Explanatory
Answers

1. Mother Age + Daughter Age = 40 years
   After 5 years their total age will be **50 years**

2. Average age of brother and sister = 35 years
   ∴ Their average age at present = 35 + 5 years
   $$= 40 \text{ years}$$

3. Ram's age = x, say
   Ram's Father's age = y, say
   $$\therefore x = \frac{1}{6}y$$
   If y − x = 35, then
   $$y - \frac{y}{6} = 35 \Rightarrow \frac{6y - y}{6} = 35$$
   $$\Rightarrow 5y = 35 \times 6 \Rightarrow y = 42$$
   ∴ Father's age = **42 years**

4. Price of 1 kg mangoes = Rs. 7.50 × 4 = Rs. 30
   Price of 5 kg mangoes = Rs. 30 × 5 = **Rs. 150**

5. Amount = Rs. $\left[6250 \times \left(1 + \frac{16}{100}\right)^2 \right]$
   = Rs. $\left(6250 \times \frac{29}{25} \times \frac{29}{25}\right)$ = Rs. 8410
   ∴ Compound Interest = Rs. (8410 − 6250)
   $$= \textbf{Rs. 2160}$$

6. Simple Interest for 5 years = 1020 − 720
   = Rs. 300
   Simple Interest for 2 years = Rs. 120
   ∴ Sum = 720 − 120 = **Rs. 600**

7. Let the numbers be x and y.
   $$\therefore \frac{x}{y} = 15 \text{ and } xy = 9375$$
   $$x = (15y)(y) = 9375$$
   $$\Rightarrow 15y^2 = 9375 \Rightarrow y = 25$$
   $$\therefore x = \frac{9375}{25} = 375$$
   ∴ Sum of the numbers
   = x + y = 375 + 25 = **400**

8. H.C.F. of 148 and 185 is 37
   $$\therefore \text{L.C.M.} = \left(\frac{148 \times 185}{37}\right) = \textbf{740}$$

9. Let side = 10 cm. Then, area = 100 cm²
   New side = 125% of 10 = 12.5 cm
   Area = (12.5)² = 156.25
   ∴ Increase percent = **56.25%**

10. S.P. = Rs. 100, loss = Rs. 10
    So, C.P. = $\left(\frac{100}{90} \times 100\right)$ = Rs. $\frac{1000}{9}$
    $$\therefore \text{Loss \%} = \left(10 \times \frac{9}{1000} \times 100\right)\% = \textbf{9\%}$$

11. Father's 1 hour's work = $\left(\frac{1}{3} + \frac{1}{6}\right) = \frac{1}{2}$
    ∴ Time taken by father to complete the work
    $$= \textbf{2 hours}$$

12. 10 men can finish the work in 108 hours.
    ∴ 15 men can finish the same work in
    $$\frac{108 \times 10}{15} = 72 \text{ hours,}$$
    i.e. 12 days of **6 hours** each

15. Area of floor = (300 × 300) sq. cm.
    Area of 1 slab = (20 × 30) sq. cm.
    $$\therefore \text{Number of slabs} = \left(\frac{300 \times 300}{20 \times 30}\right) = \textbf{150}$$

16. C.P. of 12 pens = Rs. 12, say
    S.P. of 8 pens = Rs. 12
    $$\Rightarrow \text{S.P. of 12 pens} = \frac{12}{8} \times 12 = \text{Rs. 18}$$
    ∴ Gain percent is **50%**

17. Let C.P. of a ball be Rs. x.
    C.P. of 5 balls = 5x = Loss (Given)
    S.P. of 17 balls = 720
    C.P. of 17 balls = 17x
    ∴ 17x − 720 = 5x
    ⇒ 12x = 720 ⇒ x = **Rs. 60**

19. Distance = (time × speed) = $\left(\frac{11}{4} \times 4\right)$ km
    $$= 11 \text{ km}$$
    Now, distance = 11 km & new speed
    $$= 16.5 \text{ kmph}$$

$$\therefore \text{Time} = \left(\frac{\text{distance}}{\text{speed}}\right) = \left(\frac{11}{16.5}\right) \text{hrs.}$$

$$= \left(\frac{11}{16.5} \times 60\right) \text{min.} = \mathbf{40\,min}$$

21. $A : B : C = 36000 : 45000 : 54000 = 4 : 5 : 6$

C's share = Rs. $\left(37500 \times \frac{6}{15}\right) = $ **Rs. 15000**

23. New average $= (20 - 1) = 19$

$\therefore$ Age of new student

$= (13 \times 19 - 12 \times 20)$ years $= \mathbf{7\ years}$

24. $20 \times 12 - 12 \times 11 - 7 \times 10$

$= 240 - 132 - 70 = \mathbf{38}$

25. Let $x^2 = (75.15)^2 - (60.12)^2$

$= (75.15 + 60.12)(75.15 - 60.12)$

$= 135.27 \times 15.03$

$= 2033.1081$

$\Rightarrow \mathbf{x = 45.09}$

26. A and B together can complete a piece of work in 14 days

Let A alone can complete the work in x days.

