gradeup

gradeup

Sahi Prep Hai Toh Life Set Hai

AVERAGE-3

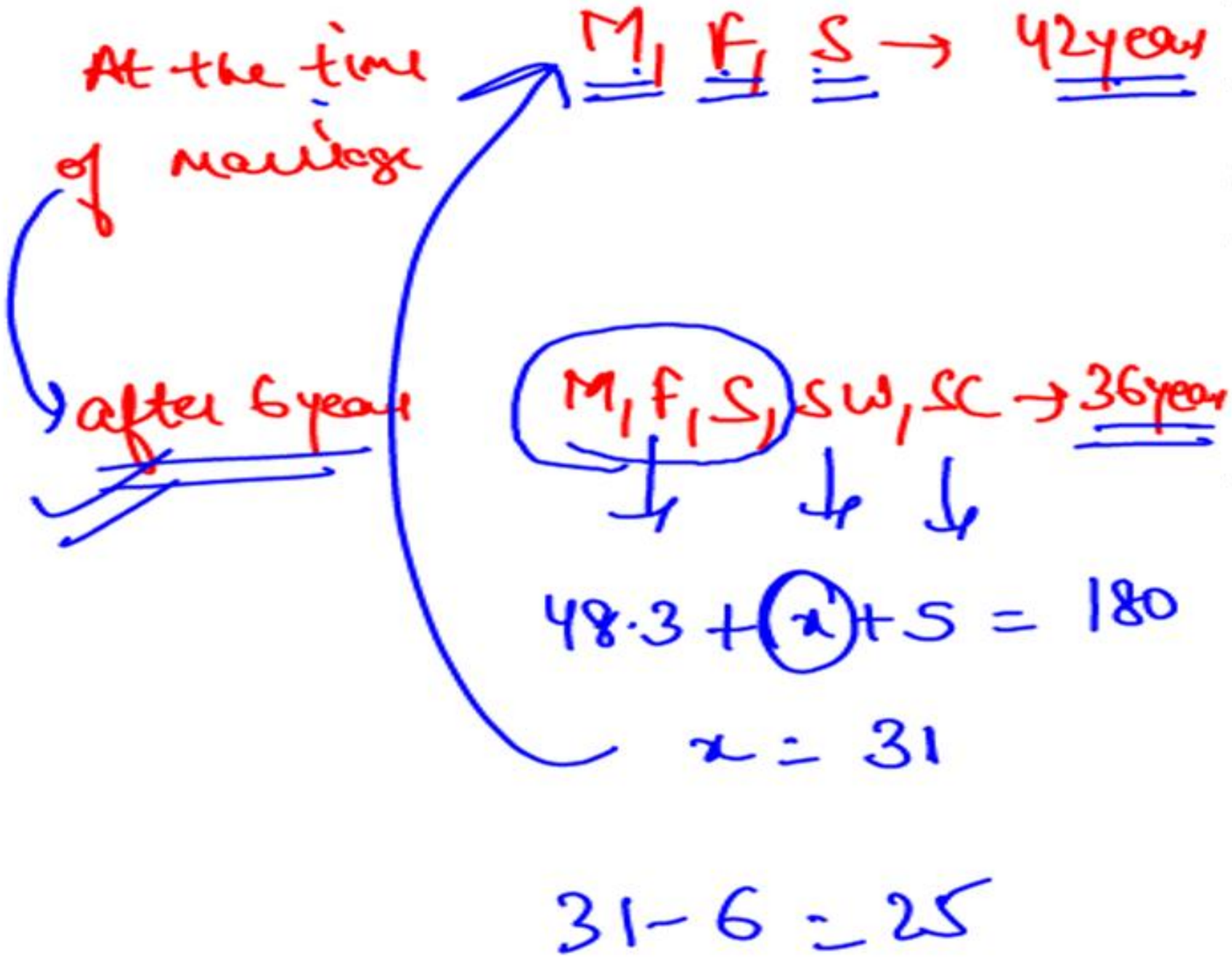
gradeup

* Age + Average → (12-14) Min

* Average
  Numbers
  (Property of Arithmetic) (85-90) Min
  Practice (16-20)Q

12:45 pm

gradeup



Eg. Average age of mother, father and son was 42 years at the time of marriage of their son. After one year, an infant was born and after 6 years of marriage the average age of a family becomes 36 years. Find the age of bride at the time of marriage.

