Answer & Solutions

Level-I

1. (d) $(x-3)(2x+1)=0 \Rightarrow (x-3)=0$ or $(2x+1)=0$
when $x-3=0$, $x=3$

when $2x+1=0 \Rightarrow x=-\frac{1}{2}$

When $x=3$, then $(2x+1)=7$ and when $x=-\frac{1}{2}$,
then $2x+1=0$,
Possible values of $(2x+1)$ are 0 and 7.

2. (c) Let father's, mother's and daughter's present age be F, M, D respectively.
We have, $F=M+5$, $M=3D$ and $D=10$
$\Rightarrow M=3\times 10=30$ years and $F=30+5=35$ years
The father's age at the time of birth of the daughter $=35-10=25$ years

3. (b) Let the present age of the son be x years, then
$x=38-x$ or $x=19$ years
Five years back, son's age $=x-5=19-5=14$ years

4. (c) Let the number be x, Then,

$$x-24=\frac{4}{7}x \Leftrightarrow x-\frac{4}{7}x=24 \Leftrightarrow \frac{3}{7}x=24$$

$$\Leftrightarrow x=\left(\frac{24\times 7}{3}\right)=56.$$

5. (c) Let the number be x.

$$\text{Then, } \left(\frac{1}{2}x+\frac{1}{5}x\right)-\frac{1}{3}x=\frac{22}{3} \Leftrightarrow \frac{11x}{3}$$

$$=\frac{22}{3} \Leftrightarrow x=\left(\frac{22\times 30}{3\times 11}\right)=20$$

6. (b) Let the salary of the driver be ₹ x.

$$\text{Then, his income during one week} = x+\frac{5}{4}x=\frac{9x}{4}$$

$$\text{Required fraction} = \frac{\frac{5}{4}x}{\frac{9}{4}x}=\frac{5}{9}$$

7. (c) Let the number of rice bowls be x,
the number of broth bowls be y
and the number of meat bowls be z.
Now, $x+y+z=65$ …(1)
and $2x=3y=4z$ …(2)
From (1) and (2), we have $x=30$, $y=20$, $z=15$
Thus, the total number of guests $=2x=3y=4z=60$

8. (c) Let the numbers be $4x$ and $7x$. Then, $\frac{4x+4}{7x+4}=\frac{3}{5}$
$\Leftrightarrow 5(4x+4)=3(7x+4) \Leftrightarrow x=8$
$\therefore$ Larger number $=7x=56$

9. (a) We have, $(M+30)=2(R-30)$
or $M+30=2R-60$
or $M-2R=-90$ …(1)
Again $(R+10)=3(M-10)$
or $R+10=3M-30$
or $R-3M=-30-10$
or $R-3M=-40$ …(2)
Solving (1) and (2), we have $M=34$ and $R=62$.

10. (b) Let the numbers be x and y. Then, $x+y=25$ and $x-y=13$.
$\Rightarrow xy=114$

11. (b) Person's daily expenses = ₹ x
Number of days tour last = y days
So, $x\times y=360$ …(1)
$(x-3)(y+4)=360$ … (2)
Solving equations (1) and (2), we get
$y=20$ or -24 (not possible)
$\therefore$ $y=20$ days

12. (b) Let the numbers be x and y. Then, $x^2-y^2=256000$ and $x+y=1000$.
On dividing, we get : $x+y=256$.
Solving $x+y=1000$ and $x-y=256$.
We get : $x=628$ and $y=372$.

13. (b) Let the numbers be x, $x+2$ and $x+4$
Then, $x+(x+2)+(x+4)=x+20 \Leftrightarrow 2x=14$
$\Leftrightarrow x=7$.
$\therefore$ Middle number $=x+2=9$.

