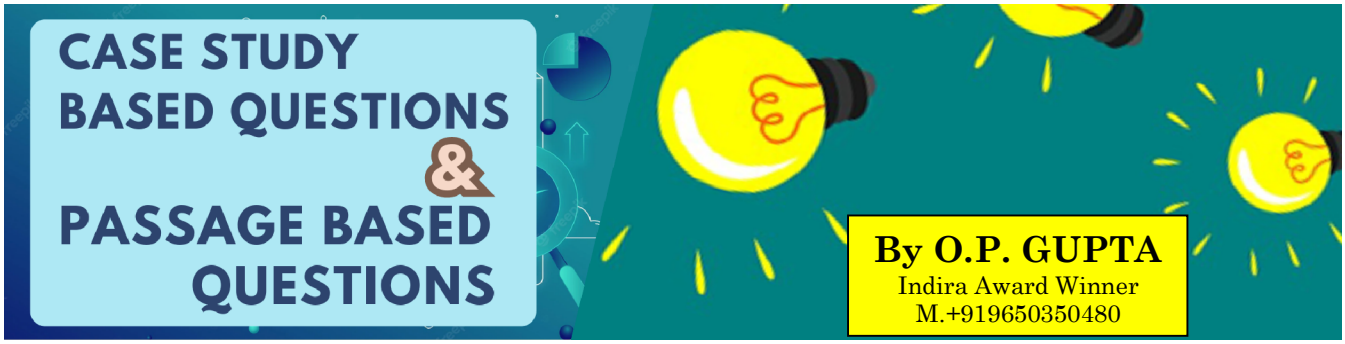


☑ Chapter 01
Sets Theory

Q01. 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?

Q02. If every element of a set A is also an element of a set B, then set A is called a subset of B and we write $A \subseteq B$. Thus, $A \subseteq B \Leftrightarrow \{x \in A \Rightarrow x \in B\}$.

Moreover if $n(A) = m$, then set A will have a total of 2^m subsets.

Based on the above information, answer the following questions.

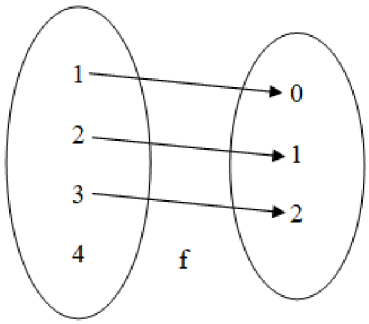
(i) How many subsets are possible for set $A = \{-2, -1, 0\}$?
(ii) Let $E = \{\}$. Is E a subset of $A = \{-2, -1, 0\}$? Justify your answer.
(iii) Write all those subsets of $A = \{-2, -1, 0\}$, which have exactly two elements.
(iv) Write all those subsets of $A = \{-2, -1, 0\}$, which have exactly one elements.
(v) Write all the subsets of $A = \{-2, -1, 0\}$.

☑ Chapter 02
Relations & Functions

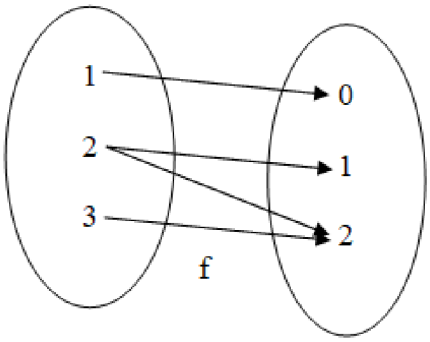
Q01. Given a relation in x and y, we say ' y is a function of x ' if for every element x in the domain, there corresponds exactly one element y in the range.

Based on the above information, attempt the following questions.