(a) 26 years
(b) 25 years
(c) 24 years
(d) 23 years

Ans. (b)

gradeup

Daughter Son

D DW C1 C2

28 24 0

32 28 4 0 64

Present 39 35 11 7 92

Eg. The average age of Donald, his wife and their two children is 23 years. His wife is just 4 year younger than Donald himself and his wife was 24 years old when his daughter was born. He was 32 years old when his son was born. The average age of Donald and his daughter is :

(a) 25 years

(b) 22.5 years

(c) 26 years

(d) Data Insufficient

gradeup

Ans. (a)

gradeup

QUESTIONS BASED ON NUMBERS

1. Sum of natural numbers.

2. Property of Arithmetic Progression

gradeup

$$1+2+3+4+\ldots\ldots\ldots\ldots+n=\frac{n(n+1)}{2}$$

$$1^2+2^2+3^2+4^2+\ldots\ldots\ldots\ldots+n^2=\frac{n(n+1)(2n+1)}{6}$$

$$1^3+2^3+3^3+4^3+\ldots\ldots\ldots\ldots+n^3=\left[\frac{n(n+1)}{2}\right]^2$$

eg1 $1+2+3+\cdots\cdots 100 \longrightarrow \frac{\overset{50}{100}\cdot 101}{2} \rightarrow 5050$

eg2 $1^2+2^2+3^2+\cdots 40^2 = \frac{\overset{20}{40}\cdot 41\cdot \overset{27}{81}}{6\overset{2}{}} = 22140$

eg3 $1^3+2^3+3^3+\cdots\cdots 15^3 \rightarrow \left(\frac{15\cdot \overset{8}{16}}{2}\right)^2 = 14400$

gradeup

Eg. Find the average of squares of all numbers from 1 to 30.

$1^2 + 2^2 + \cdots + n^2 \longrightarrow \frac{n(n+1)(2n+1)}{6}$

$\frac{\cancel{30} \cdot 31 \cdot 61}{6 \cdot \cancel{30}} = \frac{1891}{6}$

$= 315\frac{1}{6}$

gradeup

ARITHMETIC PROGRESSION

When the difference between two consecutive terms is constant :

e.g. 2, 5, 8, 11, 14,..... **is an AP**

3 3 3 3

First term → **a**

Common difference → **d**

$a = 2$

$d = 3$

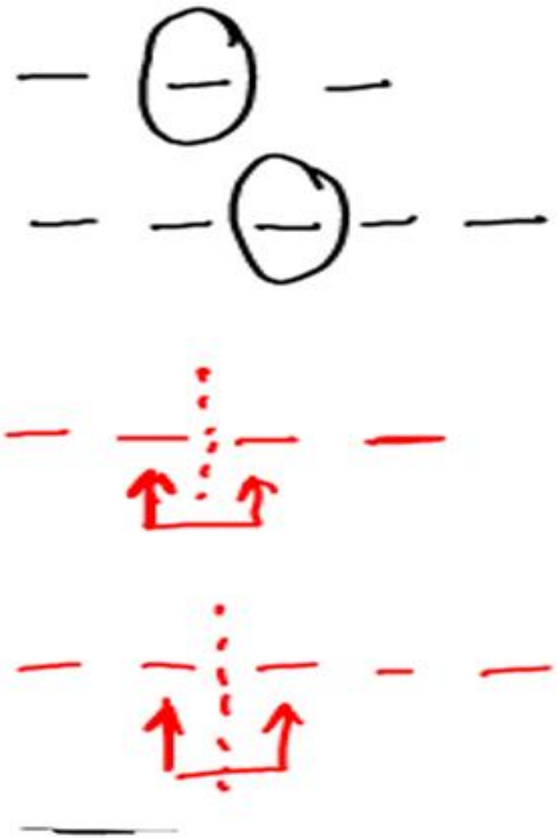
$d = T_2 - T_1$

$= T_3 - T_2$

$= T_n - T_{n-1}$

gradeup

If numbers are in Arithmetic Progression (AP) :



1. **No. of terms (n) → Odd**

   Average = Central Term $\left(\frac{n+1}{2}\right)^{th}$ term

2. **No. of terms (n) → Even**

   Average = Average of 2 central terms i.e.

   Average of $\left[\left(\frac{n}{2}\right)^{th}, \left(\frac{n}{2}+1\right)^{th}\right]$ term

eg There are 19 terms in A.P Average → 10^{th} term

gradeup

If there are 5 terms, then the average would be:

$\left(\frac{5+1}{2}\right)^{th}$ term **i.e. the 3rd term.**

If there are 7 terms, then the average would be:

$\left(\frac{7+1}{2}\right)^{th}$ term **i.e. the 4th term.**

gradeup

If there are 6 terms, then the average would be the average of :

$\left(\frac{6}{2}\right)^{th}, \left(\frac{6}{2}+1\right)^{th}$ term **i.e. the 3rd & 4th term.**

If no. of terms $\longrightarrow$ 50

avg $\rightarrow$ avg of (25^{Th} & 26^{th} term)

gradeup

Eg. Average of 7 consecutive natural numbers is 58. Find the largest number?