$\therefore$ B alone can complete the same work in 2x days.

$$\therefore \frac{1}{x} + \frac{1}{2x} = \frac{1}{14} \Rightarrow x = 21$$

$\therefore$ A alone can complete the work in **21 days.**

27. Amout $= \dfrac{216}{125} P$, where P is the principal.

Time = 3 years. $\therefore$ Amount $= P\left(1 + \dfrac{R}{100}\right)^T$

$$\Rightarrow \frac{216}{125} P = P\left(1 + \frac{R}{100}\right)^3$$

$$\Rightarrow \left(\frac{6}{5}\right)^3 = \left(1 + \frac{R}{100}\right)^3 \Rightarrow 1 + \frac{R}{100} = \frac{6}{5}$$

$$\Rightarrow \frac{R}{100} = \frac{1}{5}$$

$\Rightarrow R = 20$

$\therefore$ Rate of interest = **20%**

28. Length of the wire

$= 2\pi r = 2 \times \dfrac{22}{7} \times 28 = 176$ cm

Since it is rebent in the form of a square, therefore the length of the side of the square

$= \dfrac{176}{4} = \mathbf{44\ cm}$

29. Let the reduced price be Rs. x per kg.

Let the original price be Rs. y per kg.

$\therefore y - 25\%$ of $y = x$

$$\Rightarrow y - \frac{y}{4} = x \Rightarrow \frac{3y}{4} = x \Rightarrow y = \frac{4x}{3}$$

$$\therefore \frac{500}{x} - 50 = \frac{500}{y} \Rightarrow \frac{500}{x} - \frac{500}{y} = 50$$

$$\Rightarrow \frac{10}{x} - \frac{10}{y} = 1 \Rightarrow 10y - 10x = xy$$

$$\Rightarrow 10 \times \frac{4x}{3} - 10x = x \times \frac{4x}{3}$$

$$\Rightarrow 40x - 30x = 4x^2 \Rightarrow 4x^2 = 10x$$

$$\Rightarrow x = \frac{5}{2} = 2.5$$

$\therefore$ Reduced price per kg = **Rs. 2.50**

30. Suppose the candidate answers x questions correctly.

$\therefore 2x - (100 - x) = 80$

$\Rightarrow 2x - 100 + x = 80 \Rightarrow 3x = 180 \Rightarrow x = 60$

$\therefore$ **60 questions were answered correctly**

31. Let Mohan bought one scooter for Rs. x and the other one for Rs. (18000 − x).

S.P. of 1st scooter

$= x + 25\%$ of $x = x + \dfrac{x}{4} = \dfrac{5x}{4}$

S.P. of the 2nd scooter

$= (18000 - x) - 20\%$ of $(18000 - x)$

$= \dfrac{4}{5}(18000 - x)$

$$\therefore 18000 = \frac{5x}{4} + \frac{4}{5}(18000 - x)$$

$$\Rightarrow \frac{18000}{5} = \frac{5x}{4} - \frac{4x}{5} = \frac{9x}{20}$$

$$\Rightarrow \frac{9x}{4} = 18000 \Rightarrow x = 8000$$

$\therefore$ C.P. of the 1st scooter = **Rs. 8000** ;

C.P. of the 2nd scooter = **Rs. 10000**

32. C.P. of the Umbrella

$$= \frac{300 \times 100}{100 + 20} = \frac{30000}{120} = \text{Rs. } 250$$

If 10% discount is allowed on Rs.300, then the S.P. = Rs.270 ∴ Gain = Rs.20

∴ Gain % during the sale season

$$= \frac{20}{250} \times 100 = \mathbf{8\%}$$

33. Rs. 2400 are earned in 5 days by 12 boys

⇒ Rs. 2400 are earned in 1 day by 60 boys

⇒ Rs. 4200 are earned in 1 day by

$$\frac{60}{2400} \times 4200 = 105 \text{ boys}$$

⇒ Rs. 4200 are earned in 21 days by **5 boys**

34. L.C.M. of 3, 4, 5, 6 and 8 is 120.

$120 = 2 \times 2 \times 2 \times 3 \times 5$

∴ Least perfect square number

$= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5 = \mathbf{3600}$

35. Let the number of one-rupee notes, five-rupee notes and ten-rupee notes be x each.

∴ $10x + 5x + x = 480 \Rightarrow x = 30$

∴ Total number of notes = $3x = \mathbf{90}$

36. 40% of the employees are matriculates.

30% of the employees are graduates

30%, i.e. 180 of the employees are post-graduates

∴ Total number of graduate employees = **180**

37. S.P. = Rs. 240, Loss = 10%

$$\therefore \text{ C.P.} = \frac{240 \times 100}{100 - 10}$$

$$= \frac{2400}{9} = \frac{800}{3}$$

If profit = 20%, then S.P. $= \frac{800}{3} + 20\% \text{ of } \frac{800}{3}$

$$\text{S.P.} = \frac{800}{3} + \frac{20}{100} \times \frac{800}{3} = \frac{960}{3} = \textbf{Rs. 320}$$

