Answer & Solutions

Level-I

1. (b) $x = \frac{2ab}{a+b} \Rightarrow \frac{x}{a} = \frac{2b}{a+b}$

$\Rightarrow \frac{x+a}{x-a} = \frac{3b+a}{b-a}$ (componendo di videndo)

Similarly, $\frac{x}{b} = \frac{2a}{a+b} \Rightarrow \frac{x+b}{x-b} = \frac{3a+b}{a-b}$

$\therefore \frac{x+a}{x-a} + \frac{x+b}{x-a} = \frac{3b+a}{b-a} + \frac{3a+b}{a-b}$

$= -\frac{(3b+a)}{a-b} + \frac{3a+b}{a-b} = \frac{2a-2b}{a-b} = 2$

2. (b) Let us represent their shares by the corresponding letter of their names.
$A + B = 2C$ and $B + C = 3A$.
$\Rightarrow A + 3A - C = 2C$ (since $B = 3A - C$)
$4A = 3C \Rightarrow A : C = 3 : 4$

3. (d) Let $3X$ and $4X$ be the numbers $\Rightarrow \frac{3X-5}{4X-5} = \frac{2}{3}$
$\Rightarrow 9X - 15 = 8X - 10 \Rightarrow X = 5$
$\Rightarrow$ The required numbers are 15 and 20.

4. (d)

	Original	Present
Wages	$22x$	$25x$
Number	$15y$	$11y$

Ratio of total wages $= \frac{22x \times 15y}{25x \times 11y} = \frac{6}{5}$

If the present bill is ₹ 5000, the original was ₹ 6000.

5. (d) Let x is to be added
$(11+x) : (15+x) = (17+x) : (23+x)$

$\Rightarrow \frac{11+x}{15+x} = \frac{17+x}{23+x} \Rightarrow x = 1$

6. (b) Let r be the 4th proportional.

Then $\frac{12X^3}{9aX^2} = \frac{8a^3X}{r} \Rightarrow r = 6a^4$

7. (a) The 100 acres should no be divided between Sunanda and Ansuya in the ratio

$\frac{1}{4} : \frac{1}{5}$ i.e. $5 : 4$

So, Sunanda gets $\frac{500}{9}$ acres and Ansuya gets $\frac{400}{9}$

8. (d) $\frac{a}{b} = \frac{9}{6} = 3 : 2 = 15 : 10$

$\frac{b}{c} = \frac{10}{9} = 10 : 9$

Hence, $a : b : c = 15 : 10 : 9$

9. (c) If x is the integer, $\frac{5+x}{9+x} > \frac{7}{10}$
$\therefore 50 + 10x > 63 + 7x$
$\therefore 3x > 13$
$\therefore x > \frac{13}{3}$

The least integer greater than $\frac{13}{3}$ is 5.

10. (d) Obviously the ratio is 2 : 3 : 4 : 5

11. (a) If A's share is 1, B's share $= \frac{5}{9} \times 1 = \frac{5}{9}$

C's share $= \frac{7}{10} \times \frac{5}{9} = \frac{7}{18}$;

D's share $= \frac{1}{3}\left(\frac{5}{9} + \frac{7}{18}\right) = \frac{17}{54}$

$\therefore A : B : C : D = 1 : \frac{5}{9} : \frac{7}{18} : \frac{17}{54} = 54 : 30 : 21 : 17.$

$\therefore A$'s share $= \frac{54}{122} \times 1220 = \text{Rs.}540.$

12. (c) If the maximum for each paper is 100, total marks = 500 and his aggregate $= \frac{3}{5} \times 500 = 300$. which when divided in the given ratio gives marks 36, 48, 60, 72 and 84 and so there are 3 subjects in which he gets more than 50.

13. (a) 80% of the total profit is divided in the ratio
$20000 : 24000 : 16000 = 5 : 6 : 4$
80% of total profit $= 5x + 6x + 4x = 15x$

Total profit $= \frac{15x}{80\%} = 18.75x$

$\therefore$ Share of C in profit $= 4x + 20\%$ of $18.75x$
$= 4x + 3.75x = 7.75x$

Share of A in profit $= 5x$
Share of B in profit $= 6x$
$\therefore (6x + 5x) - 7.75x = 487.50$
$3.25x = 487.50 \Rightarrow x = 150$
$\therefore$ Total profit $= 18.75 \times 150 =$ ₹ 2812.50.