I st — Better

II nd

— — — 58 59 60 61

$x, x+1, x+2, x+3, x+4, x+5, x+6$

$$\frac{x + x+1 + x+2 + x+3 + x+4 + x+5 + x+6}{7} = 58$$

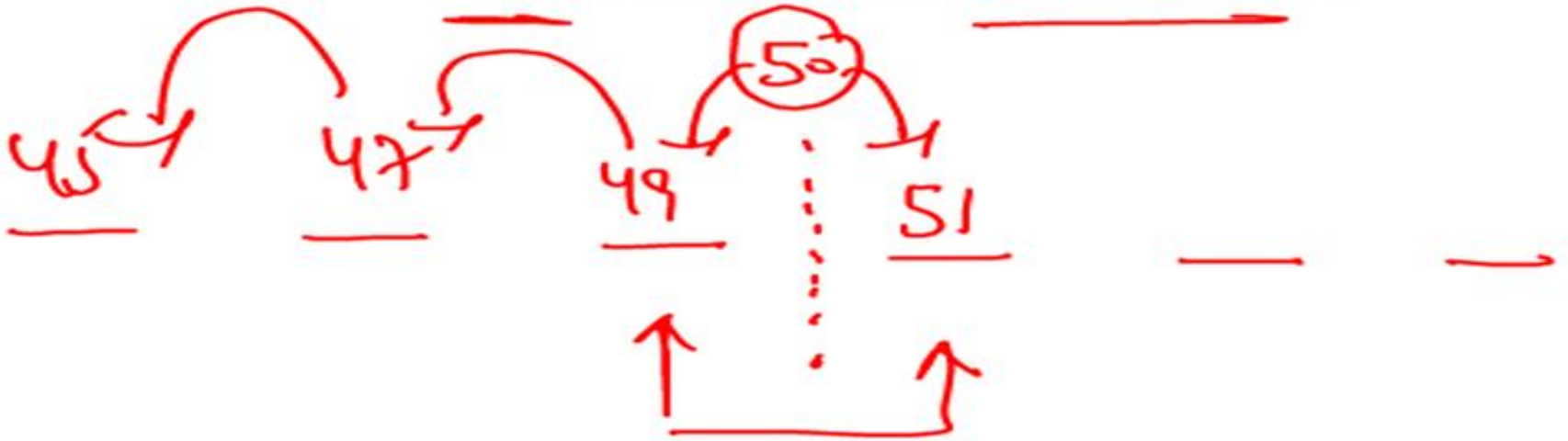
$$\frac{7x+21}{7} = 58$$

$$x = 55$$

61

gradeup

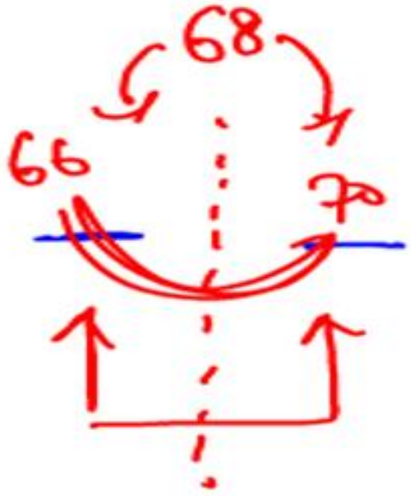
Eg. Average of 6 consecutive odd numbers is 50. Find the smallest number?



45

gradeup

Eg. Average of 8 consecutive even numbers is 68. Find the largest number?



Data Inconsistent

gradeup

If numbers are in Arithmetic Progression (AP) :

$$\text{Average} = \frac{\text{First Term} + \text{Last Term}}{2}$$

Eg. 5, 12, 19, 26, 33, ..., 341, 348, 355

Find the average of all the numbers.