38. C.P. of 24 bananas = Rs.32

S.P. of 18 bananas @ Rs. 12 per dozen = Rs.18

S.P. of the remaining 6 bananas @ Rs.4 per dozen = Rs.2

∴ S.P. of 24 banans = Rs. 20

$$\Rightarrow \text{Loss } \% = \frac{12}{32} \times 100$$

$$= \mathbf{37.5\%}$$

39. C.P. of 12 articles = Rs.12, say

S.P. of 10 articles = Rs.12

$$\Rightarrow \text{S.P. of 12 articles} = \frac{12}{10} \times 12 = \frac{144}{10}$$

$$\therefore \text{ Profit } \% = \frac{\frac{144}{10} - 12}{12} \times 100 = \mathbf{20\%}$$

40. $\sqrt{12^2 + 9^2 + 8^2} = \sqrt{144 + 81 + 64}$

$$= \sqrt{289} = \mathbf{17 \, m}$$

41. Given expression

$$= \frac{1}{2} + \left[\frac{19}{4} - \left(\frac{19}{6} - \frac{7}{3} \right) \right]$$

$$= \frac{1}{2} + \left[\frac{19}{4} - \frac{5}{6} \right] = \frac{1}{2} + \frac{47}{12} = \frac{53}{12} = 4\frac{5}{12}$$

42. $A = B + 25\% \text{ of } B = \frac{5B}{4}$

$$\Rightarrow B = \frac{4}{5}A = A - \frac{A}{5} = A - 20\% \text{ of } A$$

∴ **B's salary is 20% lower than A's.**

43. $\dfrac{10 \times 12.5 + 20 \times 13.1}{30}$

$$= \frac{125 + 262}{30} = \frac{387}{30} = 12.9$$

44. To find the time taken by the 110 metres long train in crossing 165 metres length platform @ 132 km/hr

= To find the time taken by the train in covering

110 + 165 = 275 metres

∴ 132 km/hr (convert)

⇒ 132000 m / 3600 seconds

⇒ 110 m / 3 seconds

∴ Train take to cross the 275 m length platform = **7.5 seconds**

45. She saved Rs. 2.50 on

Rs. 27.50, i.e. $\dfrac{2.50}{27.50} \times 100\%$

i.e. $\dfrac{100}{11}$ %, i.e. $9\dfrac{1}{11}$ % ≈ **9%** .

46. $\dfrac{5.32(56+44)}{(7.66+2.34)(7.66-2.34)} = \mathbf{10}$

47. $\dfrac{A}{B} = \dfrac{3}{4}, \dfrac{B}{C} = \dfrac{3}{4} \Rightarrow \dfrac{A}{9} = \dfrac{B}{12} = \dfrac{C}{16}$

$\Rightarrow$ A : B : C = 9 : 12 : 16

∴ A's share = $\dfrac{9}{37} \times 370 =$ **Rs. 90**

48. Let the two numbers be x and y
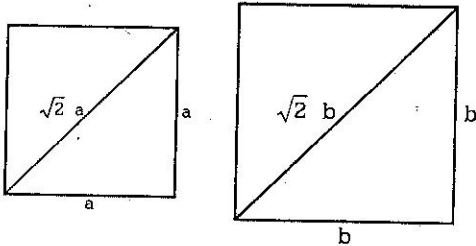
∴ $\dfrac{x}{y} = \dfrac{3}{5}$

$\Rightarrow$ x is the smaller number

and y is the larger number ..... (1)

$\Rightarrow \dfrac{x-9}{y-9} = \dfrac{12}{23} \Rightarrow 23x - 12y = 99$

$\Rightarrow 23x - 20x = 99 \Rightarrow \mathbf{x = 33}$

49.

Let a and b be the sides of the two squares respectively

∴ $\dfrac{\sqrt{2}\,a}{\sqrt{2}\,b} = \dfrac{2}{5} \Rightarrow \dfrac{a}{b} = \dfrac{2}{5} \Rightarrow \dfrac{a^2}{b^2} = \dfrac{4}{25}$

∴ $a^2 : b^2 = \mathbf{4 : 25}$

50. Perimeter of the wheel = $2\pi r$

$\Rightarrow 2 \times \dfrac{22}{7} \times 1.75 = 11$ m,

$\Rightarrow$ No. of revolutions that the wheel will make in travelling 11 km

$= \dfrac{11000}{11} = \mathbf{1000\ revolutions}$

51. ? % of 8.25 = 759 $\Rightarrow$? = $\dfrac{759 \times 100}{8.25} = \mathbf{9200}$

52. Let the required number be "N".

Thus, we get, (0.3 N) = 40% of 150 = 60

$\Rightarrow$ N = (60 ÷ 0.3) = **200**

53. Let the three numbers be "X", "Y" and "Z". Further. let "X" be the smallest number, "Y" be the middle number and "Z" be the largest number, Thus, we get,

(i) (X + Y + Z) = 3 × 49 = 147,

(ii) (Z − X) = 31 and

(iii) (Z + X) = 99

∴ Y = 147 − 99 = **48**.

54. Let the Cost Price of the plot be Rs. "X". Thus, we get, 18700 = (X − 15% of X) $\Rightarrow$ X = Rs.22,000. Hence, in order to gain 15%, the plot must be sold for **Rs.25,300** (22,000 + 15% of 22,000).