14. (a) Let the prices of two houses A and B be ₹ $4x$ and ₹ $5x$, respectively for the last year.
Then, the prices of A this year = ₹ $(1.25 \times 4x)$ and that of B = ₹ $(5x + 50{,}000)$
This year, Ratio of their prices = 9 : 10

$\therefore \frac{1.25 \times 4x}{5x + 50{,}000} = \frac{9}{10}$

$\Rightarrow 50x - 45x = 450000 \Rightarrow 5x = 4{,}50{,}000$
$\Rightarrow x = 90{,}000$
Hence, the price of A last year was
$4x =$ ₹ 3,60,000

15. (b) Let the length and breadth of the rectangular room be ℓ and b.

We have, $\frac{\ell+4}{b+4}=\frac{4}{3}$

$\Rightarrow 3\ell+12=4b+16$

$\Rightarrow 3\ell-4b=4$ ...(1)

Again, we have $\frac{\ell-4}{b-4}=\frac{2}{1} \Rightarrow \ell-4=2b-8$

$\Rightarrow \ell-2b=-4$ ...(2)

Solving (1) and (2), we get $\ell=12$ and $b=8$.

16. (b) Let A, B and C be the first, second and third nos. respectively.

Then, $A:B=2:3$ and $B:C=5:8$

Consider, $A:B=2:3=2\times5:3\times5=10:15$

and $B:C=5:8=5\times3:8\times3=15:24$

$\therefore$ $A:B:C=10:15:24$

Let the required number be $10x$, $15x$ and $24x$.

Given, sum of three numbers = 98

Then,

$\therefore$ $10x+15x+24x=98$

$\Rightarrow 49x=98 \Rightarrow x=2$

$\Rightarrow$ Second number $=15x=15\times2=30$

17. (b) Given, ratio of numbers is 3 : 4

$\therefore$ The numbers are $3x$ and $4x$.

Now, according to the question

$16x^2=8(3x)^2-224$

$\Rightarrow 16x^2=72x^2-224 \Rightarrow 56x^2=224$

$\Rightarrow x=2$

$\therefore$ Required numbers = 6, 8

18. (c) Let the third type of tea is priced at ₹ x per kg. Also suppose that the three types of tea mixed together are 1, 1 and 2 kg, respectively.

Now, $\frac{126\times1+135\times1+2x}{1+1+2}=153$

$\Rightarrow \frac{261+2x}{4}=153 \Rightarrow 261+2x=612$

$\Rightarrow x=\frac{351}{2}=$ ₹ 175.5 per kg.

19. (b) Quantity of milk $=\frac{3}{5}\times45=27$ litres

Quantity of water $=\frac{2}{5}\times45=18$ litres

Let x litres of water be added to make the ratio 9 : 11.

$\therefore$ $\frac{18+x}{27}=\frac{11}{9} \Rightarrow 18+x=33 \Rightarrow x=15l$

20. (d) Radius of the two pipes are 1 cm and 2 cm.

Square of the radii of the pipes are 1 and 4.

$\therefore$ Required ratio of rates of flow in the two pipes $=1:\frac{1}{4}$

$=4:1$

21. (b) 18 carat gold $=\frac{3}{4}$ pure gold $=\frac{3}{4}\times24$

= 18 carat pure gold

20 carat gold $=\frac{5}{6}$ pure gold $=\frac{5}{6}\times24$

= 20 carat pure gold

$\therefore$ Required ratio $=18:20=9:10$

22. (c) We have, $\frac{y}{x-z}=\frac{y+x}{z}$

$\Rightarrow yz=xy+x^2-yz-xz$ ....(1)

Also, $\frac{x}{y}=\frac{y}{x-z} \Rightarrow x^2-xz=y^2$ ...(2)

From (1) and (2), we have

$yz=xy-yz+y^2$

$\Rightarrow 2yz=xy+y^2$

$\therefore 2z=x+y$ ...(3)

Checking with the options, we find that the values given in option c satisfies the equation (3)

23. (d) Increased ratio of their respective salaries

$=3\times\frac{150}{100}:5\times\frac{160}{100}:7\times\frac{150}{100}$

$=\frac{9}{2}:8:\frac{21}{2}=9:16:21$

24. (b) Let the no. of the boys and girls that appeared in the examination be x and y, respectively.

