gradeup

gradeup

Sahi Prep Hai Toh Life Set Hai

AVERAGE-2

gradeup

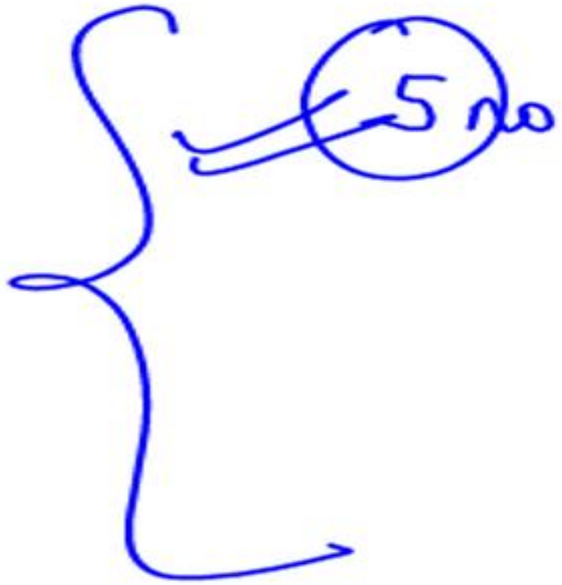
Agenda

* Very Imp Concept
  7-8 Question → (45 Min)
* Batting Avg & Bowling Average → (20 Min)
* +, −, X, ÷ → 15 Min
* Age (Average) → 15 Min

12:40 PM

gradeup

MOST IMPORTANT CONCEPT IN AVERAGE



Average → 8) Total 40

Average → 9 +1 Total 45

Average → 10 (+2) Total 50

1000 Rs/emp

Salary of F → 28000 Rs/month

gradeup

Eg. Average age of 12 students in a class is 24 years, if the age of the teacher is included then their average becomes 27 years. Find the age of the teacher.

12 students → 24 years

Teacher → ??