14. (b) Let fixed charge = ₹ x
and charge for 1 km is ₹ y

$$\begin{array}{l} x+10y=85 \\ x+15y=120 \\ - \quad - \quad - \\ \hline -5y=-35 \end{array}$$

$y=$ ₹ 7 per km
$x=$ ₹ 15
Charges for 25 km $=15+25\times 7=$ ₹ 190

15. (b) Let the numerator be x.
Then, denominator $=x+4$

$$\therefore \quad \frac{x-4}{x+4+2}=\frac{1}{6}$$

$$\Rightarrow \quad \frac{x-4}{x+6}=\frac{1}{6}$$

$\Rightarrow 6(x-4)=x+6$
$\Rightarrow 6x-24=x+6 \Rightarrow 5x=30$
$\therefore$ $x=6$
Thus, Numerator = 6, Denominator $=6+4=10$.

Hence, the original number $=\frac{6}{10}$.

16. (a) Let the present ages of Vikas and Vishal be $15x$ years and $8x$ years.
After 10 years,
Vikas's age = $15x + 10$ and
Vishal's age = $8x + 10$

$$\therefore \quad \frac{15x+10}{8x+10}=\frac{5}{3}$$

$$\Rightarrow \quad 3(15x + 10) = 5(8x + 10)$$

$$\Rightarrow \quad 45x + 30 = 40x + 50$$

$$\Rightarrow \quad 5x = 20 \quad \Rightarrow x = \frac{20}{5} = 4$$

$\therefore$ Present age of Vikas = $15x = 15 \times 4 = 60$ years
Present age of Vishal = $8x = 8 \times 4 = 32$ years.

17. (c) Let the numbers be $3x$, $3x + 3$ and $3x + 6$
Then, $3x + (3x + 3) + (3x + 6) = 72$
$\Leftrightarrow 9x = 63 \Leftrightarrow x = 7$.
$\therefore$ Largest number = $3x + 6 = 27$

18. (d) $\frac{2}{5}\times\frac{1}{4}\times\frac{3}{7}\times x=15$

$$\therefore \quad \frac{x}{2}=\frac{5\times7\times2\times5}{2} = 25 \times 7 = 175$$

19. (a) $F + S = 4S$
or, $F = 3S \Rightarrow F : S = 3 : 1$
The ages of father and son = 56 years

$$\therefore \quad \text{Son's age } = \frac{1}{4}\times56 = 14 \text{ years}$$

20. (c) Let the two numbers be x and y.
$\therefore \quad xy = 192, x + y = 28 \quad \ldots(1)$
$\therefore \quad (x-y)^2 = (x+y)^2 - 4xy = 784 - 768 = 16$
$\therefore \quad x - y = 4 \quad \ldots(2)$
Combining (1) and (2), $x = 16$, and $y = 12$.

21. (b) Let the middle no.$= x$

$$(x-2)+x+(x+2)=\frac{176}{4}-14$$

$$\text{or } 3x = \frac{120}{4} \text{ or, } x = 10$$

22. (b) Let the denominator be x. Then, numerator = $x + 5$.

$$\text{Now, } \frac{x+5}{x}-\frac{x+5}{x+5}=\frac{5}{4} \Leftrightarrow \frac{x+5}{x}=\frac{5}{4}+1=\frac{9}{4}=2\frac{1}{4}$$

So, the fraction is $2\frac{1}{4}$

23. (c) Let the three numbers be $5x$, $9x$ and $11x$ respectively.
Then, $25x = 300 \Rightarrow x = 12$
So, the second number is $9x = 9 \times 12 = 108$

24. (d) Let the number be x. Then,

$$x-20=\frac{7x}{12} \Rightarrow x-\frac{7x}{12}=20 \Rightarrow \frac{5x}{12}=20$$

$$\Rightarrow x = 48$$

25. (d) Let the unit's digit be y and the ten's digit be x.
Then, the number is $10x + y$.
Interchanging the numbers, the new number is $10y + x$.
Then, $10x + y = 10y + x + 18 \Rightarrow 9x - 9y = 18$
$\Rightarrow x - y = 2$ and given $x + y = 8$
Solving $x = 5$, $y = 3$
Then, the original number is 53.

