1d

Total age of 6 persons = (54×6) years
Average age of 7 persons = $(54 + 1)$ years
Total age of 7 persons = (55×7) years = 385 years
$\therefore$ The age of the new member = $(385 - 324)$ years
$= 61$ years

2a

The mean of
$$\left(\frac{2+3+11+15+8+10+9+7+16+x}{10}\right)=10$$
$$\Rightarrow \frac{81+x}{10}=10$$
$$81+x=100$$
$$\therefore x=19$$

3a

Total weight of 45 students = (45×98) kg
$= 4{,}410$ kg
Total weight of 30 students = (30×89) kg
$= 2{,}670$ kg
Weight of 15 students = $(4{,}410 - 2{,}670)$ kg
$= 1{,}740$ kg
$$\therefore \text{Average weight of 15 students} = \left(\frac{1{,}740}{15}\right) \text{kg}$$
$= 116$ kg

4a

Total marks of Section A = $55 \times 50 = 2{,}750$
Total marks of Section B = $60 \times 55 = 3{,}300$
Total marks of Section C = $45 \times 60 = 2{,}700$
$$\therefore \text{Required average} = \frac{2{,}750+3{,}300+2{,}700}{160}$$
$$= \frac{8{,}750}{160} = 54.68$$

5d

Total weight of 8 persons = 540 kg
Total weight of 9 persons = 621 kg
Increase in weight = 81 kg
$\therefore$ Increased average weight $= \frac{81}{9} = 9$ kg

6b

The sum of the first natural numbers $= \frac{n(n+1)}{2}$

So, the sum of the first 20 natural numbers
$= \frac{20 \times 21}{2} = 210$
$\therefore$ Required average $= \frac{210}{20} = 10.5$

7c

The average of 60 numbers is 40
$\therefore$ Sum $= 60 \times 40 = 2{,}400$
Sum of additional numbers $= 2{,}400 + (69 + 70)$
$= 2{,}539$
$\therefore$ Required average $= \frac{2{,}539}{62} = 40.95$

8b

Total height of 12 boys of Section A
$= (153 \times 12)$ cm $= 1{,}836$ cm
Total height of 20 boys $= (163 \times 20)$ cm
$= 3{,}260$ cm
$\therefore$ Required average $= \frac{(3{,}260 - 1{,}836)}{8}$ cms
$= 178$ cm

9e

Sum of numbers $= 20 \times 8 = 160$
Difference = 12
New sum = 172
$\therefore$ Required average $= \frac{172}{8} = 21.50$

10b

Let the third number be x
$\therefore$ Second number $= 3x$
First number $= 6x$
$\therefore \quad \frac{6x+3x+x}{3} = 50$
$10x = 150$
$x = 15$
$\therefore$ Required difference
$= 6x - x = 5x = 5 \times 15 = 75$

11b

Total weight increased $= (8 \times 2.5)$ kg $= 20$ kg
Weight of the new person $= (65 + 20)$ kg $= 85$ kg

12e

$$\text{Age of new person} = \left(60 - 45 \times \frac{1}{9}\right) \text{year}$$
$$= 55 \text{ years}$$

13a $\frac{2n+5}{2}$

14d

Average weight of 42 students = 57 kg
Total weight of 42 students $= 42 \times 57 = 2{,}394$ kg
New average = 57.600 kg
Total weight of 42 students and teacher = 43 $\times$ 57.600 = 2,476.8 kg
$\therefore$ Weight of the teacher $= 2{,}476.8 - 2{,}394 = 82.8$ kg

15c

Let the manager's salary be Rs x
Total salary of 28 workers = Rs $(2{,}500 \times 28)$
= Rs 70,000
New total salary = Rs $(3{,}200 \times 29)$ = Rs 92,800
$\therefore$ Manager's salary = Rs $(92{,}800 - 70{,}000)$
= Rs 22,800

16c

$$\text{Required average} = \frac{9{,}00{,}000 + 24{,}650}{6{,}170}$$
$$= \text{Rs } 149.86$$

17c

Let the average salary of the remaining members be Rs x.
Total salary of 7 members = Rs $(7{,}000 \times 7)$ = Rs 49,000
Total salary of 2 male members = Rs $(5{,}500 \times 2)$ = Rs 11,000

$$\therefore x = \text{Rs}\left(\frac{49{,}000 - 11{,}000}{5}\right)$$

$$= \frac{38{,}000}{5} = \text{Rs } 7{,}600$$

18b

Let the required mean score be x.
Then,

$$30 \times 90 + 20 \times 41 + 50 \times x = 62 \times 100$$
$$2{,}700 + 820 + 50x = 6{,}200$$
$$3{,}520 + 50x = 62{,}100$$
$$50x = 2{,}680$$
$$x = 53.60$$