55. Let the ages of two sisters today be "X" and "2X" years respectively. Thus we get,

$\dfrac{(X+4)}{(2X+4)} = \dfrac{2}{3}$

$\Rightarrow$ (3X + 12) = (4X + 8) $\Rightarrow$ X = 4

Thus, the age of the elder sister today is **8 years**.

56. Let the required number be "N" Thus, we get, (N − 636) = (2 ÷ 5) of N $\Rightarrow$ (3 ÷ 5) of N = 636 $\Rightarrow$ N = 1060. Thus, the required number = 1060 × 2 = **2120**. This answer is not given in any of the options. Hence, the correct choice is "None of these"

57. Required difference = $\dfrac{15750}{(20000+25000)} \times$ (25000 − 20000) = **Rs.1750**

58. Required profit per cent = $\dfrac{18-12}{12} \times 100\%$

= **50%**

59. $P_1 = 2000; P_2 = 700; SI_1 = 3000, SI_2 = 210$

Rate of interest is the same

∴ We know that, $R = \dfrac{100 \times I}{PT}$

$\dfrac{100 \times 3000}{2000 \times 5} = \dfrac{100 \times 210}{700 \times N}$

$N = \dfrac{100 \times 210 \times 2000 \times 5}{700 \times 100 \times 3000}$; **N = 1**

60. $A = P\left(1 + \dfrac{r}{100}\right)^n = 1,25,000 \left(1 - \dfrac{3}{100}\right)^2$

$\therefore$ Population decreases

$= 1,25,000 \times \dfrac{97}{100} \times \dfrac{97}{100}$

$= 11761.50$

$= 117613$

$\therefore$ Population after 2 years = **1,17,613**

61. Average speed $= \left(\dfrac{2xy}{x+y}\right)$ kmph

$= \left(\dfrac{2 \times 30 \times 70}{30 + 70}\right)$ kmph = **42 kmph**

62. Average speed from A to B $= 150 \times \dfrac{3}{10}$

$= 45$ kmph

Average speed from B to A $= 150 \times \dfrac{6}{25}$

$= 36$ kmph

Average speed $= \dfrac{\text{Total distance}}{\text{Total time}}$

Average speed for entire trip =

$\left(\dfrac{2 \times 45 \times 36}{45 + 36}\right)$ kmph $= 40$

Required difference = **5 km/hr**

63. Speed of the train $= 72 \times \dfrac{5}{18} = 20$ m/sec

Distance covered in passing the platform
$= (150 + 250) = 400$ m

Time taken $= \left(\dfrac{400}{20}\right)$ = **20 sec**

64. Let the speed of 2nd train be x kmph
Relative speed $= (20 + x)$ kmph

$= (20 + x) \times \dfrac{5}{18}$ m/sec

$(110 + 90) \times \dfrac{18}{5(20 + x)} = 10$

$\Rightarrow 40 \times 18 = 10 (20 + x) \Rightarrow$ **x = 52 kmph**

65. Speed $= \dfrac{\text{distance}}{\text{time}}$

Speed of the current is 'X' kmph

upstream $\Rightarrow 20 - X = 16 \div 1 \Rightarrow X = 4$ kmph

downstream $\Rightarrow (20 + 4) = \dfrac{16}{X} \Rightarrow$ **X = 40 min**

66. Speed upstream = 8 kmph
Speed downstream = 12 kmph

$\therefore$ Total time taken $= \left(\dfrac{120}{8} + \dfrac{120}{12}\right)$ hrs

$= \dfrac{200}{8} = $ **25 hrs**

67. Let the C.P. be Rs.100
Now the S.P. = Rs. 115
New C.P. = Rs.90

New S.P. $= \dfrac{90 \times 125}{100} = 112.5$

Difference in S.P. $= 115 - 112.5 = $ Rs. 2.5
If the difference is Rs. 2.5, the CP = Rs.100
$\therefore$ If the difference is Rs.21,

the CP $= \dfrac{100 \times 21}{2.5} = $ **Rs. 840**

68. S.P. = Rs.8000 ; Loss = 20%

$\therefore$ C.P. $= \dfrac{8000 \times 100}{100 \times 20} = \dfrac{8000 \times 100}{80} = 10000$

Now S.P. = 8500

Loss $= \dfrac{10000 - 8500}{10000} = \dfrac{1500}{10000}$

Loss % $= \dfrac{1500}{10000} \times 100 = $ **15%**

69. A's one day's work $\dfrac{1}{12}$;

B's one day's work $\dfrac{1}{18}$

(A + B)'s one day's work $= \dfrac{1}{12} + \dfrac{1}{18} = \dfrac{5}{36}$

If they work together, the number of days required to do the job

$= K \dfrac{\frac{1}{5}}{36} = \dfrac{36}{5} = $ **7.2 days**

70. $(A + B)$'s 1 hour work $= \dfrac{1}{10}$,

A's 1 hour work $= \dfrac{1}{14}$

$\therefore$ B's 1 hour work $= \left(\dfrac{1}{10} - \dfrac{1}{14}\right) = \dfrac{4}{140} = \dfrac{1}{35}$