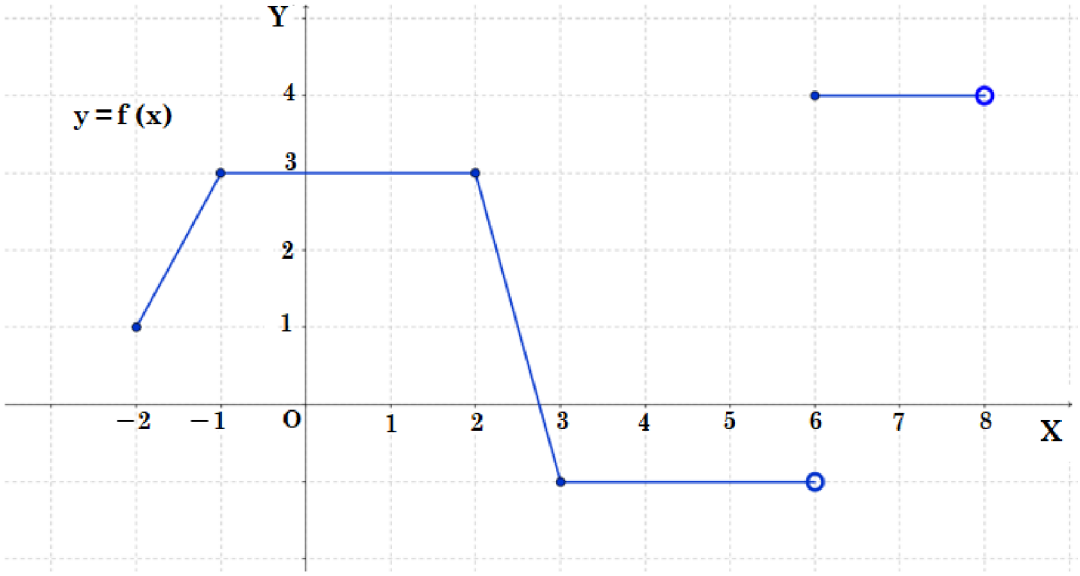
(i) Determine whether the following is a function or not. Justify your answer.



(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.

Q02. 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.

☑ Chapter 03
Trigonometric Functions

Q01. 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 $\tan\frac{x}{2}$.

Q02. 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?

☑ Chapter 04
Complex Numbers

Q01. 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?

☑ Chapter 05
Linear Inequations

Q01. 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?

☑ Chapter 06
Permutations & Combinations

Q01. 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?

Q06. 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.

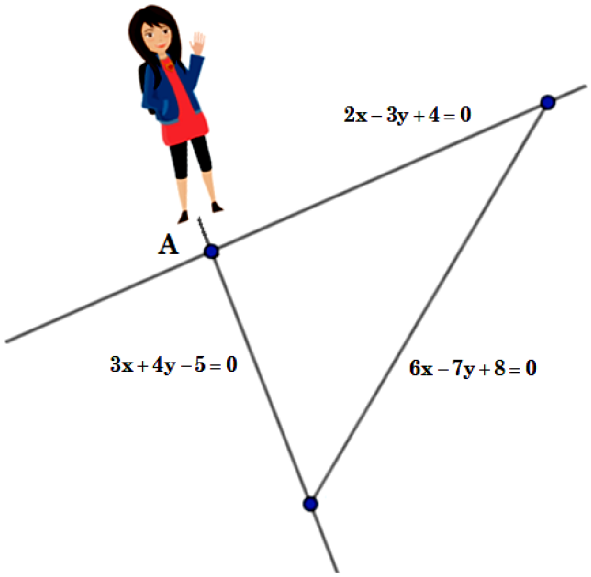
Based on the given information, answer the following questions

(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?

☑ Chapter 09
Straight Lines

Q01. Rajshri is standing at the junction (point A in the diagram shown below) of two straight paths represented by the equations $2x-3y+4=0$ and $3x+4y-5=0$.



Based on the given information, answer the following questions.

(i) Slope of the line $2x-3y+4=0$ is

(a) 2 (b) 3 (c) $-\frac{2}{3}$ (d) $\frac{2}{3}$

(ii) What is the x-intercept made by the line $3x+4y-5=0$?