26. (a) Let the two numbers be x and y. Then,
$2x + 3y = 100 \quad \ldots(1)$
and $3x + 2y = 120 \quad \ldots(2)$
Solving eqs (1) and (2), we get $y = 12$ and $x = 32$
So, the larger of the numbers is 32.

27. (d) Let the two numbers be x and y respectively. Then,
$2x + 3y = 300 \quad \ldots(1)$
and $3x + 2y = 265 \quad \ldots(2)$
Solving eqs (1) and (2), we get $x = 39$ and $y = 74$
So, the larger number is 74.

28. (a) From the options, the required two-digit number is 16.

29. (c) $h + g = 81 \quad \ldots(1)$
and $2h + 4g = 234 \quad \ldots(2)$
Solving eqs (1) and (2), we get $h = 45$ and $g = 36$

30. (c) Suppose the age of son is x years.
Therefore, age of father = $10x$ years
According to question

$$\frac{10x+x}{2}=22$$

$$\Rightarrow \quad 11x = 44$$

$$\therefore \quad x=\frac{44}{11}=4 \text{ years}$$

Age of father = $10 \times 4 = 40$ years

31. (b) Let X be the given number. Then
$X/3 + X/4 + X/5 - X/2 = 34$.
Solving this, we get $X = 120$.

32. (c) Let first book published in year x
According to question
$x + x + 7 + x + 14 + x + 21 + x + 28 + x + 35 + x + 42 = 13524$
$147 + 7x = 13524$
$7x = 13524 - 147 = 13377$

$$\therefore x=\frac{13377}{7}=1911$$

33. (b) Let the ten's digit be x. Then, the unit's digit is $3x$. Then, $x + 3x = 8 \Rightarrow x = 2$. So, ten's digit is 2 and unit's digit is 6. So, number is 26.

34. (c) From the option, 82 is the right choice as
$82 - 28 = 54$

35. (b) Let the present age of father = x year and Son's present age = y years.
5 years ago, father's age = $x - 5$ and
Son's age = $y - 5$
According to the question,
$x - 5 = 5 (y - 5) \quad \ldots.(1)$
and $x = 3y \quad \ldots.(2)$
$\therefore$ From eqs (1) and (2), we have
$y = 10$ and $x = 30$ years.
Hence, father's present age = 30 years.

36. (c) Let the original fraction be $\frac{x}{y}$.

Then, $\frac{\frac{250}{100}\times x}{\frac{450}{100}\times y}=\frac{25}{51}\Rightarrow\frac{250x}{450y}=\frac{25}{51}$

$\Rightarrow \quad \frac{x}{y}=\frac{450\times25}{250\times51}=\frac{15}{17}$

37. (b) By trial and error method.

38. (c) Let the number be x.

$63x - 36x = 3834 \Rightarrow 27x = 38834 \Rightarrow x = 142$

39. (c) Suppose his present age is x years.

According to question

$\frac{x}{4}+\frac{x}{5}+\frac{x}{3}=x-13$

$\Rightarrow \quad \frac{15x+12x+20x}{60}=x-13$

$\Rightarrow \quad 47x = 60x - 780$

$\Rightarrow \quad 60x - 47x = 780$

$\Rightarrow \quad 13x = 780$

$\therefore \quad x=\frac{780}{13}=60$ years

40. (d) Suppose the number of cows = x

Therefore, the number of herdsmen = x

According to question,

$4 \times 2x - 28 = x \times 2 + x \times 4$

$\Rightarrow \quad 8x - 28 = 2x + 4x$

$\Rightarrow \quad 8x - 6x = 27$

$\therefore \quad x=\frac{28}{2}=14$

41. (c) Let the present age of mother and daughter be $7x$ and x.