B alone can dig a trench in 35 hours

71. Let the earlier salary per annum be Rs. x

Thus we have, $x + 5\%$ of $(x) =$ Rs. 15120

$\Rightarrow x =$ Rs.14400

Thus required monthly salary $= \dfrac{14400}{12}$

$= 1200$

72. $(75\%$ of $47\%) + (40\%$ of $53\%)$

$\Rightarrow \left(\dfrac{75}{100} \times \dfrac{47}{100} + \dfrac{40}{100} \times \dfrac{53}{100}\right) \Rightarrow \mathbf{56.45\%}$

73. Let the numbers be x and y. Then

$xy = 200$ and $x^2 + y^2 = 225$

$(x+y)^2 = (x^2 + y^2) + 2xy$

$= (225 + 400) = 625$

$x + y = \sqrt{625} = \mathbf{25}$

74. $A : B = 1 : 2$ and $B : C = 2 : 3$

$\therefore A : B : C = 1 : 2 : 3$

$\therefore$ second number $= \dfrac{2}{6} \times 60 = \mathbf{20}$

75. Let the quantity of alcohol and water be 2x and x respectively; then

$\dfrac{2x}{x+3} = \dfrac{2}{3} \Rightarrow 6x = 2x + 6 \Rightarrow x = \dfrac{6}{4}$ (or)

$x = 1.5$

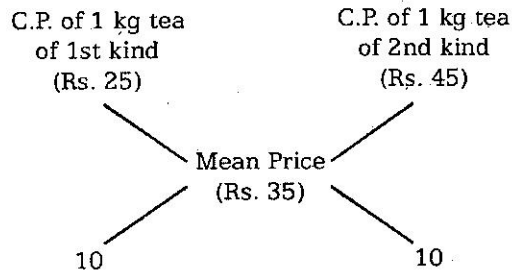$\therefore$ Alcohol in the given mixture $= 2x$

$= 2 \times 1.5 = \mathbf{3\ ltrs}$

76. Let the number of coins in the bag be '5x' of 50 paise; '6x' of 25 paise and '2x' of 1 rupee.

Thus total amount in the bag is

$(0.50) 5x + (0.25) 6x + (1.00) 2x = 6x = 42$

$\therefore x = 7$

$\Rightarrow$ There are **42 coins** (7 x 6) of 25 paise

77. By the rule of alligation, we get

C.P. of 1 kg tea of 1st kind (Rs. 25)

C.P. of 1 kg tea of 2nd kind (Rs. 45)

Mean Price (Rs. 35)

10   10

$\therefore$ (Tea of 1st kind) : (Tea of 2nd kind) $= 10:10$

$= \mathbf{1 : 1}$

78. Area of the triangle $= \dfrac{\sqrt{3}}{4}a^2 = \left(\dfrac{\sqrt{3}}{4} \times 4 \times 4\right) \text{cm}^2$

$= \mathbf{4\sqrt{3}\ cm^2}$

79. Volume $= \dfrac{4}{3}\pi r^3 = \dfrac{4}{3} \times \dfrac{22}{7} \times 14 \times 14 \times 14 \ \text{cm}^3$

$= \mathbf{11498.66\ cm^3}$

Surface area $= 4\pi r^2 = 4 \times \dfrac{22}{7} \times 14 \times 14$

$= \mathbf{2464\ cm^2}$

80. 1995 being an ordinary year, it has 1 odd day. So the second day of 1996 will be two days beyond sunday i.e. it will be **Tuesday**.

81. Each number except 56 is multiple of 11.

82. 2 and 4 are added alternatively.
The required number is **23**.

83. $\sin 30° \cos 60° + \cos 30° \sin 60° = \sin (30° + 60°)$
$= \sin 90° = \mathbf{1}$

84. In order to average 50 miles per hour for the trip, the bus must make the trip in 185/50 = 37/10 hours which is 222 minutes.

Since 2 hours or 120 minutes were needed for the first 85 miles, the final 100 miles must be completed in $222 - 120 = 102$ minutes.

85. The cost of producing the first 8,000 copies is $1,000 + 7,000 x$. Therefore

$1,000 + 7,000 x = 7,230$;

i.e. $7,000 x = 6,230$ and therefore $x = \mathbf{0.89}$.

86. Choice (a) gives $6^2 = 36$.

Choice (b) gives $4^4 = 256$.

Choice (c) gives $8^2 = 64$.

Choice (d) is $2 + 4 + 4 = 10$.

Hence **(b)** is correct.

87. After the radius is increased by 6%, the radius should be 1.06 times the original radius. Since the area of a circle is πr^2, the new area will be $\pi(1.06r)^2 = \pi(1.1236\, r^2)$ or $1.1236\,\pi r^2$. Thus the area has been increased by $.1236\,\pi r^2$ or by 12.36%.

88. After the 10% discount, price of the car was Rs. 45,000. After the second discount of 20%, the selling price was **Rs. 36,000.**

89. Water content in the original mixture $= \dfrac{2}{7} \times 56$
    $= 16$ litres. Let x litre of water be added to get the required ratio.