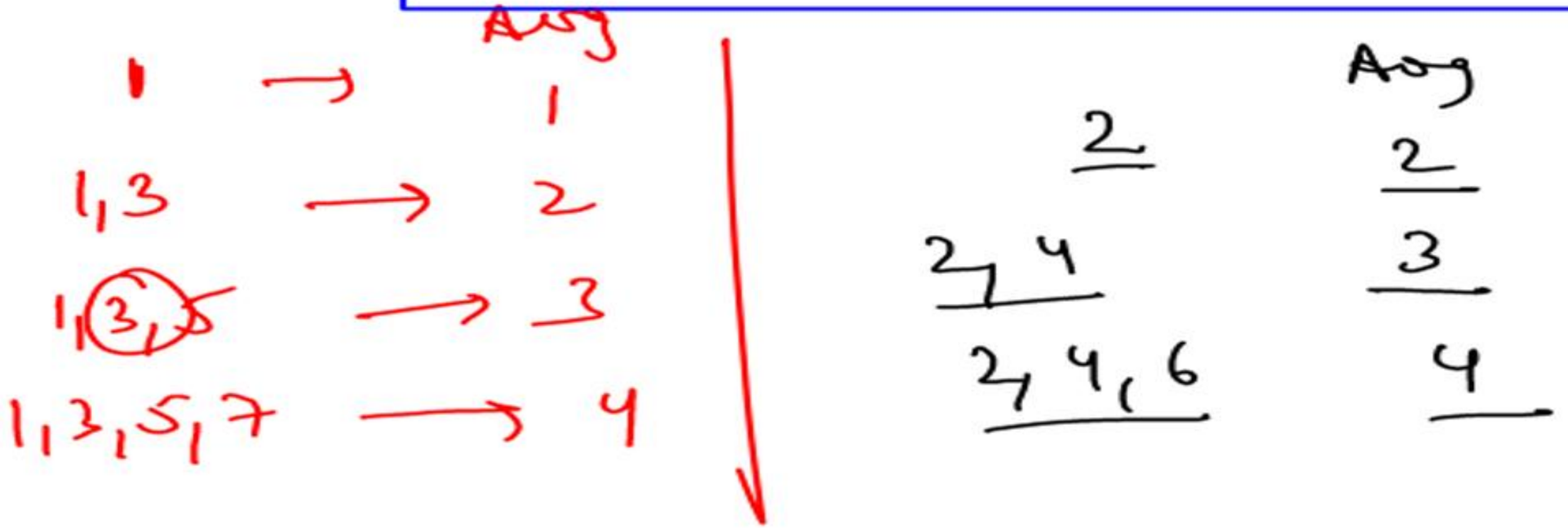
Sol^n

$$\frac{5 + 355}{2} = \frac{360}{2} = 180$$

gradeup

Average of first n odd numbers	→	n
Sum of first n odd numbers	→	n^2

Average of first n even numbers	→	n + 1
Sum of first n even numbers	→	n (n + 1)



gradeup

Eg. Find average of first 25 odd numbers.

→ 25

gradeup

Eg. Find average of first 30 even numbers.

Avg of first n even no ⟶ n+1

31

gradeup

Eg. 1,2,3,4,5,....., 2020

M = Average of all odd numbers

N = Average of all even numbers

Find M – N.

(a) 0 (b) 1 (c) –1 (d) None of these

$M = 1, 3, 5, \ldots\ldots 2019$

$= \frac{1+2019}{2} = 1010$

$N \rightarrow 2, 4, 6, \ldots 2020$

$\frac{2+2020}{2} = 1011$

$M - N = -1$

gradeup

Q1. The average of 7 consecutive natural numbers is 20. The largest of these numbers is:

(a) 24 **(b) 23**

(c) 22 **(d) 20**

gradeup

Ans. (b)

gradeup

Q2. The average of odd numbers upto 100 is:

(a) 50.5 (b) 50

(c) 49.5 (d) 49

Sol^{n} Ist

1, 3, 5, 7, ---- 99

Avg = $\frac{1+99}{2}$ = 50

II TM 100

⟶ 50 odd

Avg of first 50 odd ⟶ 50

gradeup

Ans. (b)

gradeup

Q3. Find the average of first 50 even numbers.

(a) 47 **(b) 49**

(c) 51 **(d) 53**

Avg of first n even no $\longrightarrow$ n+1

gradeup

Ans. (c)

gradeup

Q4. Find the average of square of first 20 natural numbers.

(a) 287
(b) 143.5
(c) 387
(d) 193.5

$$\frac{\cancel{20} \cdot \cancel{21} \cdot 41}{\cancel{6} \cdot \cancel{20}} = \frac{287}{2} = 143.5$$

gradeup

Ans. (b)

gradeup

Q5. The arithmetic mean of the following numbers: 1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 5, 5, 6, 6, 6, 6, 6, 6 and 7, 7, 7, 7, 7, 7, 7 is

(a) 4 (b) 5 (c) 14 (d) 20

Time 60sec

I st

1 (1) = 1
2 (2) = 4
3 (3) = 9
4 (4) = 16
5 (5) = 25
6 (6) = 36
7 (7) = 49

140
28

= 5

gradeup

1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 5, 5, 6, 6, 6, 6, 6, 6, 7, 7, 7, 7, 7, 7, 7

Ans. (b)

II nd

4

5

19

20

1 2 3 4 5 6 7

gradeup

Q6. Find the average of cubes of first 49 positive integers.

(a) 30625 (b) 1225

(c) 30125 (d) 6235

$$\frac{\left(\frac{49 \cdot 50}{2}\right)^2}{49} \Rightarrow \frac{49 \cdot 49 \cdot 25 \cdot 25}{49}$$

$$49 \cdot 625$$

$$(50-1) \cdot 625$$

$$31250 - 625$$

gradeup

Ans. (a)

gradeup

Q7. If the average of 7 distinct positive integers is 16, maximum how many numbers can be greater than 16?

(a) 7 (b) 6

(c) 5 (d) 4

Avg → 16

Sum → 16×7

= 112

17, 18, 19, 20, 21

Max 5 no can be greater than 16

gradeup

eg Average of 8 natural number is 25.

