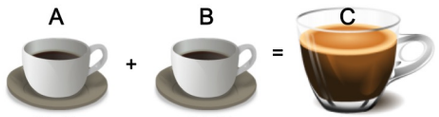
BASIC PRINCIPLE:

Analyze the mixture using pure stuff!

The amount of mixture times the percent of pure stuff equals the amount of pure stuff in container.

Example:



Where:

A, B, and C are the amount of mixture (by volume or weight) in each container.

X_A, X_B, and X_C, are the percentages of pure stuff X in each container.

EQUATIONS:

Quantity Analysis : $A + B = C$

Pure Stuff Analysis: $Ax_A + Bx_B = Cx_C$

IV. DIGIT PROBLEMS

The word *digit* is used to refer to individual numerals found in a given number and the place value which each such numeral holds.

BASIS OF ANALYSIS:

Number Type	Original Number	Reversed Digit
2 - digit number	10t+u	10u+t
3 - digit number	100h+10t+u	100u+10t+h

Where:

h = hundred's digit
t = ten's digit
u= unit's digit

V. MOTION/RATE PROBLEMS

❶ **Motion in a Straight Path:** (Land)

$\text{Rate} = \frac{\text{Distance}}{\text{Time}}$ $\quad D = \text{rate} \times \text{time}$ $\quad \text{time} = \frac{\text{Distance}}{\text{rate}}$

❷ **Motion in a Straight Path:** (Water)

Downstream : $D = (R + C)t$

Upstream : $D = (R - C)t$

❸ **Motion in a Straight Path:** (Air)

Tailwind : $D = (R + W)t$

Headwind : $D = (R - W)t$

VI. COIN PROBLEMS

In order to solve coin problems, or closely related problems, the tricks are two:

1. Be aware of the following facts: ***the number of coins, the value of each coin, and the total value of each type of coin.***

Coin Denomination	*Coin Value*	*Total Value*
Penny, (p)	1 cent	p
Nickel, (n)	5 cents	5n
Dime, (d)	10 cents	10d
Quarter,(q)	25 cents	25q
Half, (h)	50 cents	50h

2. Be able to: ***translate word problem language into equations.***

Usually coin problems involve two equations: one that describes how many coins are there and one that describes the amount of the coins.

82. The difference of the cubes of two positive numbers is 2402 and the cube of their difference is 8. Find the bigger number.
A. 21 C. 27
B. 22 D. 17

83. Find two consecutive odd numbers such that thrice the smaller number exceeds the larger by 12.
A. 6, 8 C. 7, 9
B. 8, 10 D. 5, 7

84. The difference of the squares of the digits of a 2-digit positive number is 27. If the digits are reversed in order and the resulting number is subtracted from the original number, the difference is also 27. What is the original number?
A. 72 C. 63
B. 56 D. 81

85. Alfred runs around a circular track in 60 seconds and Barry in 30 seconds. Five seconds after Alfred starts, Barry starts from the same point in the same direction. When will they be together for the first time, assuming that they run around the track continuously?
A. 6.5 minutes C. 3.4 minutes
B. 5.5 minutes D. 6.5 minutes

86. The current in a wire varies directly as the electromotive force and inversely as the resistance. If current = 12 amperes when voltage = 120 volts and resistance = 6 ohms find the current when voltage = 220 volts and resistance = 10 ohms.
A. 13.2 C. 22
B. 15.2 D. 18.5

87. A man sold a book by mistake at 120% of the marked price instead of discounting the marked price by 20%. If he sold the book for P 14.40, what was the price for which he have sold the book?
A. P 9.10 C. P 8.20
B. P 8.40 D. P 9.60

88. Separate 17 into two parts so that the sum of the their squares is equal to the square of one more that the larger part. Find the smaller part.
A. 5 C. 3
B. 12 D. 10

89. Two thousand kg of steel containing 8% nickel is to be made by mixing steel containing 14% nickel with another steel containing 6% nickel. How much of the steel containing 14% nickel is needed?
A. 400 kg C. 450 kg
B. 500 kg D. 510 kg

90. At what time between 4 and 5 o'clock will the hands of the clock be coincident?
A. 4:21.82 C. 4:22.42
B. 4:23.72 D. 4:20.32

91. A merchant has three items on sale: namely, a radio for P50, a clock for P30, and a flashlight for P1. At the end of the day, he has sold a total of 100 of the three items and has taken exactly P 1000 on the total sales. How many radios did he sale?
A. 20 C. 28
B. 16 D. 18

92. An engineer and his helper can do a certain job in 3 hours. On a given day, they work together for 1 hour then the helper left and the engineer finishes the rest of the work in 8 more hours. How long will it take for the engineer to the job alone?
A. 12 hours C. 10 hours
B. 8 hours D. 15 hours

93. Six times the middle digit of a three digit number is the sum of the other two. If the number is divided by the sum of its digits, the answer is 51 and the remainder is 11. If the digits are reversed, the number becomes smaller by 198. Find the number.
A. 782 C. 725
B. 678 D. 842

94. In a 2-digit number, the unit's digit is 3 greater than the ten's digit. If the number is 4 times as large as the sum of its digits, find the number.
A. 36 C. 52
B. 74 D. 41

95. At what time will the hands of the clock be in straight line between 7:00 and 8:00 o'clock in the morning?
A. 7:5 5/11 C. 7:7 7/11
B. 7:4 2/11 D. 7:6 4/11

96. The difference between two numbers is 24 and their sum is 60. Find the numbers.
A. 16, 40 C. 20, 44
B. 18, 42 D. 15, 39