

WERS

6. (e) 7. (b) 8. (b) 9. (a) 10. (b)
 16. (c) 17. (b) 18. (b) 19. (c) 20. (b)
 26. (d) 27. (b) 28. (b) 29. (b) 30. (c)
 36. (b) 37. (d) 38. (c) 39. (d) 40. (c)
 46. (d) 47. (d) 48. (b) 49. (d) 50. (d)
 56. (a) 57. (a) 58. (a) 59. (b) 60. (b)
 66. (c) 67. (e) 68. (c) 69. (b) 70. (c)
 76. (c) 77. (d) 78. (c) 79. (c) 80. (c)
 86. (a) 87. (a) 88. (d) 89. (b) 90. (e)
 96. (d) 97. (e) 98. (c) 99. (c) 100. (b)
 106. (d) 107. (c) 108. (d) 109. (b) 110. (c)
 116. (a) 117. (b) 118. (d) 119. (c) 120. (c)
 126. (a) 127. (c) 128. (d) 129. (c) 130. (c)
 136. (c) 137. (c) 138. (b) 139. (d) 140. (d)
 146. (c) 147. (d) 148. (b) 149. (a) 150. (b)
 156. (a) 157. (a) 158. (b) 159. (a) 160. (d)
 166. (a) 167. (c) 168. (c) 169. (c) 170. (c)
 176. (a) 177. (c)

TIONS

7. We have:

Mean working hours	4	6	8	10	12	14
No. of employees	7	10	18	57	14	8

Sum of working hours of all the employees

$$= (4 \times 7 + 6 \times 10 + 8 \times 18 + 10 \times 57 + 12 \times 14 + 14 \times 8)$$

$$= (28 + 60 + 144 + 570 + 168 + 112) = 1082.$$

Total number of employees

$$= (7 + 10 + 18 + 57 + 14 + 8) = 114.$$

\therefore Average number of working hours

$$= \left(\frac{1082}{114} \right) = 9.49 \approx 9.5.$$

8. We have: $a = \frac{0+5+4+3}{4} = 3$; $b = \frac{-1+0+1+5+4+3}{6} = 2$;

$$c = \frac{5+4+3}{3} = 4.$$

$$\therefore a : b : c = 3 : 2 : 4.$$

9. Total money paid for 115 books = ₹ (1050 + 1020) = ₹ 2070.

$$\therefore \text{Average price paid per book} = ₹ \left(\frac{2070}{115} \right) = ₹ 18.$$

10. Required average = $\frac{\left(\frac{1}{x} + \frac{1}{y} \right)}{2} = \frac{x+y}{2xy}.$

11. Sum of numbers = $2XY.$

$$\therefore \text{Other number} = 2XY - X.$$

AVERAGE

12. Weight of first box = 200 kg.

Weight of third box = 125% of 200 kg = 250 kg.

Weight of second box = 120% of 250 kg = 300 kg.

Weight of fourth box = 350 kg.

Let the weight of fifth box be x kg.

Then, 70% of $x = 350$ kg $\Rightarrow x = \left(\frac{350 \times 100}{70}\right) = 500$ kg.

Average weight of four heaviest boxes

$$= \left(\frac{500 + 350 + 300 + 250}{4}\right) \text{ kg} = 350 \text{ kg.}$$

Average weight of four lightest boxes

$$= \left(\frac{200 + 250 + 300 + 350}{4}\right) \text{ kg} = 275 \text{ kg.}$$

\therefore Required difference = $(350 - 275)$ kg = 75 kg.

13. Let Arun's weight be X kg.

According to Arun, $65 < X < 72$.

According to Arun's brother, $60 < X < 70$.

According to Arun's mother, $X \geq 68$ i.e. $X \leq 68$.

The values satisfying all the above conditions are 66, 67 and 68.

$$\therefore \text{Required average} = \left(\frac{66 + 67 + 68}{3}\right) \text{ kg} = \left(\frac{201}{3}\right) \text{ kg} = 67 \text{ kg.}$$

14. Average of 20 numbers = 0.

\therefore Sum of 20 numbers = $(0 \times 20) = 0$.

