

SN DEY MATHEMATICS SOLUTIONS

CLASS XII

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SN Dey Mathematics Solutions for Class XII: Comprehensive Guide

SN Dey Mathematics Solutions for Class XII is an invaluable resource for students preparing for their board exams and competitive entrance tests. It provides detailed and step-by-step solutions to all the questions in the NCERT textbook for Class XII Mathematics.

Question 1: Find the value of x for which the expression $(x - 1)(x + 2)$ is maximum.

Solution: The expression $(x - 1)(x + 2)$ can be written as $x^2 + x - 2$. To find the maximum value of this expression, we need to find its vertex. The x -coordinate of the vertex is given by $x = -b/2a$, where a and b are the coefficients of x^2 and x , respectively. Substituting $a = 1$ and $b = 1$, we get $x = -1/2$. Therefore, the maximum value of the expression is $(0.5)^2 + 0.5 - 2 = -1.75$.

Question 2: Prove that the sum of the first n terms of an arithmetic progression is given by $S_n = n/2 (a + a_n)$, where a is the first term, a_n is the n th term, and n is the number of terms.*

Solution: Let S_1, S_2, \dots, S_n be the sum of the first 1, 2, ..., n terms of the arithmetic progression, respectively. Then,

$$\begin{aligned} S_1 &= a \\ S_2 &= a + (a + d) = 2a + d \\ S_3 &= a + (a + d) + (a + 2d) = 3a + 3d \dots \\ S_n &= a + (a + d) + (a + 2d) + \dots + (a + (n-1)d) = na + (1 + 2 + \dots + (n-1))d = na + n(n-1)/2 \cdot d = n/2 (a + a_n) \end{aligned}$$

Question 3: Find the area of the triangle formed by the lines $2x + 3y = 12$, $x - y = 1$, and the x-axis.

Solution: We can find the points of intersection of the lines as follows:

$2x + 3y = 12$: (0, 4) and (6, 0) $x - y = 1$: (2, 1) and (3, 2)

The area of the triangle can be calculated using the formula: $\text{Area} = (1/2) \times \text{base} \times \text{height}$.

Base = $|6 - 2| = 4$ Height = $|1 - 0| = 1$

Therefore, Area = $(1/2) \cdot 4 \cdot 1 = 2$ square units.

Question 4: Solve the quadratic equation $x^2 - 5x + 6 = 0$.

Solution: Using the quadratic formula, $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, where a, b, and c are the coefficients of x^2 , x, and the constant term, respectively. Substituting a = 1, b = -5, and c = 6, we get:

$$x = (5 \pm \sqrt{25 - 4(1)(6)}) / 2(1) = (5 \pm \sqrt{1}) / 2 = (5 \pm 1) / 2$$

Therefore, the solutions are $x = 2$ and $x = 3$.

Question 5: Find the volume of a cone with radius 5 cm and height 12 cm.

Solution: Volume of a cone = $(1/3) \pi r^2 \cdot h$, where r is the radius and h is the height.

Substituting $r = 5$ cm and $h = 12$ cm, we get:

Volume = $(1/3) \times (5 \text{ cm})^2 \times (12 \text{ cm}) = (1/3) \times 25 \text{ cm}^2 \times 12 \text{ cm} = 100 \text{ cubic centimeters}$

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Sorting and Searching Algorithms: A Comprehensive Q&A Guide

by Thomas Niemann

Q: What is the difference between sorting and searching algorithms?

A: Sorting algorithms arrange data elements in a specific order, such as ascending or descending numeric order, while searching algorithms find the location of a target value within a dataset.

Q: What are some common sorting algorithms?

A: Bubble sort, insertion sort, selection sort, merge sort, and quicksort are widely used sorting algorithms. Each algorithm has its own strengths and weaknesses,

depending on the size and nature of the dataset. Bubble sort is simple and easy to implement, but it is inefficient for large datasets. Insertion sort is efficient for small datasets, while merge sort and quicksort are highly efficient but require more complex implementations.

Q: What are some common searching algorithms?

A: Linear search, binary search, and interpolation search are common searching algorithms. Linear search checks each element in the dataset sequentially until the target is found. Binary search is highly efficient for sorted datasets, as it repeatedly divides the search space in half until the target is located. Interpolation search approximates the target's position based on its value, which can lead to faster searches for large, uniformly distributed datasets.

Q: Which sorting or searching algorithm should I use?

A: The choice of algorithm depends on factors such as the size, order, and characteristics of the dataset, as well as the desired time and space complexity requirements. For small, unsorted datasets, bubble sort or insertion sort may suffice. For large, unsorted datasets, merge sort or quicksort are often the best choices. For sorted datasets, binary search or interpolation search are highly efficient.

Q: Are there any additional considerations when choosing an algorithm?

A: Yes, consider the following:

- **Time complexity:** The amount of time it takes the algorithm to run as the size of the dataset increases.
- **Space complexity:** The amount of additional memory the algorithm requires as the size of the dataset increases.
- **Stability:** Whether the algorithm preserves the original ordering of equal elements in the dataset.
- **Adaptability:** Whether the algorithm can handle datasets with varying characteristics, such as duplicates or missing values.

Traffic Highway Engineering: Garber 5th Edition - Key Questions and Answers

1. What is the definition of "highway capacity"? Highway capacity refers to the maximum number of vehicles that can safely pass a given point on a highway or roadway during a given period. It is a function of several factors, including geometric characteristics, traffic conditions, and driver behavior.

2. How does the "saturation flow rate" affect highway capacity? Saturation flow rate represents the maximum number of vehicles that can pass through an intersection or merge point per unit time under ideal conditions. It is influenced by the type of vehicle maneuvers involved and the geometry of the intersection or merging area. The saturation flow rate has a significant impact on the capacity of a highway.

3. What is the purpose of highway design? Highway design involves the planning, design, and construction of highways to meet the needs of users, including safety, capacity, accessibility, and environmental sustainability. It considers factors such as traffic volume, vehicle characteristics, geometric features, and infrastructure requirements.

4. How are intersection designs optimized for safety and efficiency? Intersection designs aim to minimize conflicts and collisions between vehicles by considering sight distances, traffic signal timing, intersection geometry, and the physical separation of different traffic flows. They also incorporate measures to improve pedestrian and cyclist safety.

5. What are the different types of highway traffic analysis methods? Highway traffic analysis includes various methods to assess traffic conditions and predict future traffic patterns. These methods range from empirical observations to simulation modeling and involve techniques such as traffic volume counts, speed surveys, and capacity modeling.

[william shakespeare stories in hindi, sorting and searching algorithms by thomas niemann, traffic highway engineering garber 5th edition bing](#)

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