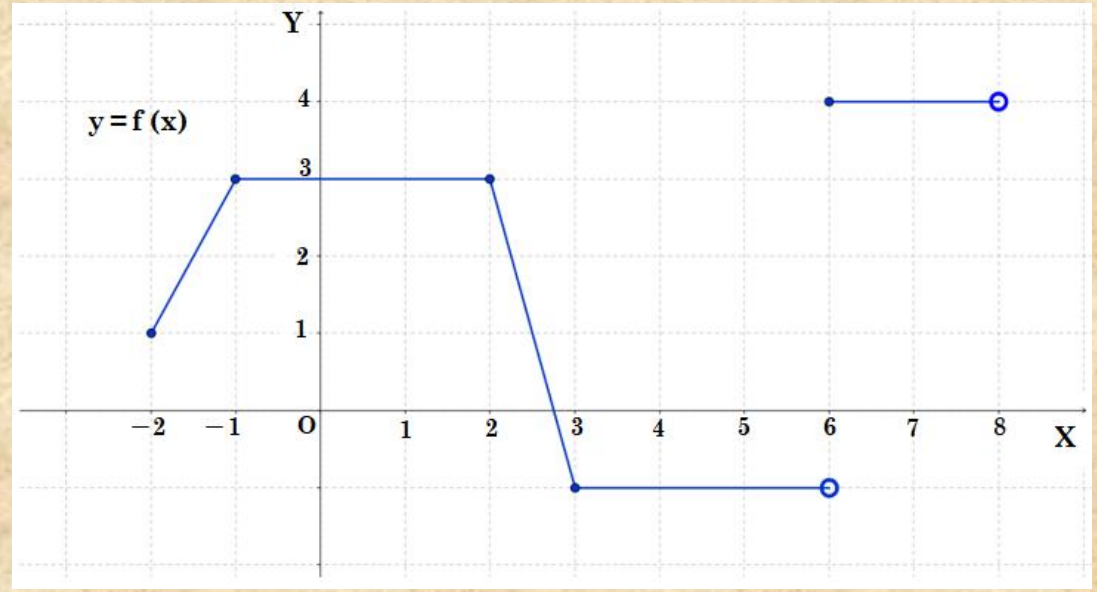
(i) Determine whether the following is a function or not. Justify your answer.



(ii) Determine whether the following is a function or not. Justify your answer.



(iii) Determine the domain and range of the function $y = f(x)$, whose graph is shown below.



(iv) Examine the graph shown in (iii). Mention the integral value(s) of x at which $f(x) = 3$.

(v) Check if $f = \{(a, z), (b, y), (b, x), (c, w), (d, v)\}$ is a function or not. Justify your answer.

Q116. A relation R defined from A to B, is a subset of $A \times B$.
Based on the above information, attempt the following questions.

(i) If $A = \{1, 2, 3\}$, $B = \{4, 5\}$ then, write a relation R defined from A to B, having maximum number of elements.

(ii) For the data given in (i), what will be the total number of relations?

(iii) Check if $S : A \to B$, where $S = \{(1, 4), (2, 5), (3, 4), (4, 5)\}$ is a relation or not. Give reason.

(iv) For a relation $R' : B \to A$ defined as $R' = \{(x, y) : x \in B,\ y \in A;\ x \text{ is divisible by } y\}$, write the roster form.

(v) For the relation R' defined in (iv), draw an arrow diagram.

Q 117 Given that $\sin x = -\frac{5}{13}$, x lies in third quadrant.

Based on the above information, answer the following questions.

(i) Find the value of $\sin 2x$.

(ii) Find the value of $\cos 2x$.

(iii) Find the value of $\sin\frac{x}{2}$.

(iv) Determine the value of $\cos\frac{x}{2}$.

(v) Determine the value of $\tan\frac{x}{2}$.

Q118 After retirement, Mr Ravi Dutt Sharma purchased a farm house in the shape of quadrilateral ABCD with $\angle A = 90°, \angle B = 72°, \angle C = 108°$ and $\angle D = 90°$. Mr Sharma also purchased a horse and a cow. One day, he tied the horse with a rope at vertex B and observed that it describes an arc of length 88 m when it moves along a circular path keeping the rope tight.

Based on the above information, answer the following questions.

(i) What is radian measure of $\angle B$?

(ii) What is the length of rope?

(iii) What will be the length of arc described by horse if he doubles the rope length?

(iv) What will be the length of arc described by cow, if it is tied at vertex C with the rope of same length as horse?

(v) What is the ratio of area that horse can cover to that of cow with same length of rope?

Q 119. While solving a typical equation a student Ayesha finds that one of the roots of the equation is a complex number $z = \frac{1+2i}{1-3i}$. Help her to find the answer of following questions.

(i) Find the standard form of z.

(ii) If $z = 2x + (4-y)i$, then obtain values of x and y.

(iii) Write the conjugate of z.

(iv) What is the modulus of z?

(v) Mention the quadrant in which z lies?

Q 120 A company produced cassettes; one cassette costs the company `30 and also an additional fixed cost of `26000 per week. The company sold each cassette at `43.

Let x be the number of cassettes produced and sold by the company in a week.

From the above information, answer the following questions.

(i) Find the cost function of the company.

(ii) Find the revenue function of the company.

(iii) Find the profit function of the company.

(iv) How many cassettes must be produced by the company in a week to realize some profit?

(v) If company incurred an additional cost of `3 on each cassette per week, then how many cassettes must be produced by the company in a week so that there is no profit no loss?

Q 121. A school administration decides to send some of its students of class XI to an educational tour. From a class of 25 students, 10 are to be chosen for the tour.

There are three friends - Rajesh, Shreya and Deepa - who decide that either all of them will join or none of them will join.

Based on the above information, answer the following questions.

(i) In how many ways can the students be chosen for this educational tour, if these three friends will join?

(ii) In how many ways can the students be chosen for this educational tour, if these three friends will not join?

(iii) In how many ways can the students be chosen for this educational tour?

(iv) Mr O.P. GUPTA, the Mathematics teacher of school puts some questions for these three students - with a condition that if any one of them answers correctly then, they may join this tour.

He asks them to find the number of words formed using all the letters of 'Rajesh'. Deepa answers it correctly. What could be her answer?

(v) Further the teacher asked all of them to find the number of words formed using all letters of 'Deepa'. What could be the correct answer?

Q 122. Anish appears in an examination.

While reading the instructions, Anish observed that the question paper consists of 12 questions divided into two parts - Part I and Part II, containing 5 and 7 questions, respectively.

Based on the given information, answer the following questions

(i) If Anish is required to attempt 8 questions in all, selecting at least 3 from each part, then in how many ways can he select the questions?

(ii) If Anish is required to attempt 8 questions in all, selecting at most 3 from part I, then in how many ways can he select the questions?