    Then, $\dfrac{16+x}{56+x} = \dfrac{5}{4+5}$ (Compare only water contents in the new mixture)
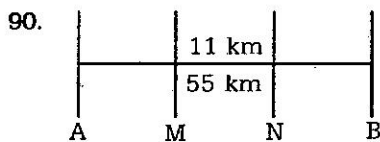   i.e. $9(16 + x) = 5(56 + x)$
    i.e. $144 + 9x = 280 + 5x$
    i.e. $9x - 5x = 280 - 144$
    $4x = 136$
    $x = \dfrac{136}{4} = 34$
    Therefore, **34 litres of water should be added.**

90.

    Let them be so x hours after their simultaneous start.
    Then, $AM + MN + NB = 55$
    i.e. $12x + 11 + 10x = 55$
    i.e. $22x = 55 - 11$
    i.e. $x = \dfrac{44}{22} = 2$ hours
    Then the answer is **2 hours after start.**

91. Let x be the number.
    $\dfrac{x}{2} = \dfrac{x}{3} + 17$
    $3x = 2x + 102$
    $3x - 2x = 102;\ \mathbf{x = 102}$

92. I mixture 2 kg of Rs. 33 + 1 kg of Rs. 15
    $\therefore$ Cost/kg $= \dfrac{81}{3} =$ Rs. 27

II mixture 1 kg of Rs. 33 + 2 kg of Rs. 15 = Rs. 63
$\therefore$ Cost/kg = Rs. 21
Profit per kg $= 27 - 21 =$ Rs. 8
Profit for 100 kg = **Rs. 800**

93.

No. of participants	No. of days
1600	60
1200	x

Here x is the required answer; downward arrow indicates the inverse proportion between the number of participants and the number of days.

$x = \dfrac{1600}{1200} \times 60 = 80$

$\therefore$ **The provision will last for 80 days.**

94. $\dfrac{0.7 \times 0.7 \times 0.7 - 0.2 \times 0.2 \times 0.2}{0.7 \times 0.7 + 0.2 \times 0.2 + 0.2 \times 0.7}$

    = Crossing the Numerator and Denominator and using the formula

    $\dfrac{a^3 - b^3}{a^2 + b^2 + ab} = a - b = 0.7 - 0.2 = 0.5$

95.

Hours	Work done	Days	Men
8	1/3	18	50
10	2/3	10	?

    $\dfrac{8}{10} \times \dfrac{2}{3} \times \dfrac{3}{1} \times \dfrac{18}{10} \times 50 = 144$

    $\therefore 144 - 50 =$ **94 men needed**

96. Let 'x' be the distance between Mettupalayam and Ooty and 'y' be the time taken for downward journey.

    $\therefore \dfrac{x}{7.5} = y + \dfrac{32}{60}$ .....(1)

    $\dfrac{x}{8.7} = y$ .....(2)

    $x = 7.5y + 4$ .....(1)
    $x = 8.7y$ .....(2)
    From (1) & (2), $1.2y = 4$
    $\therefore y = 3$ hours, 30 minutes

    $\therefore x = 8.7 \times 3\dfrac{1}{3} =$ **29 miles**

97. The ratio of profit is $100 : 11\dfrac{1}{9}$ = Milk : Water

i.e. **9 : 1.**

98. The difference between Rs. 3,250 and Rs. 2,800 is Rs. 450 for 3 years

∴ For one year = $\dfrac{450}{3}$ = 150

∴ The original principal must be

Rs. 2,800 – (150 × 2) = Rs. 2,500

The rate of interest is

2500   150

100    $\dfrac{100 \times 150}{2500} = 6$

∴ **6% is the rate of interest.**

99. Suppose there were 'x' students in the beginning.

Their total age = 15x

Total age of 5 new boys = (12½ years) × 5 with the inclusion of boys.

Average age (15 years – 6 months) 14½ years

Then the total age = 14½ × (x + 5)

15x + 12½ × 5 = 14½ × (x + 5)

i.e. 15x – 14½ x = 5(14½ – 12½)

½(x) = 5 × 2 = 10   ∴ x = 20

∴ **There were 20 students in the beginning.**

100. $a^2 = 225$

∴ a = 15; ∴ **4a = 60**

101. x + x + 1 + x + 2 + x + 3 = 94

4x + 6 = 94

4x = 94 – 6 = 88

∴ x = 22

∴ The last consecutive number is **25.**

102. $a^3 + b^3 + c^3 - 3abc$

$= (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca) = 0$

(∵ a + b + c = 0)

∴ $a^3 + b^3 + c^3 =$ **3 abc.**

103. $\dfrac{40}{1000} = 0.04$

104.

A	:	B	:	C
4	:	5		
		3	?	8
12	:	15	:	40

∴ A : C = **12 : 40**

105. By data : 75% of x + 75 = x

i.e. $\dfrac{3}{4} x + 75 = x \Rightarrow 3x + 300 = 4x$

$\Rightarrow$ **x = 300**

106. Let the salary be Rs. 100

Investment on food = Rs. 40

∴ Remaining Salary = Rs. 60

Investment on Education = 50% of Rs. 60 = 30

∴ Remaining Salary = (60 – 30) = Rs. 30

Investment on other items = 10% of Rs. 30 = 3

∴ Remaining Salary = Rs. 27

∴ Salary = $\dfrac{100}{27} \times 540 =$ **Rs. 2000**

108. Speed of the train = $\dfrac{90000}{3600}$ mts/sec = 25m/sec

∴ Length of train = 10 × 25 = **250 m/sec.**

109. We have, (No. of Workers × No. of Days) = **Constant.**

Thus, we get, 20 × 45 = **900 Man – Days.** Now, in order to complete the task in 30 days, (900 ÷ 30) = 30 workers will be required in all. Hence, **10 more workers will be required** (30 – 20 = 10).

