RAM Maths Circle

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Nagpur

Introduction

The following problem set is designed to guide students through increasingly complex scenarios with the help of some basic problems which will eventually help the students making efficient decisions ,developing strategies and how to work on certain problems

Problem Set

Problem 1: 25 Horses Problem

Started off with the classic 25 horses puzzle.
https://www.geeksforgeeks.org/aptitude/puzzle-9-find-the-fastest-3-horses/Link to problem on GeeksforGeeks.
Gave students time to explore and continue solving it at home.

Problem 2: Impure Coin using Weighing Balance

You are given 3 coins, one of which is impure. You have access to a weighing balance.
Question: How many weighings/comparisons are required to find the impure coin?

The problem was extended to 5 coins.

- Students initially gave answers like 5, 6, 7.
- Eventually, through hints and reasoning, they discovered the correct answer.
- Attempted to use combinations, but realized it was more of a logical problem-solving task.

Sub-problem 2: 10 Coins — Find Whether Impure is Lighter or Heavier

You are given 10 coins, with exactly one impure coin. You need to determine whether the impure coin is lighter or heavier using a weighing balance.
Goal: Find the number of weighings/comparisons required.

- Students started with guesses like 9.
- Optimized to 5, then 4.
- Eventually arrived at the correct answer after observation, discussion, and hints.

Task for Students: If there are 100 coins. One of them is impure. Find whether impure coin is heavy or light. Find no of weighing/comparison

Problem 3: 10 Bags with Digital Weighing Machine

You have 10 bags full of coins. Each bag has a random number of coins, but one bag contains only impure coins.

- Genuine coins weigh 10 grams.
- Impure coins weigh 9 grams.
- You have a digital weighing machine that gives exact readings.

Question: How many weighings are required to determine the impure bag?