13 → 27 years

I st

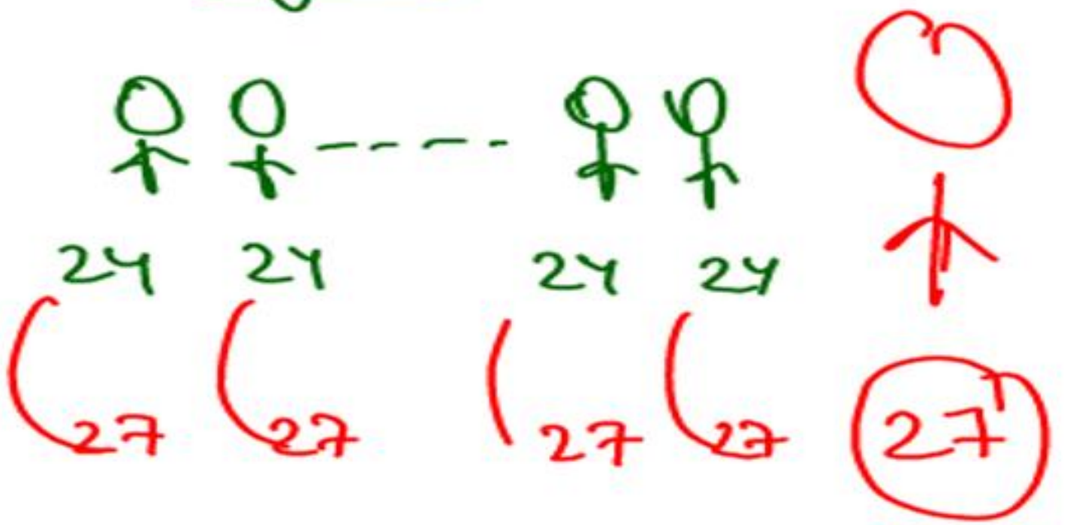
$12 \times 24 = 288$

$13 \times 27 = 351$

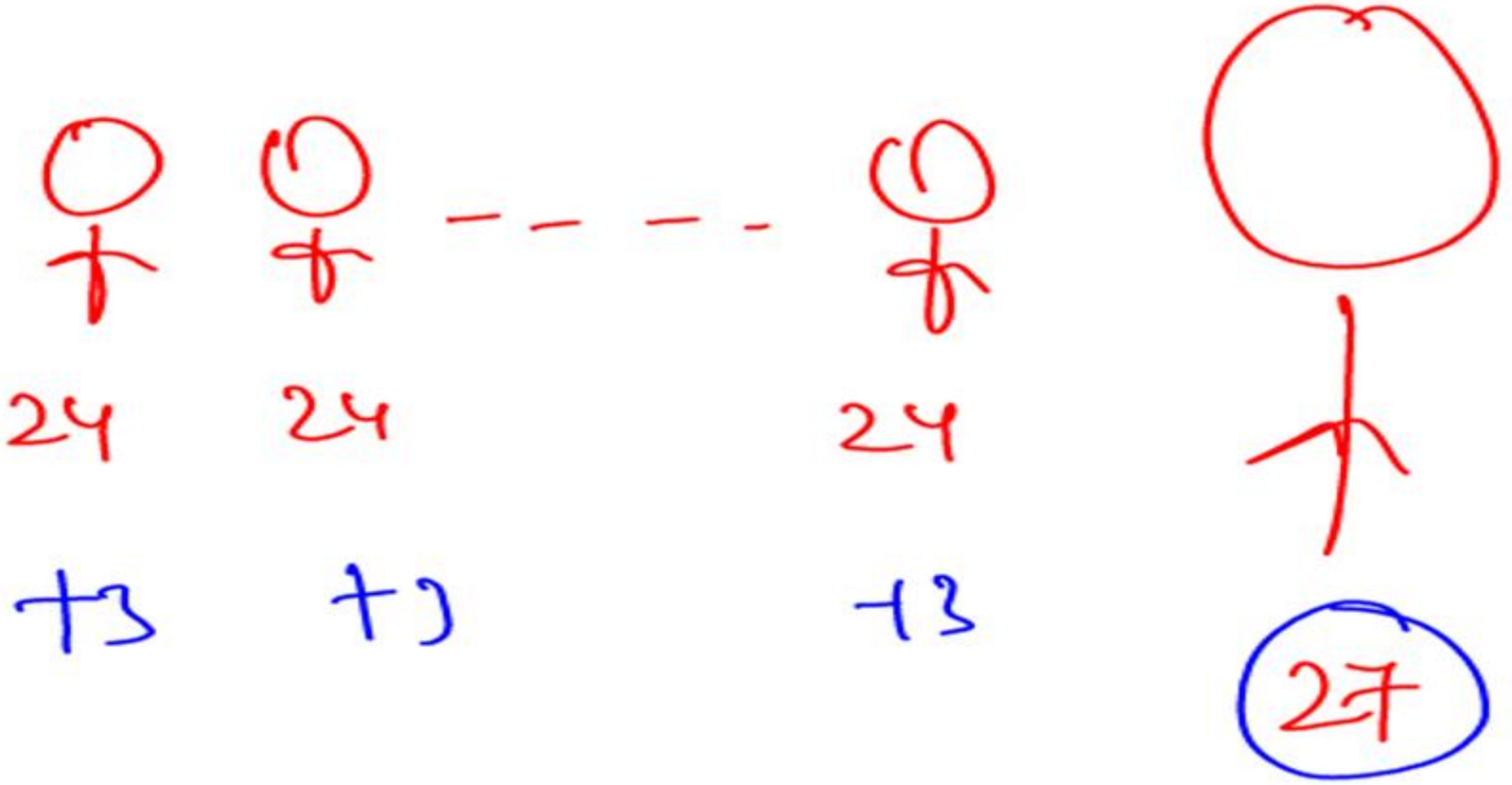
Age of Teacher = 351 − 288

= 63 years

II nd Logical



27 + 12 × 3 = 63 years



27 + 12·3 = 63 years

gradeup

Ans. 63 Years

gradeup

19 ⟶ 12.8

Teacher

⟶ 13.7

Eg. Average age of 19 students in a class is 12.8 years, if the age of the teacher is included then their average becomes 13.7 years. Find the age of the teacher.

$13.7 + 19 \times 0.9$

$13.7 + 17.1$

⟶ 30.8

gradeup

Ans. 30.8 Years

gradeup

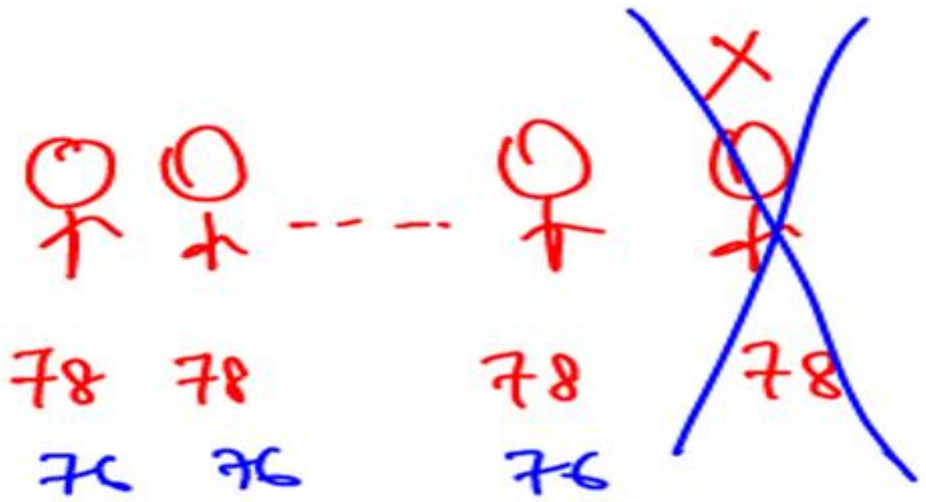
Eg. In a class of 28 students the average marks of all the students are 78. If a student of the class, left the class, then the average of the remaining students becomes 76. Find the marks of students who left the class.