110. The number of students who passed in English = 65% of 40 = 26

thus, the required number = 40 – 26 = **14**

111. X = 60% of Y = 0.6Y. Thus, we get,

$\dfrac{Y}{(X + Y)} = \dfrac{Y}{(0.6Y + Y)} = \dfrac{Y}{1.6Y} = \dfrac{1}{1.6} = \dfrac{10}{16} = \dfrac{5}{8}$

Thus, the required ratio is 5 : 8. This answer is not given in any of the options. Hence, the correct choice is "None of these".

112. The least number which is exactly divisible by 2, 3, 4, 5 and 6 is the L.C.M. of these numbers, which is 60. Now, any multiple of 60 would be exactly divisible by all these numbers. The least square number in multiple of 60 is **900.**

113. Let the cost price of the article be Rs. "X". Thus, we get, 7% of (X) = 42 ⇒ **X = Rs.600.**

114. $\dfrac{(Profit)_A}{(Profit)_B} = \dfrac{8000 \times 12}{7000 \times 12} = \dfrac{8}{7}$

Thus, out of the total profit of Rs.15, A's share is Rs.8. Hence, out of the total profit of Rs. 22,500, A's share would be given as equal to (22,500 × 8 ÷ 15) = **Rs.12,000**

115. The side of Square "A" = $\sqrt{36}$ = 6 metre.

Hence, the side of squre "B" = 12 meters.

Thus, required area = 12 × 12 = **144 sq.m.**

116. Let the speed of the stream be "X" kmph. Thus, while going upstream, the effective speed of travel for the boat would be (8 − X) kmph; and while going downstream, the effective speed of travel for the boat would be (8 + X) kmph.

Thus, Speed = Distance ÷ Time

⇒ Time = Distance ÷ Speed.

Hence,

$\dfrac{15}{(8-X)} + \dfrac{15}{(8+X)} = 5 \Rightarrow 15(8+X) + 15(8-X)$

$= 5(64 - X^2)$

∴ 120 + (15X) + 120 − (15X) = 320 − 5X² ⇒ 5X² = 80 ⇒ X² = 16

∴ X = $\sqrt{16}$ = **4 kmph**

117. Let the required two digit number be "XY" Thus, we have, (10X + Y) × (X + Y) = 637 and (X + 5) = Y.

Hence, we get,

[(10X) + (X+5)] × [X + X + 5] = 637

⇒ [11X + 5] × (2X+5)] = 637

⇒ 22X² + 65X + 25 = 637

⇒ 22X² + 65X − 612 = 0

Solving this equation, we get X = 4. Hence, Y = 9. Thus, the required number is **49.**

118. Let the radius of the circle be "r" cm. Thus, (2πr − r) = 370

⇒ r = 370 ÷ (2π −1).

Substituting π = (22 ÷ 7), we get r = 70 cm. Hence, the required diameter of the circle is **140 cm.**

119. x × 11 = 55550 ∴ x = $\dfrac{55550}{11}$ = **5050**

120. x − 1046 − 398 − 69 = 999; x − 1513 = 999

∴ x = 999 + 1513 = **2512.**

121. Use the formula: (a² − b²) = (a + b) (a − b)

1014×986 = (1000+14)(1000−14) = 1000²−14²

= 1000000 − 196 = **999804.**

122. x × 48 = 173 × 240;

∴ x = $\dfrac{173 \times 240}{48}$ = **865**

123. Use the formula: BODMAS {B - bracket, O - of, D - division, M - multiplication, A - addition, S - subtraction}

$\dfrac{42060}{15}$ +5 = 2804 + 5 = **2809.**

125. 6.606
  0.066
  0.66
  0.6
  _____
  7.932

126. 0.001 ÷ x = 0.01

0.001 = 0.01 × x

0.1 = $\dfrac{0.001}{0.01}$ = x

127. $\dfrac{0.24 \times 0.35}{0.14 \times 0.15 \times 0.02} = \dfrac{4}{0.02}$ = **200**

128. $\dfrac{1}{3600}$ = **0.0002777**

129. $\dfrac{12276}{155}$ = 79.2. Now we have put two decimal points in the numerator and one decimal point in that denominator. Hence, we must get the answer 7.92. But if we put one decimal point in the numerator and two decimal points in the denominator, we will get 792.