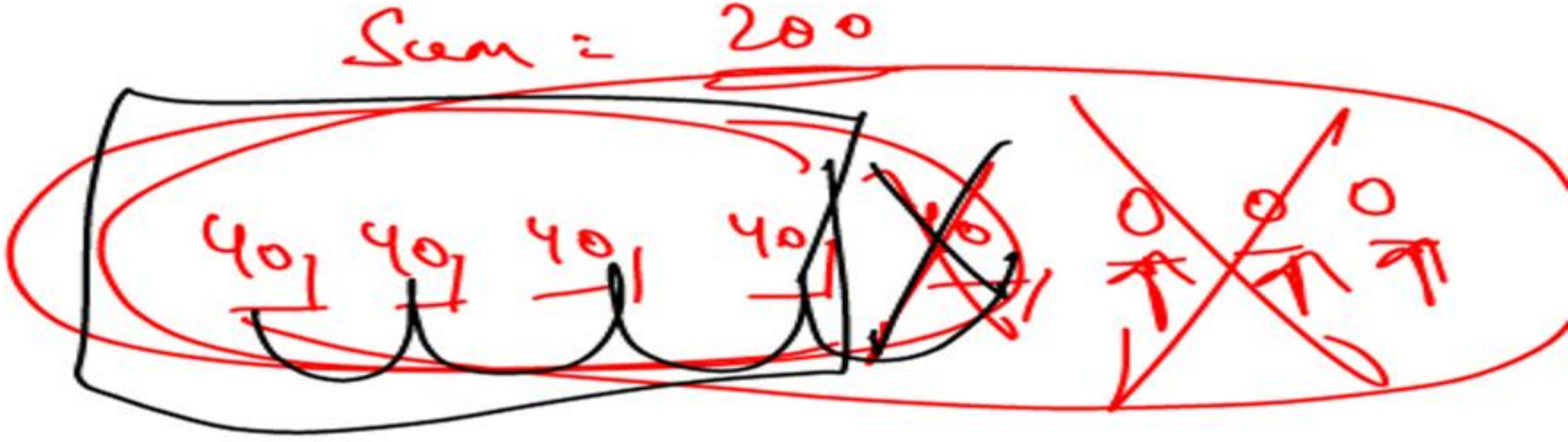
Max how many can be greater than 39

A 7

B 4

C 5

D 6



gradeup

Eg Avg of 7 distinct even numbers is 50. How many of them can be greater than 70 ??

Sol^n

Total = 350

72, 74, 76, 78, 50

Ans

gradeup

Ans. (c)

gradeup

Q8. The average of 20 numbers is zero. Of them at the most, how many may be greater than zero?

(a) 0 (b) 1

(c) 10 (d) 19

Avg = 0

Sum = 0

(+1, +1, -1, +1 - - - 19 times) +19

→ 0

gradeup

Ans. (d)

→ Avg of 20 numbers is 0

Max how many can be less than 0

Sum = 0

Ans = 19

(−1, −1, −1, −1, − (19 times)) +19

---

eg Avg of 20 numbers is 0. Max how many can be non-negative ??

→ Sum = 0

0, 0, 0, 0, ---- 0

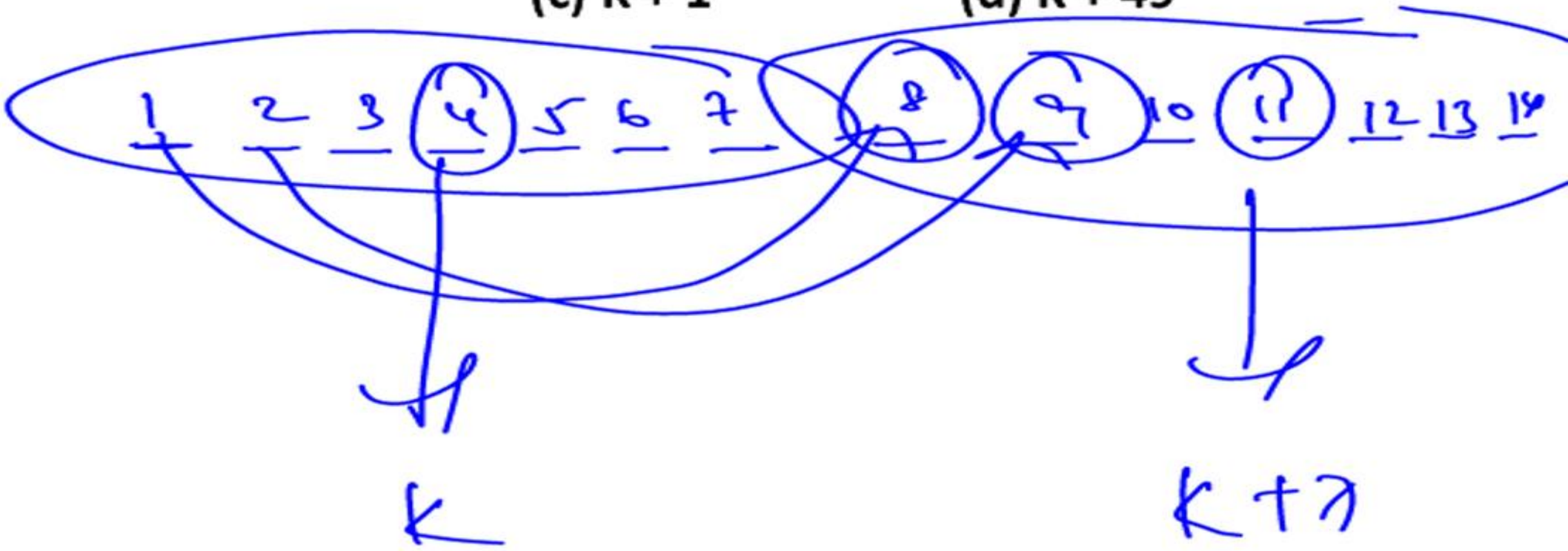
Ans = 20 ⟹

gradeup

Q9. The average of 7 consecutive natural numbers is K, then what will be the average of next 7 consecutive natural numbers?

