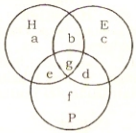
43. 4; Given b + c + g + d = 23 ... (i)



a + b + g + f = 15 ... (ii)
e + f + g + d = 18 ... (iii)
From all the four equations
b = 3, f = 6, d = 6, c = 9 and g = 5

44. 2; Machines A and B together can produce 30000 metres of cloth in one hour.
Machine B alone can produce 20000 metres of cloth in one hour.
∴ Machine A alone can produce 10000 metres of cloth in one hour, ie 100000 metres of cloth in 10 hours.

45. 1; Sum of 10 numbers = 402
Correct sum of 10 numbers = 402 - 13 + 31 - 18 = 402

Hence new average = $\frac{402}{10} = 40.2$

46. 1; Two tallest boys can be arranged in 2! ways
rest 18 can be arranged in 18! ways.
Girls can be arranged in 6! ways
∴ total no. of ways in which all the students can be arranged = 2! × 18! × 6! = 18 × 2 × 720 = 18! × 1440

47. 1; $2^{2x-1} + 4^x = 2^{x-1/2} + 2^{x+1/2}$

$\Rightarrow 2^{2x} \cdot 2^{-1} + 2^{2x} = 2^x \cdot 2^{-1/2} + 2^x \cdot 2^{1/2}$

$\Rightarrow 2^{2x}\left[\frac{1}{2}+1\right] = 2^x\left[\frac{1}{\sqrt{2}}+\sqrt{2}\right]$

$\Rightarrow 2^x = \frac{3/\sqrt{2}}{3/2} = \frac{2}{\sqrt{2}} = \sqrt{2} = 2^{1/2}$

$\Rightarrow x = \frac{1}{2}$

48. 4; Let length and width of the rectangular plot be L and B respectively.
∴ Original area of the plot = LB
Now when the length is increased by 25%, ie

the length becomes L + 25% of L = $\frac{5L}{4}$

then the area of the plot = $\frac{5L}{4}$ y, where y is the reduced length in order that the area is not to be changed due to change in the length.

$\therefore \frac{5L}{4} y = LB \Rightarrow y = \frac{4}{5} B$

$= B - \frac{B}{5} = B - 20\% \text{ of } B$

∴ The width is reduced by 20%

Quicker Method: Required percentage decrease in width

$= 25\left(\frac{100}{100+25}\right) = \frac{25 \times 100}{125} = 20\%$

49. 3; 1 candle is made from 9 stubs, hence 116 candles will be made from 1044 stubs.
From 116 candles, 12 candles can be made with 8 stubs left.
Now, total stubs left = (12 + 8) = 20 out of which two candles can be made with 2 stubs left.
∴ Maximum number of candles that can be made = 116 + 12 + 2 = 130

50. 4; Total tax payable = 0% of 50000 + 10% of 10000 + 20% of 90000 + 30% of 20000
= 1000 + 18000 + 6000 = Rs 25000

51. 4; Let the original length and width of the garden be x and y respectively.
Then original area = x × y
Now, area = 1.2x × 1.2y = 1.44xy

% increase in area = $\frac{1.44xy - xy}{xy} \times 100 = 44\%$

Quicker Method: If all the measuring sides of any two dimensional figure is changed by x%, then its area changes by $\left(2x + \frac{x^2}{100}\right)\%$

Here, x = 20%
∴ required percentage increase in area

$= 2 \times 20 + \frac{(20)^2}{100} = 44\%$

52. 4; In 2 min it becomes 2000
In 4 min it becomes 4000
In 6 min it becomes 8000
Likewise in 18 min it becomes 512000

53. 2; The net increase in one year = (1 + 4) = 5%
∴ single percentage increase after 2 years
= 100 × 1.05 × 1.05 = 110.25
= (110.25 - 100) = 10.25%

54. 4; Let the sides of the triangle be $\frac{K}{2}$, $\frac{K}{3}$ and $\frac{K}{4}$

According to the question,

$\frac{K}{2} + \frac{K}{3} + \frac{K}{4} = 52 \Rightarrow K = 48$