19c

$$\text{Required average} = \frac{404 - 34 \times 2}{14} = \frac{404 - 68}{14}$$
$$= 24 \text{ years}$$

20a

Total age = (24×17) years = 408 years
New total age = (23×16) years = 368 years
$\therefore$ Age of teacher = $(408 - 368)$ years = 40 years

21d

Average score after the 19th inning = $X - 2$
$= 116 - 2 = 114$

22d

$$\text{Average score of 11th inning} = \frac{x + 42}{11}$$

$$\overline{X} = \frac{500 + 42}{11} = \frac{542}{11} = 49.27 = 49 \text{ runs.}$$

23d

So, the eight consecutive numbers are;
2.5, 3.5, 4.5, 5.5, 6.5, 7.5, 8.5, 9.5
Sum of eight consecutive numbers = 48

24b

25d

Let the four consecutive numbers = x, $x+2$, $x+4$, $x+6$
Mean of these numbers = 15

$$\frac{x+x+2+x+4+x+6}{4}=15$$

$$4x+12=60$$
$$4x=48$$
$$x=12$$

The second highest number = $(x+4)=12+4=16$

26c

$\frac{3}{4}=0.75, \frac{5}{4}=1.25,$

$\frac{4}{5}=0.8, \frac{7}{13}=0.53, \frac{21}{20}=1.05, \frac{6}{7}=0.85$

$\frac{17}{20}=0.85, \frac{21}{20}=1.05$

$\therefore \frac{7}{13}$ is the answer.

27b

$\frac{8}{9}=0.88, \frac{2}{3}=0.66, \frac{3}{5}=0.6, \frac{7}{9}=0.77,$

$\frac{9}{11}=0.81$

So, $0.6<0.66<0.77<0.81<0.88$

$\therefore \frac{3}{5}<\frac{2}{3}<\frac{7}{9}<\frac{9}{1}<\frac{8}{19}$

28b

$$\left(0.\bar{3}+0.\bar{4}+0.\bar{7}+0.\bar{8}+0.0\bar{4}\right)$$
$$=\frac{3}{9}+\frac{4}{9}+\frac{7}{9}+\frac{8}{9}+\frac{4}{9}$$
$$\frac{33+44+77+88+4}{99}=\frac{246}{99}=\frac{82}{33}$$

29a

$$\frac{(0.47)^3-(0.2)^3}{(0.47)^2+0.188+(0.2)^2}$$

$$=\frac{(0.47-0.2)\left[(0.47)^2+(0.2)^2+(0.47)(0.2)\right]}{(0.47+0.2)^2}$$

[By using: $a^3-b^3=(a-b)(a^2+b^2+ab)$
and $(a+b)^2=a^2+b^2+2ab$]

$$=\frac{0.27(0.2209+0.04+0.094)}{(0.67)^2}$$

$$=0.27\left(\frac{0.3549}{0.4489}\right)$$

$$=0.27\times0.79=0.213$$

30a

Taking LCM of the given fractions,

$$\frac{1}{8},\frac{3}{16},\frac{5}{32},\frac{7}{64},\frac{9}{128}$$

$$=\frac{16,24,20,14,9}{128}$$

So, $\frac{24}{128},\frac{20}{128},\frac{16}{128},\frac{14}{128},\frac{9}{128}$

$$\therefore\ \frac{3}{16}\rangle\frac{5}{32}\rangle\ \frac{1}{8}\rangle\frac{7}{64}\rangle\frac{9}{128}$$

31c

$$\frac{1}{3\times4}+\frac{1}{4\times5}+\frac{1}{5\times6}+.....+\frac{1}{13\times14}$$

$$=\left(\frac{1}{3}-\frac{1}{4}\right)+\left(\frac{1}{4}-\frac{1}{5}\right)+\left(\frac{1}{5}+\frac{1}{6}\right)+.....+\left(\frac{1}{13}-\frac{1}{14}\right)$$

$$=\left(\frac{1}{3}-\frac{1}{14}\right)=\frac{11}{42}=0.26$$

32d

$$0.454545=0.\overline{45}=\frac{45}{99}=\frac{5}{11}$$

33c

34a

Let the number be x.