Then,

$\frac{7x-4}{x-4}=\frac{19}{1}\Rightarrow 7x-4$

$=19x - 76$

$= 12x = 72$

$= x = 6$

$\therefore$ mother's age 4 yrs hence = $7 \times 6 + 4 = 46$ yrs.

42. (b) $\frac{6x}{7}=180\Rightarrow x=210$

43. (c) Age of Farah = $x=(x-8)\times\frac{9}{7}$

$\Rightarrow x=\frac{9(x-8)}{7}$

$\Rightarrow 7x = 9x - 72$

$\Rightarrow 2x = -72$

$\Rightarrow x=\frac{72}{2}=36$ years

Present age of her daughter = $\frac{36}{6}=6$ years

$\therefore$ Age of daughter 3 years ago

$= 6 - 3 = 3$ years

44. (d) Let the number of parrots be p and the number of tigers be t. Then

$p + t = 858$ ...(1)

$2p + 4t = 1846$ ...(2)

After rearranging equation (2), we get

$p + 2t = 923$ ...(3)

Solving (1) & (2) we get

$t = 65$ & $p = 793$

45. (a) Let the ten's digit be x. Then, units digit = $(x + 3)$.

Sum of the digits = $x + (x + 3) = 2x + 3$.

Number = $10x + (x + 3) = 11x + 3$.

$\therefore \quad \frac{11x+3}{2x+3}=\frac{4}{1} \Leftrightarrow 11x + 3 = 4\ (2x + 3)$

$\Leftrightarrow 3x = 9 \quad \Leftrightarrow x = 3$

Hence, required number = $11x + 3 = 36$

46. (d) Let the numbers be x and y.

$\therefore \quad \frac{x}{y}=\frac{4}{7}$

$\therefore \quad 7x = 4y$ ... (1)

$\frac{x+30}{y+30}=\frac{5}{8}$

$\therefore \quad 8x - 5y = -90$ ...(2)

From eqn (2), $32x - 20y = -360$

From eqn (1), $35x = 20y$

$\therefore \quad 32x - 35x = -360$

$\therefore \quad x=\frac{360}{3}=120$

$y = 210$

$\therefore$ Average = $\frac{330}{2}=165$

47. (c) Let the ten's digit be x. Then, number = $10x + 3$ and sum of digits = $(x + 3)$.

So, $(x + 3) = \frac{1}{7}\ (10x + 3) \Leftrightarrow 7x + 21 = 10x + 3$

$\Leftrightarrow 3x = 18 \Leftrightarrow x = 6$.

Hence, the number is 63.

48. (c) Let the number be x. Then, $3\ (2x + 9) = 75$

$\Rightarrow 2x + 9 = 25 \Rightarrow 2x = 16 \Rightarrow x = 8$.

49. (b) Let the ten's digits be x and unit's digit be y.

Then, $(10x + y) - (10y + x) = 36 \Leftrightarrow 9(x - y) = 36$

$\Leftrightarrow x - y = 4$.

50. (b) Let the two parts be $(54 - x)$ and x.

Then, $10\ (54 - x) + 22x = 780 \Leftrightarrow 12x = 240$

$\Leftrightarrow x = 20$.

$\therefore \quad$ Bigger part = $(54 - x) = 34$.

51. (a) Greatest of the five numbers will be least if remaining four numbers are less then m and as large as possible

$\Rightarrow$ The remaining four numbers are same.

$4\ (m - 1) + m = 146$

$\Rightarrow \quad m = 30$

52. (d) Let number of notes of each denomination be x.
Then, $x + 5x + 10x = 480 \Leftrightarrow 16x = 480 \Leftrightarrow x = 30$.
Hence, total number of notes $= 3x = 90$.