(a) K **(b) K + 7**

(c) K + 1 **(d) K + 49**



gradeup

Ans. (b)

gradeup

Q10. The average of nine consecutive numbers is n. If the next two numbers are also included the new average will

(a) increase by 2

(b) remain the same

(c) increase by 1.5

(d) increase by 1

Time → 45sec

1, 2, 3, 4, (5), 6, 7, 8, 9, 10, 11

gradeup

Ans. (d)

gradeup

Q11. The average of 5 consecutive natural numbers is M. If the next three natural numbers are also included, How much more than M will the average of these 8 numbers be ?

(a) 2 **(b) 1**

(c) 1.4 **(d) 1.5**

gradeup

Ans. (d)

gradeup

Q12. The average of 5 consecutive integers starting with 'm' is n. What is the average of 6 consecutive integers starting with (m+2) ?

5 no m, 1, 1, 1, 1, ... n

6 no m+2, 1, 1, 1, 1, 1, ...

$n + 2 + \frac{1}{2}$

$n + 2.5$

(a) $\frac{2n+5}{2}$

(b) (n+2)

(c) (n+3)

(d) $\frac{2n+9}{2}$

gradeup

Ans. (a)

gradeup

Q13. Consider the set S = {2, 3, 4, ..., 2n+1}, where 'n' is a positive integer larger than 2007. Define X as the average of the odd integers in S and Y as the average of the even integers in S. What is the value of (X - Y)?

(a) 0

(b) 1

(c) $\frac{1}{2}n$

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

2 (3) 4, ---- 2n+1

$X = \frac{3+2n+1}{2} = n+2$

$Y = \frac{2+2n}{2} = n+1$

$X - Y = 1$

gradeup

Ans. (b)

gradeup

Q14. a, b, c, d, e, f, g are consecutive even numbers. j, k, l, m, n are consecutive odd numbers. The average of all the numbers is

(a) $3\ (\frac{a+n}{2})$

(b) $\frac{l+d}{2}$

(c) $\frac{a+b+m+n}{4}$

(d) $\frac{j+c+n+g}{4}$

gradeup

Q15. The average weight of student in four section A, B, C and D is 60 kg. The average weight of the students A, B, C and D individually are 45 kg, 50 kg, 72 kg and 80 kg respectively. If the average weight of a student of section A and B together is 48 kg and that of B and C is 60 kg. What is the ratio of the no. of students in section A and D ?

(a) 3 : 4
(b) 2 : 3
(c) 5 : 8
(d) 4 : 3

gradeup

Ans. (d)

gradeup

Q16. 5 members of a team are weighed consecutively and their average weight calculated after each member is weighed. If the average weight increased by one kg each time, how much heavier is the last player than the first one?

(a) 4 kg
(b) 20 kg
(c) 8 kg
(d) 5 kg

gradeup

Ans. (c)

gradeup

Q17. The average daily income of 7 men, 11 women and 2 boys is Rs. 257.50. If the average daily income of the men is Rs. 10 more than that of women and the average daily income of the women is Rs. 10 more than that of boys, the average daily income of a man is

(a) 277.50 (b) 250

(c) 265 (d) 257

gradeup

Ans. (c)

gradeup

Q18. The average of the three numbers x, y and z is 45. x is 9 more than the average of y and z is. Average of y and z is 2 more than y, then the difference of x and z is

(a) 3 (b) 5

(c) 7 (d) 11

gradeup

Ans. (c)

gradeup

PRACTICE QUESTIONS

gradeup

Q1. A company produces an average of 4000 items per month for the first 3 months. How much items, it must produce on an average per month over the next 9 months so that it averages to 4375 items per month over the whole year?