It is quite possible that 19 of these numbers may be positive and if their sum is a , then 20th number is $(-a)$.

$$\begin{aligned} 15. \text{ Required mean} &= \left(\frac{2 + 4 + 6 + \dots + 20}{10}\right) = \frac{2(1 + 2 + \dots + 10)}{10} \\ &= \left(\frac{1}{5} \times \frac{10 \times 11}{2}\right) = 11. \end{aligned}$$

$$\left[\because 1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2} \right]$$

$$\begin{aligned} 16. \text{ Required mean} &= \left(\frac{1 + 2 + \dots + 11}{11}\right) = \left(\frac{1}{11} \times \frac{11 \times 12}{2}\right) = 6. \\ &\left[\because 1 + 2 + \dots + n = \frac{n(n+1)}{2} \right] \end{aligned}$$

$$17. \text{ Average} = \left(\frac{10 + 15 + 20 + 25 + 30}{5}\right) = \frac{100}{5} = 20.$$

$$18. \text{ Average} = \frac{3(1 + 2 + 3 + 4 + 5)}{5} = \frac{45}{5} = 9.$$

$$\begin{aligned} 19. \text{ Average} &= \left(\frac{2 + 3 + 5 + 7 + 11 + 13 + 17 + 19 + 23}{9}\right) \\ &= \frac{100}{9} = 11\frac{1}{9}. \end{aligned}$$

20. Clearly, we have

$$\left(\frac{3 + 11 + 7 + 9 + 15 + 13 + 8 + 19 + 17 + 21 + 14 + x}{12}\right) = 12$$

$$\text{or } 137 + x = 144 \quad \text{or } x = 144 - 137 = 7.$$

21. We have : $\left(\frac{2+7+6+x}{4}\right)=5$ or $15+x=20$ or $x=5$.

Also, $\left(\frac{18+1+6+x+y}{5}\right)=10$ or $25+5+y=50$ or $y=20$.

22. $P+C+M=C+120 \Rightarrow P+M=120$.

\therefore Required average = $\frac{P+M}{2} = \frac{120}{2} = 60$.

23. Required average = $\left(\frac{1+2+3+\dots+100}{100}\right)$
 $= \frac{1}{100} \times \frac{100 \times 101}{2} = 50.5$.

24. Sum of odd numbers upto 100 = $1+3+5+\dots+99$
 $= \frac{50}{2} [2+(50-1) \times 2] = 2500$.

$\left[\because \text{Sum of } n \text{ terms of an A.P. with first term } a \text{ and common diff. } d = \frac{n}{2} [2a + (n-1)d] \right]$

\therefore Required average = $\frac{2500}{50} = 50$.

25. Sum of ages of father and mother = (35×2) years
 $= 70$ years.

Sum of ages of father, mother and son = (27×3) years
 $= 81$ years.

\therefore Son's age = $(81-70)$ years = 11 years.

26. $X_1 + X_2 + X_3 = (14 \times 3) = 42$.

$2(X_2 + X_3) = 30 \Rightarrow X_2 + X_3 = 15$.

$\therefore X_1 = (42-15) = 27$.

27. $x_1 + x_2 + x_3 + x_4 = 16 \times 4 = 64$.

$\frac{1}{2}(x_2 + x_3 + x_4) = 23 \Rightarrow x_2 + x_3 + x_4 = 46$.

$\therefore x_1 = 64 - 46 = 18$.

28. We have : $\left[\frac{x+(x+2)+(x+4)+(x+6)+(x+8)}{5}\right] = 11$ or

$5x+20=55$ or $x=7$.

So, the numbers are 7, 9, 11, 13, 15.

\therefore Required mean = $\left(\frac{11+13+15}{3}\right) = \frac{39}{3} = 13$.

29. We have : $\left(\frac{a+b+c}{3}\right) = M$ or $(a+b+c) = 3M$.

Now, $(a+b+c)^2 = (3M)^2 = 9M^2$

$\Leftrightarrow a^2 + b^2 + c^2 + 2(ab+bc+ca) = 9M^2$

$\Leftrightarrow a^2 + b^2 + c^2 = 9M^2$ [$\because (ab+bc+ca) = 0$]

\therefore Required mean = $\left(\frac{a^2+b^2+c^2}{3}\right) = \frac{9M^2}{3} = 3M^2$.

30. Average = $\left(\frac{11+22+33+44+55+66+77+88+99}{9}\right)$
 $= \left[\frac{(11+99)+(22+88)+(33+77)+(44+66)+55}{9}\right]$
 $= \left(\frac{4 \times 110 + 55}{9}\right) = \frac{495}{9} = 55$.