Now, $71.8=\frac{71x+73y}{x+y}$

$\Rightarrow 71.8x+71.8y=71x+73y$

$\Rightarrow (71.8-71)x=(73-71.8)y \Rightarrow 0.8x=1.2y$

$\Rightarrow \frac{x}{y}=\frac{1.2}{0.8}=\frac{3}{2}$

25. (b) In first cask,

Quantity of water $=\frac{7}{20}\times48=16.8L$

Quantity of wine $=\frac{13}{20}\times48=31.2L$

In second cask,

Quantity of water $=\frac{17}{35}\times42=20.6L$

Quantity of wine $=\frac{18}{35}\times42=21.6L$

Now after mixing:

Total quantity of wine = 52.8 L

Quantity of water = 57.2 L

Ratio after mixing $=\frac{52.8}{57.2}=\frac{528}{572}=\frac{12}{13}$

$=12:13$.

26. **(a)** Acid Solution (x)   Acid Solution (y)

90   97

95

2   5

$\therefore$ Amount of the solution x and y in ratio 2 : 5

Amount of acid in solution $x = \frac{2}{7} \times 21 = 6L$

Amount of acid in solution $y = \frac{5}{7} \times 21 = 15L$

6L acid in x and 15L in Y

27. **(b)** Profit ratio = 10 : 3
Time ratio = $t_1 : t_2$
Cost ratio = 550 : 330
$550\,t_1 : 330\,t_2 = 10 : 3$

$$\frac{550t_1}{330t_2} = \frac{10}{3}$$

$$\frac{t_1}{t_2} = 2$$

given $t_1 = 12$ months
$\Rightarrow\ t_2 = 6$ months

28. **(c)** Let the profit = x

Profit of $A = \frac{9x}{10}$, Remaining profit = $\frac{x}{10}$

Profit of $B = \frac{x}{20}$

Profit of $C = \frac{x}{20}$

Ratio of profit $= \frac{9}{10} : \frac{1}{20} : \frac{1}{20}$
$= 18 : 1 : 1$

A's income is increased by ₹ 270 . When profit rises 3%

Investment of $A = \frac{270}{3} \times 100 =$ ₹ 9000.

If investment of A, B and $C = 18x$, x and x
$18x = 9000$
$x = 500$
B investment = ₹ 500.
C investment = ₹ 500.

29. **(c)** After 10 days : 150 men had food for 35 days. Suppose 125 men had food for x days. Now,
Less men, More days (Indirect Proportion)
Then,
men days

$\uparrow$ 150   35 $\downarrow$
125   x

$\therefore 125 : 150 :: 35 : x \Rightarrow 125 \times x = 150 \times 35$

$\Rightarrow x = \frac{150 \times 35}{125} \Rightarrow x = 42.$

Hence, the remaining food will last for 42 days.

30. **(b)** Quantity of milk $= \frac{2}{3} \times 45 = 30$ L

Quantity of water $= \frac{1}{3} \times 45 = 15$ L

Let the required quantity of water to be added be x litre.

Then, $\frac{30}{15+x} = \frac{3}{2}$
$\Rightarrow\ 3\,(15 + x) = 30 \times 2 = 60$
$\Rightarrow\ x = 5$L

31. **(c)** Let 40% of A $= \frac{2}{3}B$. Then, $\frac{40A}{100} = \frac{2B}{3} \Leftrightarrow \frac{2A}{5} = \frac{2B}{3}$

$\Leftrightarrow \frac{A}{B} = \left(\frac{2}{3} \times \frac{5}{2}\right) = \frac{5}{3}$

$\therefore\ A : B = 5 : 3$

32. **(c)** Less leaves, less cost (Direct Proportion)
More lines, more cost (Direct Proportion)
Less words, less cost (Direct Proportion)

$$\left.\begin{array}{ll} \text{leaves} & 320 : 297 \\ \text{lines} & 21 : 28 \\ \text{words} & 11 : 10 \end{array}\right\} :: 19 : x$$

$\therefore 320 \times 21 \times 11 \times x = 297 \times 28 \times 10 \times 19$

$\Rightarrow x = \frac{171}{8} = 21\frac{3}{8}$

33. **(a)** Ratio of capitals of A, B and C
= (15000 × 3) : (40000 × 9) : (30000 × 6)
= 1 : 8 : 4

