**Lecture NO#03**

**Example: 1**

The sum of two numbers is 27 and their product is 50. Find the numbers.  
Let one number be x. Then the other number is 50/x.  
x + 50/x = 27  
 x2 + 50 = 27x  
 x2 - 27x + 50 = 0  
(x -25)(x -2) = 0  
(x -25) = 0 or (x -2) = 0  
x = 25 or x = 2.

**Example: 2**

The length of a rectangle is 5 cm more than its width and the area is 50cm2. Find the length, width and the perimeter.  
Let the width be x. Then the length = x + 5.  
X(x + 5) = 50  
x2 + 5x = 50

X2 + 5x - 50 = 0  
(x + 10)(x -5) =0  
(x + 10) = 0 or (x -5) =0  
x = -10 or x = 5 - x = -10 is impossible to be a width  
Width = 5cm; so, the length = 10cm.  
Perimeter = 30cm.

**Example: 3**

The three sides of a right-angled triangle are x, x+1 and 5. Find x and the area, if the longest side is 5.  
The hypotenuse = 5  
x2 + (x+1)2 = 52 (Pythagoras' Theorem)  
x2 + x2 + 2x + 1 = 25  
-25 => x2 + x2 + 2x - 24 = 0  
2x2 + 2x - 24 = 0  
x2 + x - 12 = 0  
(x - 3)(x + 4) = 0  
(x + 4) = 0 or (x - 3) = 0  
x = -4 or x = 3  
x = 3;  
Area = 1/2 x 3 x 4 = 6cm2

**Example: 4**

The product of two numbers is 24 and the mean is 5. Find the numbers.  
Let one number = x; then the other = 24/x  
(x + 24/x)/2 = 5  
X 2 => x + 24/x = 10  
X x => x2 + 24 = 10x  
- 10x => x2 + -10x + 24 = 0  
(x - 6)(x -4) = 0  
(x - 6) = 0 or (x -4) = 0  
x = 6 or x =4  
The numbers are 6 or 4.

**Example: 5**

The sum of numbers is 9. The square of the numbers is 41. Find the numbers.  
These are **quadratic simultaneous equations.**  
Let the numbers be x and y.  
x + y = 9  
x2 + y2 = 41  
From the first equation, y = (9-x)  
Now substitute this in the second equation.  
x2 + (9-x)2 = 41  
x2 + 81 - 18x + x2 = 41  
2x2 - 16x + 81 = 41  
2x2 - 16x + 40 = 0  
x2 - 8x + 20 = 0  
(x - 5)(x -4) =0  
(x - 5) = 0 or (x -4) =0  
x = 5 or x = 4  
Substitute in the first equation, y = 5 or 4  
The numbers are 5 and 4.