28 students → 78

Mux left → ?

27st → 76

I st



78 + 27·2 = 78 + 54

= 132

II nd

28 × 78 = 2184

27 × 76 = 2052

Mux = 132

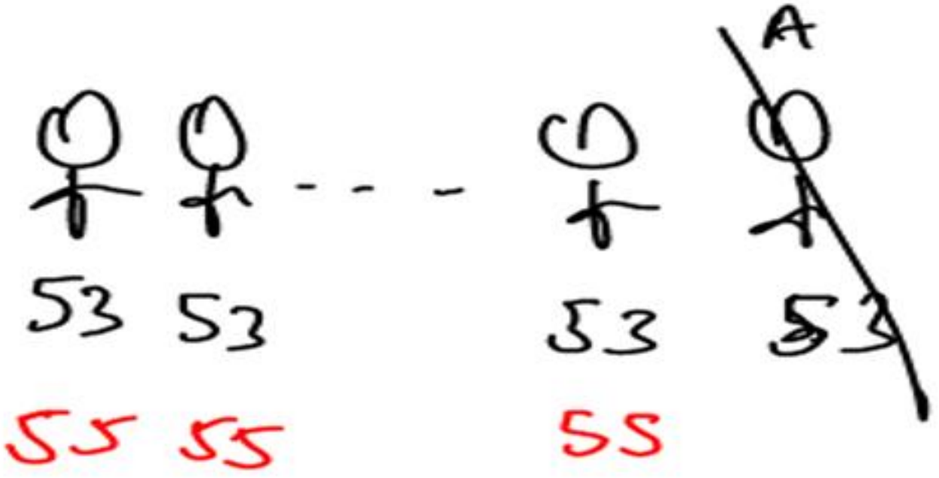
gradeup

Eg. Average marks of 38 students in a class is 53. If Mr. A left the class, then the average marks of the class becomes 55. Find marks of A.

38 students → 53

M.A → 55

I^st



53 − 2 × 37

= −21

II^nd

38 × 53 → 2014

37 × 55 → 2035

M.A → −21

gradeup

Q. The average temperature of the first 4 days of a week was 37°C and that of the last 4 days of the week was 41°C. If the average temperature of the whole week was 39° C, the temperature of the fourth day was

(a) 38°C
(b) 38.5°C
(c) 39°C
(d) 40°C

Week → 39

First 4 → 37 −8

Last 4 → 41 +8

0

4th → ??

39°C

gradeup

Ans. (c)

gradeup

11 → Avg x

12th → 120

New Avg → x+5

Q. Sachin Tendulkar has a certain average for 11 innings. In the 12th innings he scores 120 runs and thereby increases his average by 5 runs. His new average is :