B's share = ₹ $\left(\frac{8}{13} \times 7800\right)$ = ₹ 4800

34. **(d)** Let the third proportional to $(x^2 - y^2)$ and $(x - y)$ be z. Then,
$(x^2 - y^2) : (x - y) :: (x - y) : z \Leftrightarrow (x^2 - y^2) \times z$
$= (x - y)^2 \Leftrightarrow z = \frac{(x-y)^2}{(x^2 - y^2)} = \frac{(x-y)}{(x+y)}$

35. **(b)** Ratio of sides $= \frac{1}{2} : \frac{1}{3} : \frac{1}{4} = 6 : 4 : 3$

Largest side $= \left(104 \times \frac{6}{13}\right)$ cm = 48 cm

36. **(a)** Sum invested by A, B and C is

$5 \times 12 : 7 \times 12 : 6 \times 6 + 3 \times 6$
or, 60 : 84 : 54   or, 10 : 14 : 9

$\therefore$ Share of $C = \frac{9}{33} \times 33,000 =$ ₹9,000

37. **(d)** Required ratio $= \frac{4 \times 135}{5 \times 120} = 9:10$

38. **(b)** Number of females $= 156800 \times \frac{100}{80} = 196000$

$\therefore$ Number of males $= \frac{7}{8} \times 196000 = 171500$

$\therefore$ Total population $= 196000 + 171500 = 367500$

39. **(a)** Let C's investment = ₹ x.
B's investment = ₹ $(x - 3000)$
A's investment = ₹ $(x - 3000 + 6000)$ = ₹ $(x + 3000)$
Now, $(A + B + C)$'s investment = ₹ 72000
$\Rightarrow$ $x + (x - 3000) + (x + 3000) = 72000$
$\Rightarrow$ $3x = 72000 \Rightarrow x = 24000$
Hence, A's investment = ₹ 27000
B's investment = ₹ 21000
C's investment = ₹ 24000
Ratio of the capitals of A, B and C
$= 27000 : 21000 : 24000$
$= 9 : 7 : 8$

A's share = ₹ $\left(\frac{9}{24} \times 8640\right)$ = ₹ 3240

40. **(b)** $A : B : C = (40000 \times 36) : (80000 \times 12 + 40000 \times 24) : (120000 \times 24 + 40000 \times 12)$
$= 144 : 192 : 336 = 3 : 4 : 7$

41. **(c)** Let the incomes of two companies A and B be $5x$ and $8x$ respectively.
From the question,

$\frac{5x + 25}{8x} = \frac{5}{4} \Rightarrow 20x + 100 = 40x \quad \therefore \quad x = 5$

$\therefore$ Income of company $B = 8x =$ ₹ 40 lakh

42. **(b)** Ratio of Abhishek and Sudin for one month
$= (50,000 \times 36) + (30,000 \times 24) : (70,000 \times 24)$
$= (18,00,000 + 7,20,000) : 16,80,000 = 3 : 2$
Hence share of Sudin in the profit earned from the business.

$= \frac{87,500}{(3+2)} \times 2 =$ ₹35,000.

43. **(a)** In 1 kg mixture quantity of iron = 200 gm
Let x gm sand should be added, then
10% of $(1000 + x) = 200$
$\therefore \quad x = 1000$ gm $= 1$ kg

44. **(c)** Suppose B joined after x months.
Then, $21000 \times 12 = 36000 \times (12 - x) \Leftrightarrow 36x = 180$
$\Leftrightarrow x = 5$.
Hence, B joined after 5 months.

45. **(b)** Let the first and the second numbers be x and y respect then
$y + 30\%$ of $x = 140\%$ of y
or, $y + 0.3x = 1.4y$
or, $0.3x = 0.4y$
$\therefore \quad x : y = 0.4 : 0.3 = 4 : 3$

46. **(c)** Let number of ladies $= x$
then, number of gents $= 2x$

Now, $\frac{x-2}{2x-2} = \frac{1}{3} \Rightarrow 3x - 6 = 2x - 2$
$\Rightarrow x = 4$
$\therefore$ Total number of people originally present
$= 4 + 8 = 12$

47. **(a)** Let number of each type of coin $= x$. Then,
$1 \times x + .50 \times x + .25x = 35$
$\Rightarrow 1.75x = 35 \Rightarrow x = 20$ coins