(a) 4500
(b) 4600
(c) 4680
(d) 4710

gradeup

Ans. (a)

gradeup

Q2. A library has an average number of 510 visitors on Sunday and 240 on other days. The average number of visitors per day in a month of 30 days beginning with Sunday is :

(a) 285 (b) 295
(c) 300 (d) 290

gradeup

Ans. (a)

gradeup

Q3. The arithmetic mean of the scores of a group of students in a test was 52. The brightest 20% of them secured a mean score of 80 and the dullest 25% a mean score of 31. The mean score of remaining 55% is :

(a) 45%
(b) 50%
(c) 51.4% approx.
(d) 54.6% approx.

gradeup

Ans. (c)

gradeup

Q4. The average of 11 results is 50. If the average of the first 6 results is 49 and that of the last 6 is 52, the 6th no. is

(a) 48 (b) 50
(c) 52 (d) 56

gradeup

Ans. (c)

gradeup

Q5. The average of 11 numbers is 10.8 . If the average of the first 6 be 10.4 and that of the last 6 is 11.5, then the middle (6th) number is :

(a) 10.3 (b) 12.6
(c) 13.5 (d) 15.5

gradeup

Ans. (b)

gradeup

Q6. A cricket batsman had a certain average of runs in his 11 innings. In the 12th innings, he scores 90 runs and thereby his average of runs was decreased by 5. His average of runs after 12th innings was :

(a) 155
(b) 150
(c) 145
(d) 140

gradeup

Ans. (c)

gradeup

Q7. Out of 9 persons, 8 persons spent Rs. 30 each for their meals. The ninth one spent Rs. 20 more than the average expenditure of all the nine. The total money spent by all of them was

(a) Rs. 260
(b) Rs. 290
(c) Rs. 292.50
(d) None of these

gradeup

Ans. (c)

gradeup

Q8. If the mean of 4 observations is 20, when a constant 'C' is added to each observation, the mean become 22. The value of C is :

(a) 6
(b) –2
(c) 2
(d) 4

Ans. (c)

gradeup

Q9. B was born when A was 4 years 7 months old and C was born when B was 3 years 4 months old. When C was 5 years 2 months old, then their average age was:

(a) 8 years 9 months
(b) 7 years 3 months
(c) 8 years 7 months
(d) 8 years 11 months

Ans. (d)

gradeup

Q10. The average age of 30 students of a class is 14 years 4 months. After admission of 5 new student in the class the average becomes 13 years 9 months. The youngest one of the five new students is 9 years 11 month old. The average age of the remaining 4 new students is

(a) 10 years 4 months
(b) 12 years 4 months
(c) 11 years 2 months
(d) 13 years 6 months

Ans. (a)

gradeup

Q11. The average of 18 observations is recorded as 124. Later it was found that two observations with values 64 and 28 were entered wrongly as 46 and 82. Find the correct average of the 18 conservations.

(a) $111\frac{7}{9}$ **(b) 122**

(c) 123 **(d)** $137\frac{3}{9}$

Ans. (b)

gradeup

Q12. The bowling average of cricketer was 12.4. He improves his bowling average by 0.2 points when he takes 5 wickets for 26 runs in his last match. The number of wickets taken by him before the last match was:

(a) 165
(b) 180
(c) 175
(d) 170

gradeup

Ans. (c)

gradeup

Q13. The average score of a-class of boys and girls in an examination is A. The ratio of boys and girls in the class is 3 :1. If the average score of the boys is A+1 , the average score of the girls is

(a) A+1
(b) A-1
(c) A+3
(d) A-3

gradeup

Ans. (d)

gradeup

Q14. Three science classes A, B and C take a Life Science test. The average score of class A is 83. The average score of class B is 76. The average score of class C is 85. The average score of class A and B is 79 and average score of class B and C is 81. Then the average score of classes A, B and C is

(a) 80
(b) 80.5
(c) 81
(d) 81.5

Ans. (d)

gradeup

Q15. A man purchases milk for three consecutive years. In the first year, he purchases milk at the rate of Rs. 7.50 per litre, in the second year, at the rate of Rs. 8.00 per litre and in the third year, at Rs. 8.50 per litre. If he purchases milk worth Rs. 4080 each year, the average price of milk per litre for the three year is

(a) Rs. 7.68
(b) Rs. 7.98
(c) Rs. 7.54
(d) Rs. 7.83

gradeup

Ans. (b)

gradeup

Q16. In the afternoon, a student read 100 pages at the rate of 60 pages per hour. In the evening, when she was tired, she read 100 more pages at the rate of 40 pages per hour, What was her average rate of reading, in pages per hour?

(a) 60 (b) 70

(c) 48 (d) 50

gradeup

Ans. (c)

gradeup

Q17. There were 35 students in a hostel. If the number of students are increased by 7 the expenditure on food increases by Rs. 42 per day while the average expenditure of students is reduced by Rs. 1 what was the initial expenditure on food per day?

(a) Rs. 400
(b) Rs.432
(c) Rs.442
(d) Rs.420

gradeup

Ans. (d)

gradeup

Q18. Average marks of 1/4th of the total no. of students is 2/5th of the total marks. Average marks of 1/8th of total no. of students is 4/5th of the total marks. Average marks of 2/5th of the total no. of students got 3/4th of the total marks and average of rest no. of students is 1/5th times of the total marks. If average marks of all students is 327. Find maximum marks of the exam.