(a) 60 **(b) 62**

(c) 65 **(d) 66**

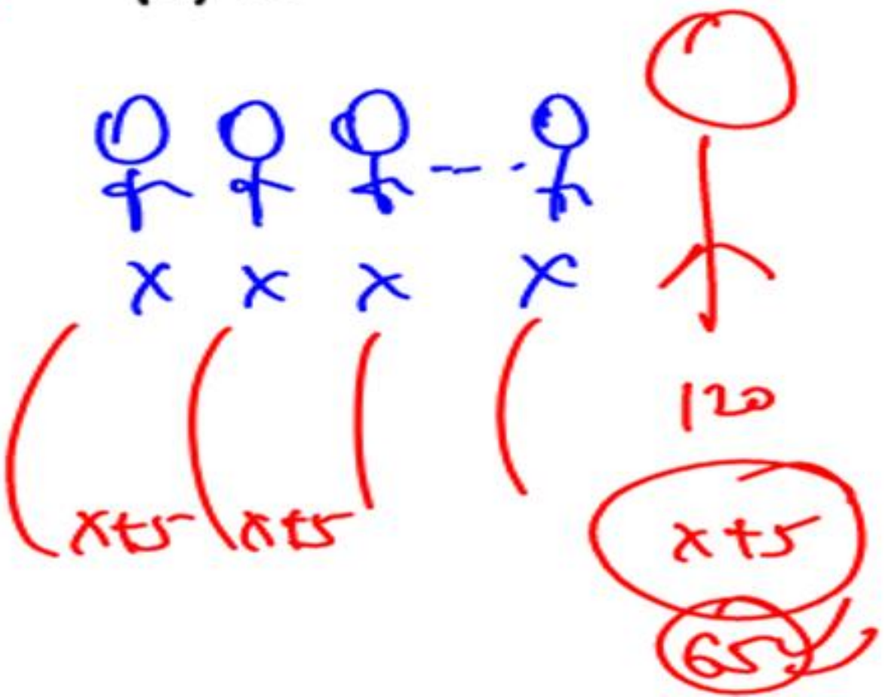
I^st

$$\frac{11x+120}{12} = x+5$$

$$11x+120 = 12x+60$$

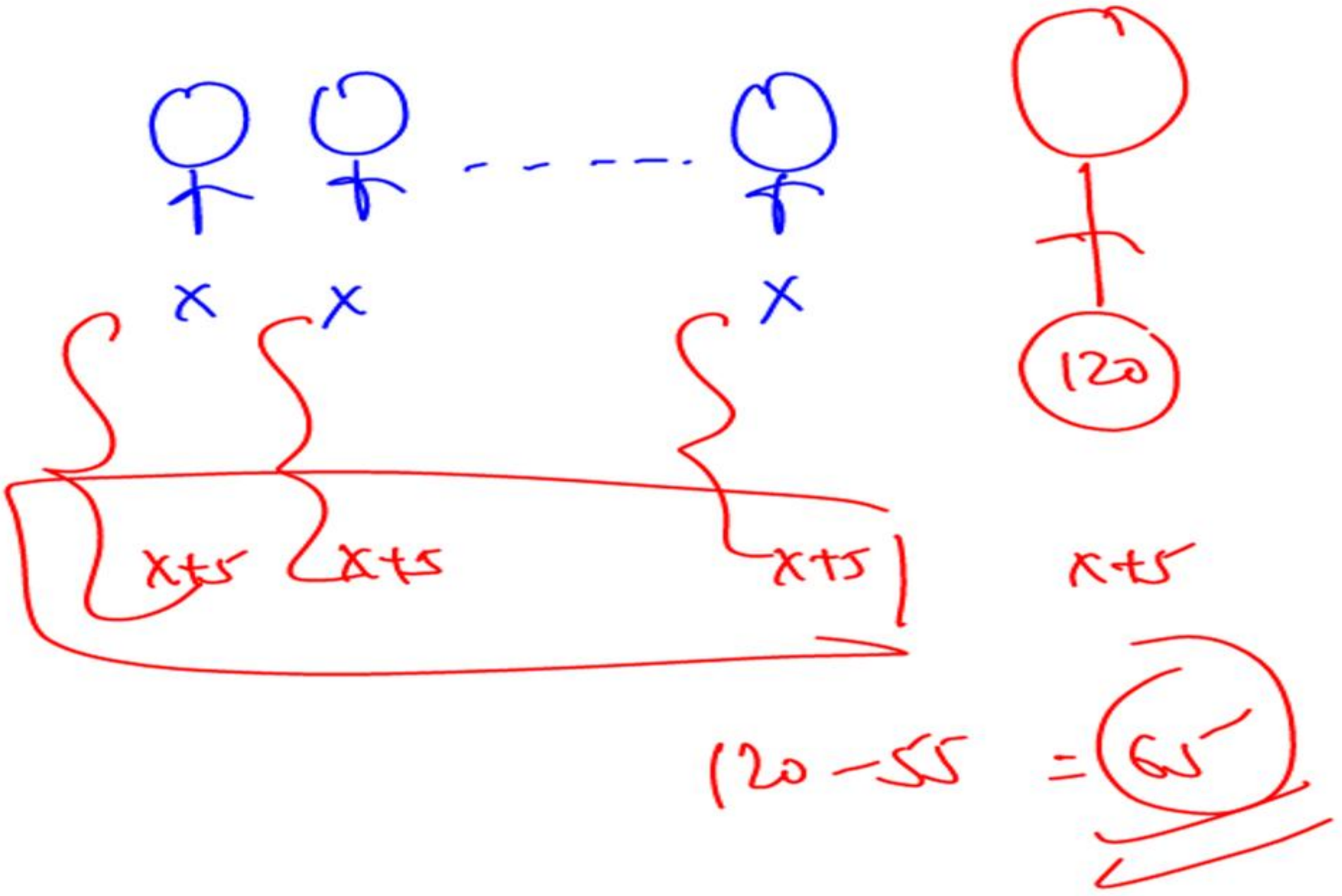
$$x = 60$$

II^nd

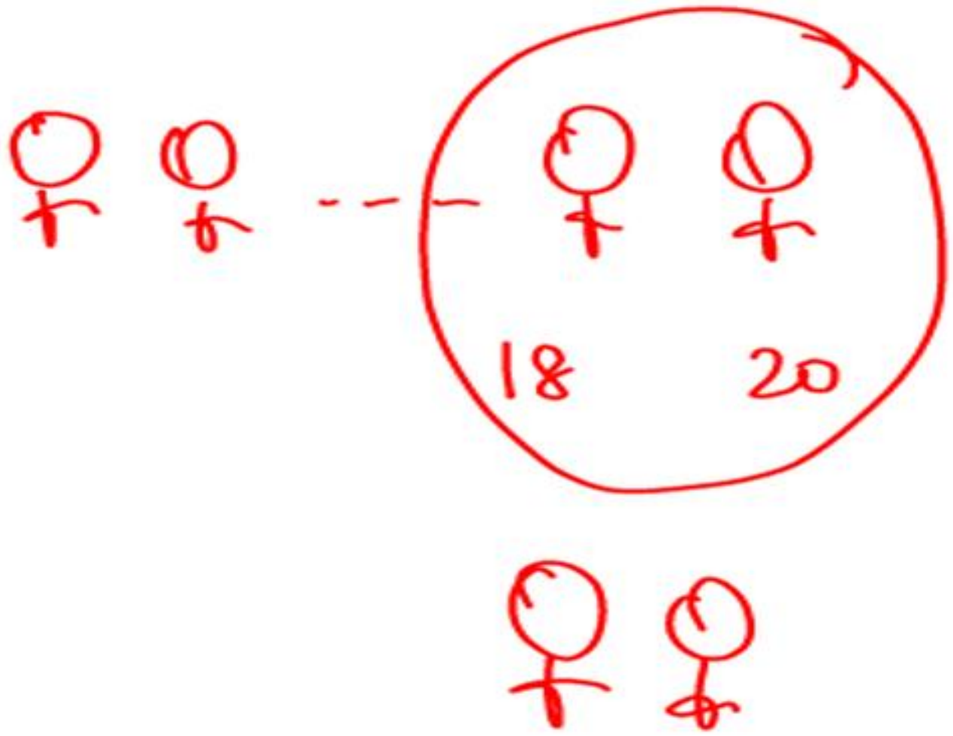


gradeup

Ans. (c)



gradeup



Q. The average age of 11 players of a cricket team is increased by 2 months when two of them aged 18 years and 20 years are replaced by two new players. The average age of the new players is

(a) 19 years 1 month
(b) 19 years 6 months
(c) 19 years 11 months
(d) 19 years 5 months

$$\frac{38 \text{ years} + 22 \text{ months}}{2}$$

$$= 19 \text{ years } 11 \text{ months}$$

gradeup

Ans. (c)