48. **(b)** In a year, for A, total amount as a remuneration
$= 10 \times 12 =$ ₹ 120
$\therefore$ Amount of A's profit $= 390 - 120 =$ ₹ 270
Ratio of investment $= 3 : 4$
Let total profit = ₹ x
Then, B's profit = ₹ $(x - 270)$

$\therefore \frac{3}{3+4} \times x = 270 \Rightarrow x = 630$

$\therefore$ B's profit $= 630 - 270 =$ ₹ 360

49. **(c)** Let $x = 5$
Then $f(x) = 6/4 = 1.5 = y$
And $f(y) = 2.5/0.5 = 5$.
Thus, the ratio of $x : f(y) = 1 : 1$
Note: Even if you take some other value of y, you would still get the same answer.

50. **(b)** The given condition has a, b and c symmetrically placed. Thus, if we use $a = b = c = 2$ (say) we get each fraction as 1/2.

51. **(d)** $1 : 2 = 3 : 6$, so $(a^2 + b^2)/(c^2 + d^2) = 5/45 = 1/9$
From the given options, only ab/cd gives us this value.

52. **(c)** $5 : 4 \rightarrow 5 : 4.8 \rightarrow 25 : 24$
Option (c) is correct.

53. **(c)** Since $A : B = 3 : 4$ ...(1)
$B : C = 5 : 6$ ...(2)
and $C : D = 7 : 5$ ...(3)
Therefore, by, proportionating, (1) and (2)
$A : B = 3 \times 5 : 4 \times 5 = 15 : 20$
$B : C = 20 : 24$ and $C : D = 7 : 5$
Hence, $A : B : C = 15 : 20 : 24$ ...(4)
Now, $A : B : C = 15 \times 7 : 20 \times 7 : 24 \times 7$
$= 105 : 140 : 168$
$\therefore \quad C : D = 24 \times 7 : 24 \times 5 = 168 : 120$
[By proportionating (3) and (4)]
Hence, $A : B : C : D = 105 : 140 : 168 : 120$
Hence, C gets the maximum share.

54. **(d)** Let the present age of A $= x$ and B $= y$ years
According to first condition

$\frac{x-7}{y-7} = \frac{3}{4} \Rightarrow 4x - 28 = 3y - 21 \Rightarrow 4x - 3y = 7$ .... (i)

According to second condition

$\frac{x+9}{y+9} = \frac{7}{8} \Rightarrow 8x + 72 = 7y + 63$

$\Rightarrow 7y - 8x = 9$ .... (ii)

$$\begin{array}{l} 8x - 6y = 14 \\ \underline{7y - 8x = 9} \\ y = 23 \text{ years.} \end{array}$$

55. **(b)** Let present age of father, mother and daughter be $7x, 6x, 2x$

$6x - 2x = 24$

$4x = 24$

$x = 6$

Father age $= 7x = 42$ years.

56. **(d)** Let total number of students in college $A = 3x$ and total number of students in college $B = 4x$

After 50 more students join college A

New Ratio $= \dfrac{3x+50}{4x} = \dfrac{5}{6}$

$\Rightarrow \quad 18x + 300 = 20x$

$\Rightarrow \quad 2x = 300$

$\Rightarrow \quad x = \dfrac{300}{2} = 150$

Total number of students in college $B = 4x = 4 \times 150 = 600$

57. **(c)** Let 'x' be the total sum of money.

Money received by A $= \dfrac{2}{7} \times x$

$\Rightarrow 100 = \dfrac{2}{7} \times x \Rightarrow x = ₹\,350$

$\therefore$ Money received by B $= \dfrac{5}{7} \times 350 = ₹\,250$

58. **(c)** $7S + 3D + 5N = ₹\,12600$ ... (1)

According to Question

$D = 3N$

$S = 7N$

Putting these values in equation (1)

$49N + 9N + 5N = 12600$

$\Rightarrow 63N = 12600$

$\Rightarrow N = 200$

Each daughter's share

$= 3 \times$ Nephew's share

$= 3 \times 200 = ₹\,600$

59. **(b)** Required ratio $= \left(\dfrac{2}{3} + \dfrac{3}{5} + \dfrac{5}{8}\right) : \left(\dfrac{1}{3} + \dfrac{2}{5} + \dfrac{3}{8}\right)$

$= \left(\dfrac{80+72+75}{120}\right) : \left(\dfrac{40+48+45}{120}\right) = 227 : 133$