(a) 3 (b) $\frac{5}{4}$ (c) $\frac{5}{3}$ (d) $\frac{3}{4}$

(iii) Coordinates of point A is

(a) $\left(\frac{1}{17},-\frac{22}{17}\right)$ (b) $\left(-\frac{1}{17},\frac{22}{17}\right)$ (c) $\left(\frac{1}{17},\frac{22}{17}\right)$ (d) $\left(-\frac{1}{17},-\frac{22}{17}\right)$

(iv) Rajshri wants to reach the path whose equation is $6x-7y+8=0$ in the least time. Then from the point A she must walk along a line which is

(a) perpendicular to the line $6x-7y+8=0$

(b) parallel to the line $6x-7y+8=0$

(c) not necessarily perpendicular to the line $6x-7y+8=0$

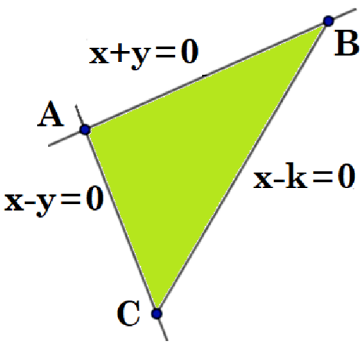
(d) not necessarily parallel to the line $6x-7y+8=0$

(v) The equation of the line along which she walks to reach the line $6x-7y+8=0$ in least time, is

(a) $102x+119y=125$ (b) $119x+102y=125$

(c) $109x+112y=125$ (d) $119x+102y=215$

Q02. A piece of land owned by a farmer is triangular in shape. See the figure given below.



The sides of the field are represented by $AB: x + y = 0$, $BC: x - k = 0$, $CA: x - y = 0$.

Based on the given information, answer the following questions.

(i) Vertex A is
(a) (k, k) (b) (0, 0) (c) (k, –k) (d) (–k, –k)

(ii) Coordinates of vertex B is
(a) (k, k) (b) (k, 0) (c) (k, –k) (d) (–k, –k)

(iii) Coordinates of vertex C is
(a) (k, k) (b) (0, 0) (c) (k, –k) (d) (–k, –k)

(iv) Area of the triangular field (ABC) is
(a) k Sq. units (b) k^2 Sq. units (c) $\frac{1}{2}k^2$ Sq. units (d) $\frac{1}{2}k$ Sq. units

(v) For the triangle ABC, which of the sides are perpendicular to each other?
(a) AB and BC (b) BC and CA
(c) AB and AC (d) None of the sides are perpendicular

☑ Chapter 10
Conic Sections

Q01. A beam is supported at its ends by supports which are 12 m apart. Since the load is concentrated at its centre, there is a deflection of 3 cm at the centre and the deflected beam is in the shape of a parabola.

Based on the above information, answer the following questions.

(i) How far from the centre is deflection of 1 cm?

(ii) What will be the equation of parabola?

(iii) At a distance of 2 m from the centre, what will be the deflection of the beam?

(iv) What is the length of latus rectum of the parabola?

(v) What is the difference of deflection of beam at a distance of 1 m and 2 m from the centre?

☑ Chapter 12
Limits & Derivatives

Q01. Mr Pardeep has a rectangular plot, which is used for growing vegetables.
Perimeter of plot is 50 m. Length and width of plot are x m and y m respectively.
Based on the above information, answer the following questions.

(i) Relation between x and y is
(a) $x + y = 50$ (b) $x + y = 100$ (c) $x + y = 25$ (d) $x = y$

(ii) Area function, $A(x) =$
(a) $x^2 - 5$ (b) $25x - x^2$ (c) $x^2 - 25x$ (d) $25 - x$

(iii) Derivative of $A(x)$ w.r.t. x, $A'(x) =$
(a) $2x$ (b) $-2x$ (c) $25 - 2x$ (d) $2x - 25$

(iv) Value of x for which $A'(x) = 0$ is
(a) 25 (b) 12.5 (c) 5 (d) 0

(v) Value of $A'(x)$ at $x = 12.5$ is
(a) 156.25 (b) 250 (c) 0 (d) 144.25

☑ Chapter 14
Probability

Q01. Two candidates Anil and Ashima appeared in a written test for a job position in a company.