131. (a − b)² = a² − 2ab + b²

(9.75−5.75)² = 9.75²−2×9.75×5.75+5.75²

⇒ (4)² = **16.**

132. Use the formula: BODMAS {B - Bracket, O - Of, D - Division, M - Multiplication, A - Addition, S - Subtraction}

21 × 1.3 = 27.3 + 3.5 = **30.8**

133. Use the formula: BODMAS {B - Bracket, O - Of, D - Division, M - Multiplication, A - Addition, S - Subtraction}

$\dfrac{48-12\times3+9}{12-9\div3} = \dfrac{48-36+9}{3+3} = \dfrac{12+9}{6} = \dfrac{21}{6} = 3\dfrac{1}{2}$

134. Use the formula: BODMAS {B - Bracket, O - Of, D - Division, M - Multiplication, A - Addition, S - Subtraction}

$179 \div 19 \times 9 = 9 \times 9 = \mathbf{81}$.

135. $\dfrac{\sqrt{256}}{\sqrt{x}} = 2$; $\dfrac{256}{x} = 4$; $4x = 256$

$\therefore x = \mathbf{64}$

136. $\dfrac{112}{\sqrt{196}} \times \dfrac{\sqrt{576}}{12} \times \dfrac{\sqrt{256}}{8} = \dfrac{112}{14} \times \dfrac{24}{12} \times \dfrac{16}{8} = \mathbf{32}$

137. x% of 250 + 25% of 68 = 67

$\dfrac{x}{100} \times 250 + \dfrac{25}{100} \times 68 = 67$

$2.5x = 67 - 17 = 50$

$x = \dfrac{50}{2.5} = \mathbf{20}$

138. $\sqrt{\dfrac{3.6}{100} \times 40} = \sqrt{\dfrac{36 \times 4}{100}} = \dfrac{6 \times 2}{10} = \mathbf{1.2}$

139. A : B = 2 : 3

B : C = 4 : 5

$\therefore$ A : B : C = 8 : 12 : 15   {$\because 2 \times 4; 3 \times 4; 3 \times 5$}

Now A : C = 8 : 15

C : D = 6 : 7

$\therefore$ A : C : D = 48 : 90 : 105

$\therefore$ A : D = 48 : 105 = **16 : 35**

140. 24 + (41 × 42) = 24 + 1722 = **1746**.

144. Increase = 6000 − 4000 = 2000

% of increase = $\dfrac{2000 \times 100}{4000} = \mathbf{50\%}$

145. Increase in strength = 10% of 840

$= 840 \times \dfrac{10}{100} = 84$

Present total strength = 840 + 84 = **924**

146. $\dfrac{130}{150} \times 100 = 86.6666$ $\therefore$ **86.6**

147. By using the formula

$\dfrac{a^2 - b^2}{a + b} = \dfrac{(a+b)(a-b)}{(a+b)} = a - b$

Here a = 85, b = 25; a − b = 85 − 25 = **60**

148. For (A) the value is $6^2 = 36$; for (C) it is $(8)^2 = 64$ for (D) it is 16+4 = 20

But for (B) the value is $4^4 = \mathbf{256}$

149. 16 workers can finish the job in 3 hours

1 worker can finish it in $3 \times 16 = 48$ hours

5 workers can finish it in $\dfrac{48}{5} = 9\dfrac{3}{5}$ **hours**.

150. There are $10 \times 9 = 90$ different ways to pick 2 socks.

$6 \times 5 = 30$ different ways of picking 2 red socks.

$\therefore$ The probability of picking 2 red socks is

$\dfrac{6 \times 5}{10 \times 9} = \dfrac{30}{90} = \dfrac{1}{3}$

151. $\dfrac{1}{2} \times \dfrac{x}{2} = \dfrac{x}{4}$

152. $1\dfrac{1}{4}(x) = \dfrac{1}{2}$; $\therefore$ $\dfrac{5}{4}x = \dfrac{1}{2}$;

$x = \dfrac{1}{2} \times \dfrac{4}{5} = \dfrac{4}{10} = \dfrac{2}{5}$

153. Present age = x − 10

Ten years from now, he will be x − 10 + 10 or x years old.

154. Let the number be x.

From the problem x = 75 + 75% of x

i.e., $x = 75 + \dfrac{75}{100}x$ i.e., $x = 75 + \dfrac{3}{4}x$

$75 = x - \dfrac{3}{4}x = \dfrac{1}{4}x \Rightarrow 75 = \dfrac{1}{4}x$

$\therefore \mathbf{x = 300}$

155. d = 21 cm $\therefore r = \dfrac{21}{2}$ cm.

Volume i.e., $\pi r^2 h = 4158$ cm^3

i.e., $4158 = \dfrac{22}{7} \times \dfrac{21}{2} \times \dfrac{21}{2} \times h$

$\therefore h = \dfrac{4158 \times 7 \times 2 \times 2}{22 \times 21 \times 21} = 12$ cm.

Total surface area $2\pi r (h+r)$ square units.

$= 2 \times \dfrac{22}{7} \times \dfrac{21}{2} \left(12 + \dfrac{21}{2}\right)$ cm^2

$= 2 \times \dfrac{22}{7} \times \dfrac{21}{2} \times \dfrac{45}{2}$ cm^2

$= 11 \times 3 \times 45 = \mathbf{1485}$ **cm²**

156. Curved surface area = $\pi r h$ square units.

$r = \dfrac{1.4}{2} = 0.7$; $l = 4.2$ cm