60. **(a)** $\dfrac{x}{y} = \dfrac{2}{3};\ \dfrac{2}{x} = \dfrac{4}{8}$

$x = 4$

$y = \dfrac{3}{2}x = \dfrac{3}{2} \times 4 = 6$

61. **(b)** $\dfrac{A}{B} = \dfrac{3}{4};\ \dfrac{B}{C} = \dfrac{3.5}{3} = \dfrac{7}{6}$

and $A + B + C = 730$

$\dfrac{3}{4}B + B + \dfrac{6}{7}B = 730$

$B\left(\dfrac{3}{4} + 1 + \dfrac{6}{7}\right) = 730$

$B = \dfrac{730 \times 28}{73} = 280$

$C = \dfrac{6}{7} \times B = \dfrac{6}{7} \times 280 = 240$

B exceeds that of C by $(280 - 240) = ₹\,40$

62. **(c)** $x = x + \dfrac{125}{100}y$ or $\dfrac{x}{y} = \dfrac{5}{4}$ or $x : y = 5 : 4$

$y = \dfrac{75}{100}z$ or $\dfrac{y}{z} = \dfrac{3}{4}$ or $y : z = 3 : 4$

$$\begin{array}{ccccc} x & : & y & : & z \\ 5 & : & 4 & & \\ & & 3 & : & 4 \\ \hline 15 & : & 12 & : & 16 \end{array}$$

Then, $x : y : z$ is equal to 15: 12: 16

63. **(d)** 10% of x = 20% of y

$\dfrac{10}{100}x = \dfrac{20}{100}y$

$x = 2y$

or $\dfrac{x}{y} = \dfrac{2}{1}$

or $x : y = 2 : 1$

64. **(a)** boys : girls girls : teacher

4 : 3 8 : 1

So,

$$\begin{array}{ccccc} \text{boys} & : & \text{girls} & : & \text{teacher} \\ 4 & : & 3 & & \\ & & 8 & : & 1 \\ \hline 32 & : & 24 & : & 3 \\ \hline \end{array}$$

So, Student : teacher

$\Rightarrow$ (boys + girls) : teacher

$(32 + 24) : 3$

$56 : 3$

65. **(d)** $A : B = 5 : 3$

$B : C = 4 : 5$

$$\begin{array}{ccccc} A & : & B & : & C \\ 5 & : & 3 & & \\ & & 4 & : & 5 \\ \hline 20 & : & 12 & : & 15 \\ \hline \end{array}$$

No. of runs scored by B $= \dfrac{12}{47} \times 564 = 144$

66. **(d)** $\dfrac{A}{B} = \dfrac{5}{6} \Rightarrow B = \dfrac{6}{5}A$ ...(1)

$\dfrac{A+2}{B+2} = \dfrac{7}{8} \Rightarrow 8A + 16 = 7B + 14 \Rightarrow 7B - 8A = 2$ ...(2)

From (1) and (2), A = 5, B = 6

$$\frac{5+12}{6+12}=\frac{17}{18}$$

67. (c) Suppose, B Joined after x month
Then B's money was invested for (12 – x) months
∴ According to question

$$\frac{64000\times 12}{48000\times(12-x)}=\frac{2}{1}$$

$$\frac{16}{12-x}=\frac{2}{1}\Rightarrow 16=24-2x$$

$2x=24-16=8\Rightarrow x=4$
Hence, B joined after 4 months

68. (c) $$\frac{4}{7}+\frac{\frac{2y}{y}-\frac{x}{y}}{\frac{2y}{y}+\frac{x}{y}}=\frac{4}{7}+\frac{2-\frac{4}{5}}{2+\frac{4}{5}}=\frac{4}{7}+\frac{6}{14}=1$$