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

$$\frac{\frac{300x}{100}}{\frac{300y}{100}} = \frac{14}{5} \Rightarrow \frac{x}{y} = \frac{14}{5}$$

54. (a) Let one pen cost be ₹ x and one pencil cost be ₹ y
$36x + 42y = 460$ ..... (1)
$18x + 21y = ?$
Divided eq. (1) by 2
$18x + 21y = 230$

55. (b) Let adult fare be x and child fare be y
$x = 6y$
$x = 114$
$y = 114/6 = 19$
Now $4x + 5y$
$= 4 \times 114 + 5 \times 19 = 456 + 95 =$ ₹ 551 /-

56. (c) Let the nubmer be $10x + y$ where $x > y$.
According to the question,
$x + y = 15$
and $x - y = 3$
Solving both the equations,
$x = 9, y = 6$
$\therefore\ x \times y = 9 \times 6 = 54$

57. (a) **58. (b)** **59. (d)**

60. (b) $y = 4x$,
When, $x = 1, y = 4$

61. (b) Number of brown socks $= x$
Price of brown socks = ₹ y per pair
Price of black socks = ₹ $2y$ per pair

$$\therefore 4y + x \times 2y = \frac{150}{100}(4 \times 2y + xy)$$

$$\Rightarrow 4 + 2x = \frac{3}{2}(8 + x)$$

$\Rightarrow 8 + 4x = 24 + 3x$
$\Rightarrow x = 24 - 8 = 16$
$\therefore$ Requried ratio $= 4 : 16 = 1 : 4$

62. (c) Let total bill would be ₹ x

Each one decided to pay $= ₹\left(\frac{x}{11}\right)$

10 friends could pay $10 \times 60 =$ ₹ 600
According to question,

$$600 + \frac{x}{11} + 50 = x$$

$$650 = x - \frac{x}{11} = \frac{10x}{11}$$

$$x = \frac{650 \times 11}{10} = 715$$

Amount paid by 11^{th} friend $= \frac{715}{11} + 50 =$ ₹ 115

63. (d) According to question

$$\frac{36+n}{50+n} = \frac{3}{4}$$

$36 \times 4 + 4n = 50 \times 3 + 3n$
$4n - 3n = 150 - 144$
$n = 6$

64. (a) Given $4x - y = 2$ or $4x - y - 2 = 0$
and $2y - 8x + 4 = 0$ or $-8x + 2y + 4 = 0$
Therefore $a_1 = 4; b_1 = -1; c_1 = -2$
$a_2 = -8; b_2 = 2; c_2 = 4$

Now, $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} \Rightarrow \frac{4}{-8} = \frac{-1}{2} = \frac{-2}{4}$

This is true only when system of equations has infinitely many solutions.

65. (c) $\frac{1}{x} + \frac{1}{50-x} = \frac{1}{12}$
$x^2 - 50x + 600 = 0$
$x^2 - 30x - 20x + 600 = 0$
$x(x - 30) - 20(x - 30) = 0$
x = 30, 20

66. (a) Since two digit number $= 10x + y$
According to question $\rightarrow y = 2x - 1$ ..(i)
When digits are interchanged then new number
$= 10y + x$
then original number – [new number – original number] = 20
$\Rightarrow 10x + y - [10y + x - (10x + y)] = 20$
$\Rightarrow 10x + y - 10y - x + 10x + y = 20$
$19x - 8y = 20$
$19x - 8(2x - 1) = 20$ (Using eq. (i))
$19x - 16x + 8 = 20$
$3x = 12 \Rightarrow x = 4$
From (i) $y = 2 \times 4 - 1 = y = 7$
$\therefore$ original number $= 10x + y = 10 \times 4 + 7 = 47$

67. (a) Cost of 5 pens + 8 pencils = ₹ 31
On multiplying by 3
15 pens + 24 pencils
$= 3 \times 31 =$ ₹ 93

68. (b) Amount paid
$=$ ₹ $(40 \times 18 + 55 \times 8)$
$=$ ₹ $(720 + 440)$
$=$ ₹ 1160