Then, $\frac{19}{9}x-\frac{9x}{19}=560$

$361x-81x=560\times171$

$280x=560\times171$

$x=\frac{560\times171}{280}=342$

35b

$1.\bar{4}\times0.\overline{33}\div0.\bar{1}$

$=1.\bar{4}\times0.\overline{33}\times\frac{1}{0.\bar{1}}=\left(1+\frac{4}{9}\right)\times\frac{33}{99}\times\frac{1}{\frac{1}{9}}$

$=\frac{13}{9}\times\frac{3}{9}\times9=\frac{13}{3}=4.\overline{33}$

36b

$\frac{5}{2}*\frac{2}{3}*\left(\frac{8}{5}*\frac{1}{3}\right)=\frac{51}{10}$

By substituting each option with *, we get

$\text{LHS}=\frac{5}{2}+\frac{2}{3}+\left(\frac{8}{5}+\frac{1}{3}\right)$

$\frac{5}{2}+\frac{2}{3}+\left(\frac{24+5}{15}\right)$

$\frac{5}{2}+\frac{2}{3}+\frac{29}{15}$

$\frac{75+20+58}{30}=\frac{153}{30}=\frac{51}{10}$

37c

Let the number be x.

Then, $\frac{x}{4}-\frac{x}{5}=160$

$\frac{5x-4x}{20}=160$

$x=160\times20=3{,}200$.

38b

Let the total numbers of passengers be x.

Then, the number of passenger at the second station

$$= x - \frac{x}{4} + 48$$

$$= \frac{4x - x}{4} + 48 = \frac{3x}{4} + 48$$

Now, the number of passengers at the third station

$$\Rightarrow \frac{2}{3}\left[\frac{3x}{4} + 48\right] + 28 = 332$$

$$= \frac{x}{2} + 32 + 28 = 332$$

$$\frac{x}{2} = 272$$

$$x = 544$$

39c

$$\frac{8.96 \times 8.96 \times 8.96 - 4.89 \times 4.89 \times 4.89}{8.96 \times 8.96 + 8.96 \times 4.89 + 4.89 \times 4.89}$$

$$= \frac{(8.96)^3 - (4.89)^3}{(8.96)^2 + 8.96 \times 4.89 + (4.89)^2}$$

$\left[\text{By using: } a^3 - b^3 = (a-b)\left(a^2 + a\,b + b^2\right)\right]$

$$= \frac{(8.96 - 4.89)\left[(8.96)^2 + (8.96)(4.89) + (4.89)^2\right]}{(8.96)^2 + 8.89 + (4.89)^2}$$

$$= 8.96 - 4.89 = 4.07$$

40a

$$(0.078)^2 + (0.871)^2 + 2 \times 0.078 \times 0.871 -$$

$$= \frac{(0.078)^2 - (0.871)^2 + 2 \times 0.078 \times 0.871}{0.078 \times 0.871}$$

$$= \frac{4 \times 0.078 \times 0.871}{0.078 \times 0.871} = 4$$

41c

$$x = \frac{(24 \times 16) - (736 \div 23)}{(42 \times 17) \div 102}$$

$$x = \frac{384 - 32}{714 \div 102}$$

$$x = \frac{352}{7}$$

$$x = 50.28$$

42b

$$x = 0.82$$

43b

$$x = \frac{(18.99)^2 - (16.66)^2}{35.65 \times 2.33}$$

$$x = \frac{(18.99 + 16.66)(18.99 - 16.66)}{35.65 \times 2.33}$$

$$x = \frac{35.65 \times 2.33}{35.65 \times 2.33}$$

$$x = 1$$

44b

$$19 + 10 \div 2 \times 6 - 7 + 5 \times 2 \div 1$$
$$= 19 + 5 \times 6 - 7 + 5 \times 2$$
$$= 19 + 30 - 7 + 10$$
$$= 59 - 7 = 52$$

45a

$$57 + 45 \div 5 - 10 \times 15$$
$$= 57 + 9 - 10 \times 15$$
$$= 57 + 9 - 150$$
$$= 66 - 150 = -84$$

46d

$$(2)^2 + (3)^2 \div 9 \times 12 + (4)^2$$
$$= 4 + 9 \div 9 \times 12 + 16$$
$$= 4 + 1 \times 12 + 16$$
$$= 4 + 12 + 16 = 32$$

47e

$$25 \div 5 + (5 \times 3) - 18 + 2 \times 4$$
$$= 25 \div 5 + 15 - 18 + 2 \times 4$$
$$= 5 + 15 - 18 + 8$$
$$= 28 - 18 = 10$$

48a

$$8^3 - 8^2 + 28 \div 7$$
$$= 512 - 64 + 28 \div 7$$
$$= 512 - 64 + 4$$
$$= 516 - 64 = 452$$

49d

$$10 \times 11 - 78 \div (13 \times 6) + 9 \times 11 + 3$$
$$= 10 \times 11 - 78 \div 78 + 9 \times 11 + 3$$
$$= 10 \times 11 - 1 + 9 \times 11 + 3$$
$$= 110 - 1 + 99 + 3$$
$$= 212 - 1 = 211$$

50b

$$(125 \div 25) + 30 - 40 \times 10$$
$$= 5 + 30 - 40 \times 10$$
$$= 5 + 30 - 400$$
$$= 35 - 400 = -365$$