69. (c) Let original property worth ₹ x

Property left for Ram's widow $=\frac{x}{3}$

Property left for his daughter $=\frac{3}{5}\times\frac{2x}{3}=\frac{2x}{5}$

Remaining property $=x-\left(\frac{x}{3}+\frac{2x}{5}\right)=\frac{4x}{15}$

$$\frac{4x}{15}=6,400$$

$$\Rightarrow x=\frac{6,400\times 15}{4}=24,000$$

70. (a) A : B = 5 : 4, B : C = 8 : 9
A : B : C = 5 × 8 : 4 × 8 : 4 × 9 = 40 : 32 : 36
A : B : C = 10 : 8 : 9

Share of C in the profit $=\frac{9}{10+8+9}\times 3600=$ ₹ 1,200

71. (d) $\frac{1}{2}:\frac{1}{3}:\frac{1}{4}=6:4:3$

Share of third friend $=\frac{3}{6+4+3}\times 624$

$=\frac{3}{13}\times 624=$ ₹ 144

72. (b) Let two numbers be 3x and 5x

$$\frac{3x-9}{5x-9}=\frac{12}{23}$$

$23(3x-9)=12(5x-9)$
$69x-207=60x-108$
$9x=99$
$x=11$
Hence, the small number will be 3 × 11 = 33

73. (c) $\frac{x}{y}=\frac{5}{2}$

$$\frac{8x+9y}{8x+2y}=\frac{8\frac{x}{y}+\frac{9y}{y}}{8\frac{x}{y}+\frac{2y}{y}}=\frac{8\times\frac{5}{2}+9}{8\times\frac{5}{2}+2}=\frac{29}{22}$$

74. (a) Let C's speed = x km/h
Then, B's speed = 3x km/h
and A's speed = 6x km/h
Ratio of speeds of A, B, C = 6x : 3x : x = 6 : 3 : 1

Ratio of time taken $=\frac{1}{6}:\frac{1}{3}:1$
$=1:2:6$

C takes 90 minutes
Hence, 6x = 90
x = 15 minutes
Hence, A should take 15 minutes.

75. (d)

76. (a) $K=xy^2$
$K'=(x-25\%\text{ of }x)(y-25\%\text{ of }y)^2$

$$=\left(\frac{3x}{4}\right)\left(\frac{3y}{4}\right)^2=\frac{27}{64}xy^2$$

Value decreased by $K-K'=\left(1-\frac{27}{64}\right)xy^2$

$$=\frac{37}{64}xy^2$$

77. (d) Let the original fraction be $\frac{x}{y}$.

According to the question

$$\therefore\ \frac{x\times 400}{y\times 300}=\frac{4}{15}$$

$$\Rightarrow\ \frac{x}{y}=\frac{4}{15}\times\frac{3}{4}=\frac{1}{5}$$

78. (a) Let Gloria's and Sara's present ages be $4x$ and $7x$ years respectively.
Two years ago,

$$\frac{4x-2}{7x-2}=\frac{1}{2}$$

$\Rightarrow\ 8x-4=7x-2$
$\Rightarrow\ x=2$
∴ Sara's age three years hence $=7x+3$
= 17 years

79. (e) $\frac{\text{A's salary}}{\text{B's salary}}=\frac{8}{7}$

A's salary = 8x
B's salary = 7x

Now, A's salary $= 8x + 8x \times \frac{21}{100} = 8x + 1.68x = 9.68x$

Now B's salary $= 7x + 7x \times \frac{20}{100} = 7x + 1.4x = 8.4x$

$\frac{9.68x}{8.4x} = \frac{121}{105}$

$\frac{9.68}{8.4} = \frac{121}{105}$

Here x is cancelled. So, salary of A can't be calculated.

80. **(e)** A's investment = 12800
B's investment = 16800
C's investment = 9600
B's profit = 13125
Investment ratio
A : B : C = 128 : 168 : 96 = 16 : 21 : 12
A, B and C profit 16x, 21x, 12x
21x = 13125
x = 625
C's profit = 12x = 12 × 625 = 7500

81. **(d)** $\frac{A+12}{B+12} = \frac{3}{4}$

$A = \frac{15}{4}C$

$A = \frac{15}{4} \times 10 = 37.5$

$\frac{37.5+12}{B+12} = \frac{3}{4}$

B = 54

82. **(e)** M's share $= 44352 \times \frac{3}{8} = 16632$

Remaining after M's share = 27720

N's share $= 27720 \times \frac{1}{6} = 4620$

Remaining after M & N's share = 23100

$\frac{O}{P} = \frac{3}{4} \Rightarrow$ O's share $= 23100 \times \frac{3}{7} = 9900$

83. **(b)** $6B^2 = A^2 + 540$

$\frac{A}{B} = \frac{3}{2}$

$A = \frac{3B}{2}$

$6B^2 = \frac{9B^2}{4} + 540$

$3.75\,B^2 = 540$

$B = \sqrt{144} = 12$