Detailed Ages are

c, d, ... x .....

$$\frac{18+20+x}{11} = A \quad \text{--- (1)}$$

$$\frac{c+d+x}{11} = A + 2 \text{ months} \quad \text{--- (2)}$$

(2) − (1)

$$\frac{c+d-38 \text{ years}}{11} = 2 \text{ months}$$

$c+d = 38 \text{ years} + 22 \text{ months}$

19 years 11 months

gradeup

11 → 95 Kg

12th → X+33

Avg of 12 pers → X

I st

$12X = 95 \cdot 11 + X + 33$

$11X = 95 \cdot 11 + 33$

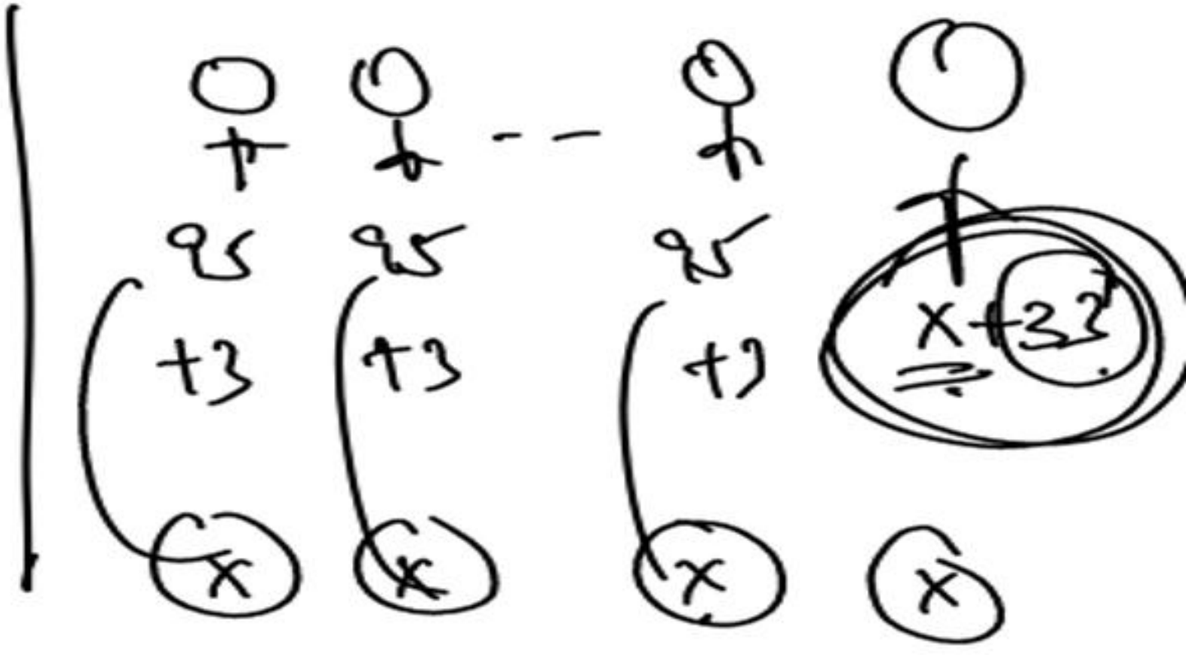
$X = 95 + 3$

$X = 98$

Q. The average weight of first 11 persons among 12 persons is 95 kg. The weight of 12th person is 33 kg more than the average weight of all the 12 persons. The weight of the 12th persons is:

(a) 128.75 kg **(b) 131 kg**

(c) 128 kg **(d) 97.45 kg**



gradeup

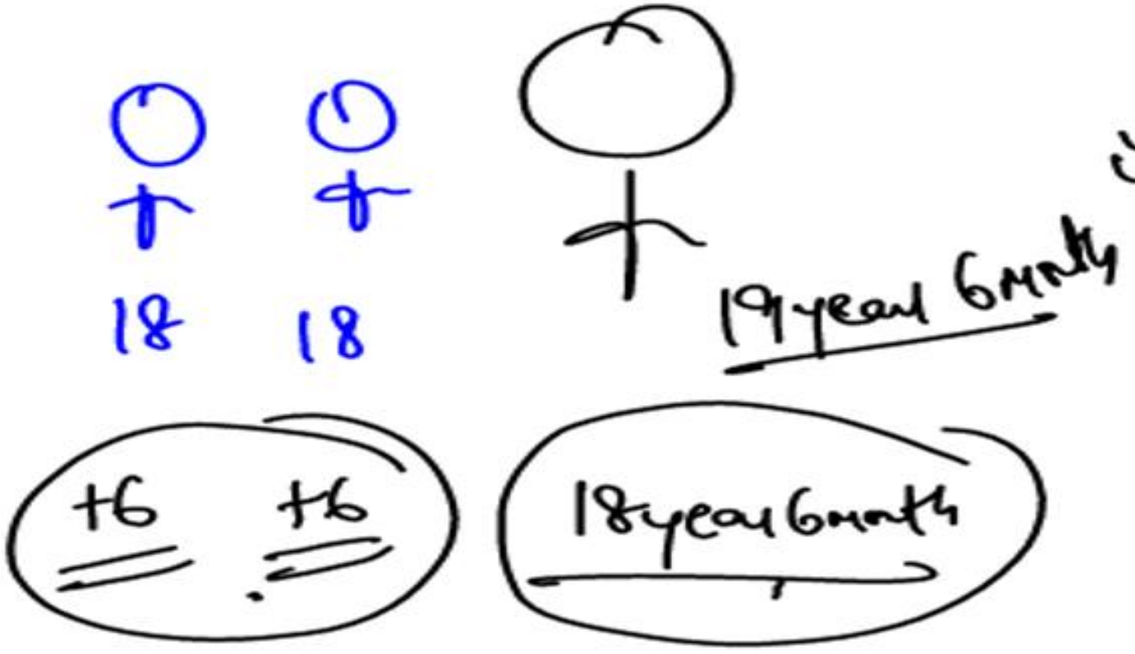
Ans. (b)

gradeup

2 ~~40 students~~ → 18 years

1 ~~20 new~~

60 stu → 18y 6Month



Q. The average age of 40 students of class is 18 years. When 20 new students are enrolled to the same class, the average age of the students of the class is increased by 6 months. The average age of newly enrolled student is

(a) 19 years

~~(b) 19 years 6 months~~

(c) 20 years

(d) 20 years 6 months

IInd

$40 \times 18 \rightarrow 720$ year

$60 \times 18.5 \rightarrow 1110$ year

$20 \rightarrow 390$ year

$\frac{390}{20} \rightarrow 19.5$ year

gradeup

Ans. (b)

gradeup

Ist Detailed Approach

V.V.I

Q. The average weight of three men A, B and C is 84 kg. D joins them and the average weight of the four becomes 80 kg. If E whose weight is 3 kg more than that of D, replaces A, the average weight of B, C , D and E becomes 79 kg. The weight of A is

(a) 65 kg (b) 70 kg

(c) 75 kg (d) 80 kg

$A+B+C = 252$ — (1)

$A+B+C+D = 320$ — (2)

(2) − (1)

$D = 68$ kg

$E = 71$ kg

$B+C+D+E = 316$ (3)

$B+C+68+71 = 316$

$B+C = 177$

PYQ of SSC

$A+177 = 252$

$A = 75$ kg

gradeup

Ans. (b)

II

A, B, C → 84

A, B, C, D (68kg) → 80 → 1,4kg

E, B, C, D → 79 ↓↑

71kg

D+3

A = ??