The probability that Anil will qualify the test is 0.05 and that Ashima will qualify the test is 0.10.

The probability that both will qualify the test is 0.02.

Based on the given information, answer the following questions.

(i) Find the probability that both Anil and Ashima will not qualify the test.

(ii) Determine the probability that only one of the candidates will qualify the test.

Q02. On a week-end curfew due to Covid-19 pandemic, Soniya and Isha could not go nearest mall to have fun. They decided to involve themselves in various indoor activities which included playing with cards as well, apart from some other activities.

The pack of playing cards has a total of 52 cards.

Based on the given information, answer the following questions.

(i) If Soniya draws four cards from the pack of 52 playing cards, then what is the probability of getting three diamonds and one spade?

(ii) Isha took two cards from the pack. What is the probability of getting both cards of king?

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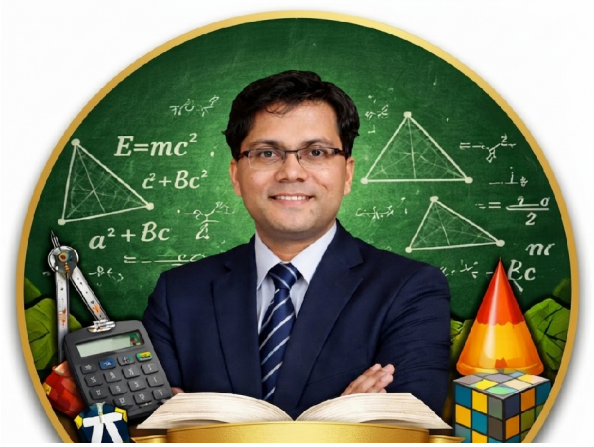

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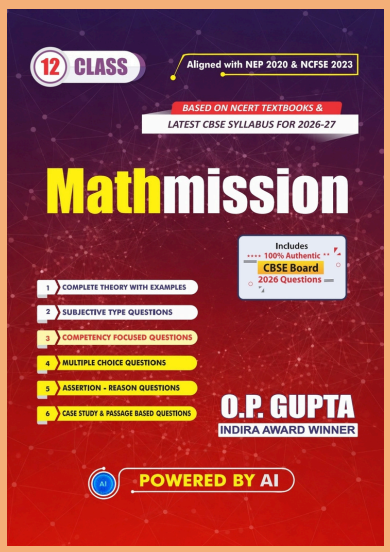

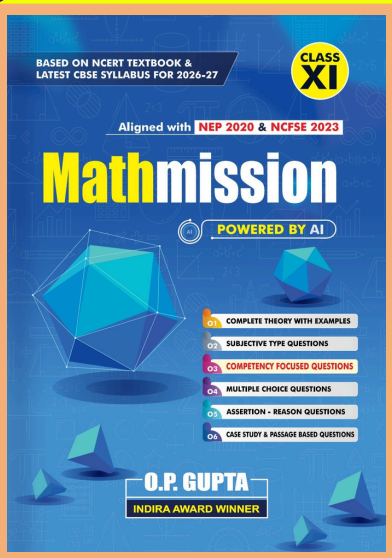

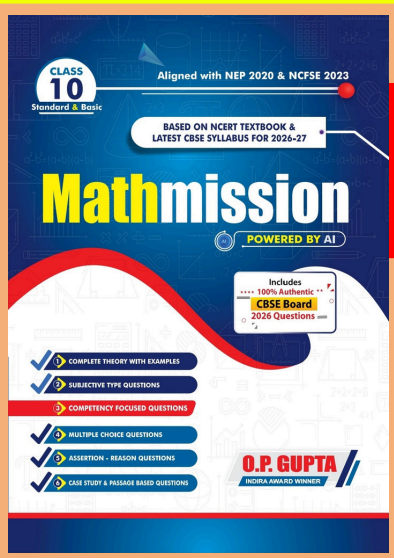

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