75kg

gradeup

BATTING AVERAGE

$$\text{Batting Average} = \frac{\text{Runs made by the batsman}}{\text{No. of innings played by the batsman}}$$

eg

30

50

40

$\frac{30+50+40}{3} = 40$

Real Life

30 out

50*

40 out

$\frac{120}{2} = 60$

gradeup

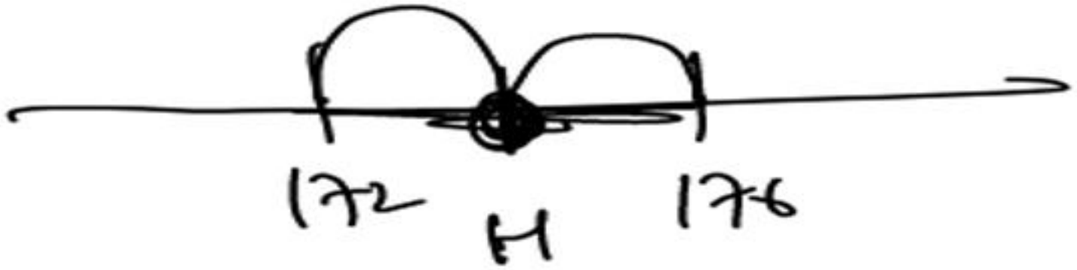
$40 \times 50 = 2000$

$38 \times 48 = 1824$

176

$H - L = 172$

$H + L = 176$



Eg. The batting average for 40 innings of a cricket player is 50 runs. His highest score exceeds his lowest score by 172 runs. If these two innings are excluded, the average of the remaining 38 innings is 48 runs. The highest score of the player is

(a) 165 runs
(b) 170 runs
(c) 172 runs
(d) 174 runs

gradeup

Ans. (d)

BOWLING AVERAGE

$$\text{Bowling Average} = \frac{\text{No. of runs given by the bowler}}{\text{No. of wickets taken by the bowler}}$$

eg 200 wickets & given 5000 runs

$$\frac{5000}{200} = 25$$

gradeup

I st → Equation Approach

B·A = 24·85 52 5w 1085

$24.85 = \frac{\text{Runs}}{\text{wickets}}$

$24.85x = \text{Runs}$

$\frac{24.85x + 52}{x+5} = 24$

$24.85x + 52 = 24x + 120$

$0.85x = 68$ $\quad x = 80$

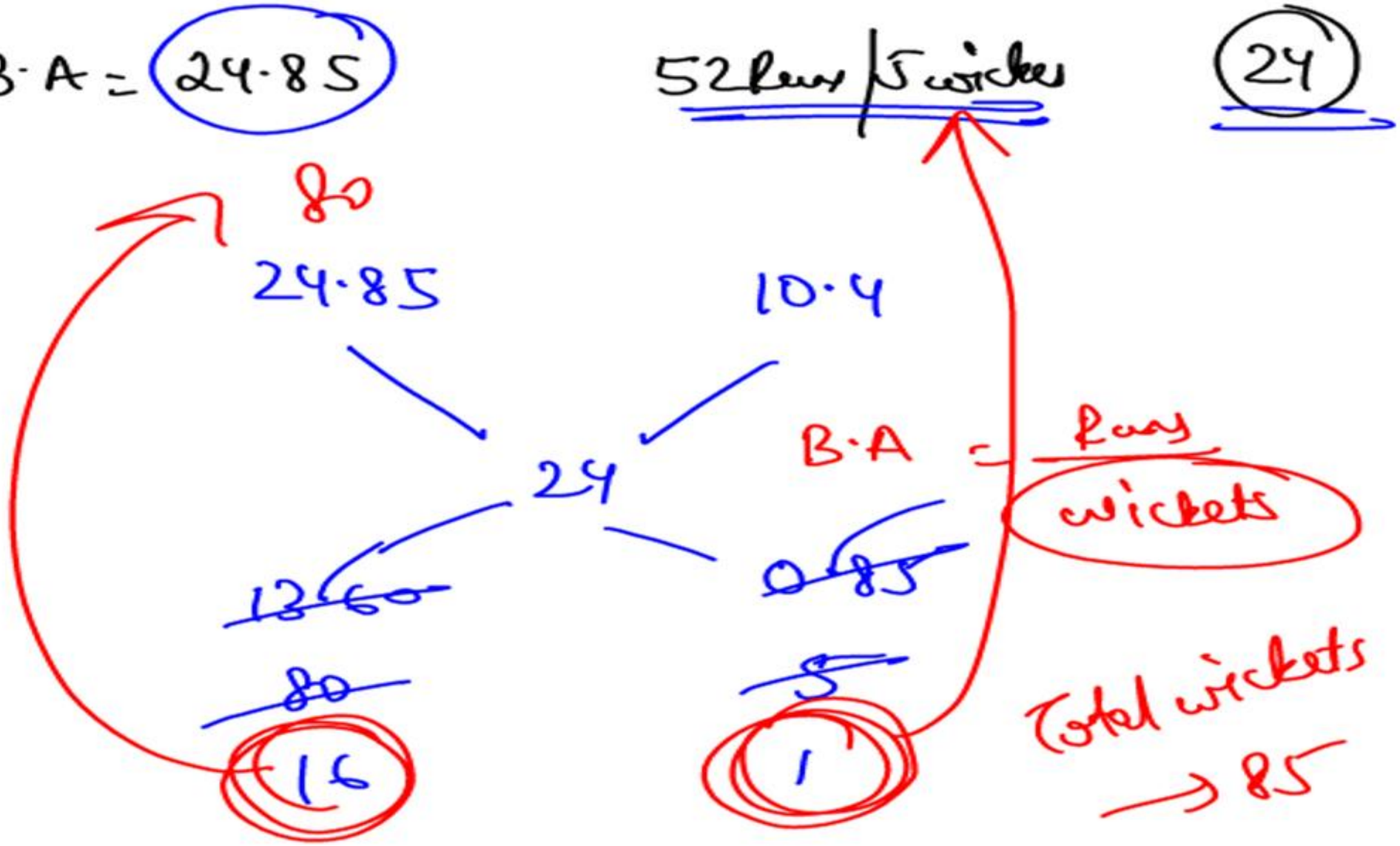
Eg. A cricketer whose bowling average is 24.85, runs per wicket. In his next match he takes 5 wickets for 52 runs and thereby decreases his bowling average by 0.85. Then the number of wickets taken by him till the last match was

(a) 64 (b) 80

(c) 85 (d) 96

gradeup

IInd Approach Alligation



gradeup

Ans. (c)

III 14

24.85

52 | 5 wickets

4, 0.85

24.1

120 runs − 52 runs

$\frac{68}{0.85} = 80$

85

gradeup

Addition, Subtraction, Multiplication and Division by a constant to a given set of numbers.

	Average
x, y, z	A
$x+k, y+k, z+k$	$A+k$
$x-k, y-k, z-k$	$A-k$
$x \cdot k, y \cdot k, z \cdot k$	$A \cdot k$
$\frac{x}{k}, \frac{y}{k}, \frac{z}{k}$	$\frac{A}{k}$

gradeup

Average

eg x, y, z → 10

$x+3, y+3, z+3 \longrightarrow 13$

$x-5, y-5, z-5 \longrightarrow 5$

$x \cdot 2, y \cdot 2, z \cdot 2 \longrightarrow 20$

$\frac{x}{5}, \frac{y}{5}, \frac{z}{5} \longrightarrow 2$

gradeup

$x+y+z=60$

Average

$x, y, z \rightarrow 20$

$\frac{2x+3y+4z}{3}$

$2x, 3y, 4z$

$\rightarrow$ Can't be determined

$\frac{3+4+5}{3}$

$x, y, z \rightarrow 20$

$x+3, y+4, z+5 \rightarrow 24$

gradeup

Eg. If average of 20 observations $x_1, x_2, \ldots\ldots, x_{20}$ is y,
then the average of $x_1 - 101, x_2 - 101, x_3 - 101, \ldots\ldots, x_{20} - 101$ is:

(a) y – 20 (b) y – 101 (c) 20y (d) 101 y

gradeup

Ans. (b)

gradeup

Q. Average of n numbers is a. The first number is increased by 2, second one is increased by 4, the third one is increased by 8 and so on. The average of the new numbers is:

(a) $a + \frac{2(2^n - 1)}{n}$

(b) $a + \frac{2(2^{n+1} - 1)}{n}$

(c) $a + \frac{2^{n+1}}{n}$

(d) $a + \frac{2^{n-1}}{n}$

Avg

$n \longrightarrow a$

$+2, +4, +8, \ldots\ldots$

$2, 4, 8, \ldots\ldots$

$$\text{Sum} = \frac{2\cdot(2^n - 1)}{2-1} = 2(2^n - 1)$$

gradeup

Ans. (a)

gradeup

Basics of Geometric Progression

$a \rightarrow$ First Term

$r \rightarrow$ Common Ratio

$$r = \frac{T_2}{T_1} = \frac{T_3}{T_2} = \frac{T_4}{T_3} = \cdots\cdots$$

gradeup

$$a,\ ar,\ ar^2,\ ar^3,\ ar^4,\ \text{----}$$

$$n^{th}\ \text{term} = ar^{n-1}$$

$$\text{Sum of } n \text{ terms} = \frac{a(r^n-1)}{r-1}$$

gradeup

eg 1

2, 6, 18, 54, - - - - -

Find the 8^{th} term

$a = 2 \quad x = 3$

ax^7

$2 \cdot 3^7$

$= 2 \cdot 2187 = \boxed{4374}$

eg 2

3, 6, 12, 24, - - - -

$x = \frac{T_2}{T_1}$

Find Sum of first 10 terms

$\text{Sum} = \frac{a(x^n - 1)}{x - 1} \Rightarrow \frac{3(2^{10} - 1)}{2 - 1} = 3 \cdot 1023$

$= \boxed{3069}$

* If you multiply or divide by different constants, then Average is Can't be determined

** If you add or subtract with different constant, then Average can be determined.