(a) 450
(b) 500
(c) 600
(d) 650

gradeup

Ans. (*)

gradeup

Q19. The average score in an examination of 10 students of a class is 60. If the scores of the top five students are not considered the average score of the remaining students falls by 5. The pass mark was 40 and the maximum mark was 100. It is also known that none of students failed. If each of the top five scorers had distinct integral scores, the maximum possible score of the topper is :

(a) 99
(b) 100
(c) 87
(d) 95

gradeup

Ans. (a)

gradeup

Q20. An aeroplane flies along the four sides of a square field at speeds of 200, 400, 600 and 800 km/hr. The average speed of the plane in the flight around the field in km/hr is :

(a) 384
(b) 400
(c) 500
(d) 284

gradeup

Ans. (a)

Q21. A hotel incurs two types of expenses, of which one is fixed and other depend on the number of guests. When there are 10 guests, then the total expenses of hotel are Rs. 6000. Also, when there are 25 guests, then the average expenses per guests are Rs. 360. What will be the total expenses of hotel, when there are 40 guests in the hotel ?

(a) 9000
(b) 10000
(c) 15000
(d) 12000

gradeup

Ans. (d)

gradeup

Q22. The average mark in English subject of a class of 24 students is 56. If the marks of three students are misread as 44, 45 and 61 of the actual marks 48, 59 and 67 respectively. Then what would be the correct average?

(a) 56.5
(b) 59
(c) 57.5
(d) 57

gradeup

Ans. (d)

gradeup

Q23. The arithmetic mean of the scores of a group of students in a test was 52. The brightest 20% of them secured a mean score of 80 and the dullest 25% a mean score of 31. The mean score of the remaining 55% is : (approx)

(a) 50
(b) 51.4
(c) 55
(d) 55.2

gradeup

Ans. (b)

gradeup

Q24. The average score of 42 students of section A & B of XYZ school in an exam is 69. The ratio of the number of students of section A to that of section B is 10:11. The average score of students of section A is 20% more than that of students of section B. The average score of students of section A is:

(a) 77.7 (b) 75.6

(c) 74.7 (d) 76.4

Ans. (B)

gradeup

Q25. Let a, b, c, d, e, f, g be consecutive even numbers and j, k, l, m, n be consecutive odd numbers. What is the average of all the numbers?

(a) $\frac{3(a+n)}{2}$

(b) $\frac{(5l+7d)}{4}$

(c) $\frac{(a+b+m+n)}{4}$

(d) None of these

Ans. (d)

gradeup

Homework Practice these 30 Question

Tomm Doubt Session

Till 10pm

Homework
Quiz
PYQ

gradeup

Sahi Prep Hai Toh Life Set Hai

Practise topic-wise quizzes

Keep attending live classes

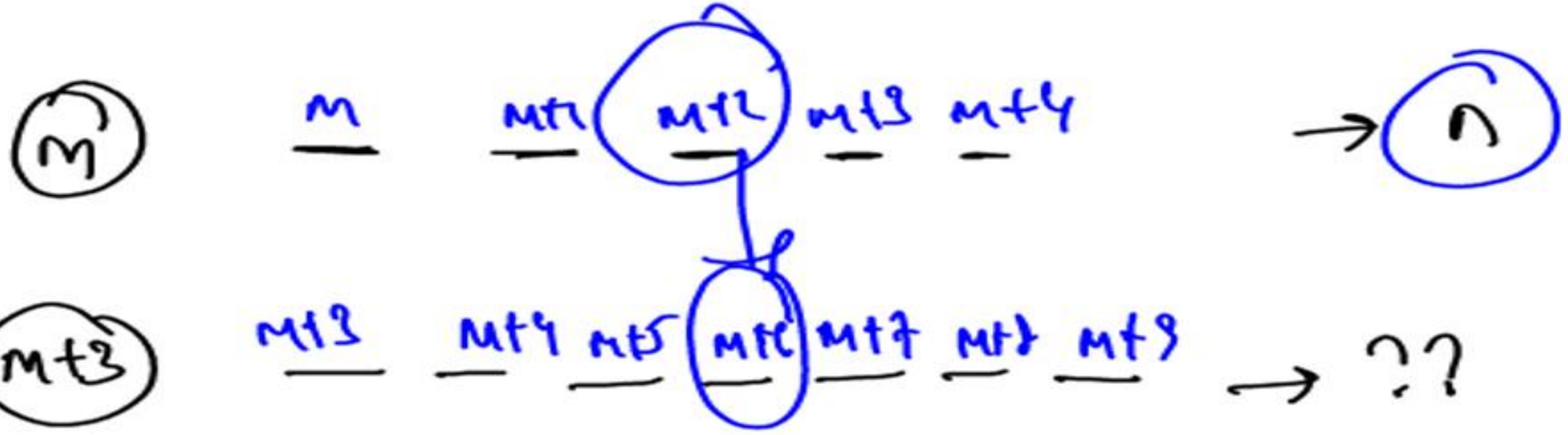
GET IT ON Google Play

whatsapp

9971658659

Eg Avg of 5 consecutive natural no starting from M is n. What is the average of 7 consecutive natural no starting from M+3 ??

Sol^n



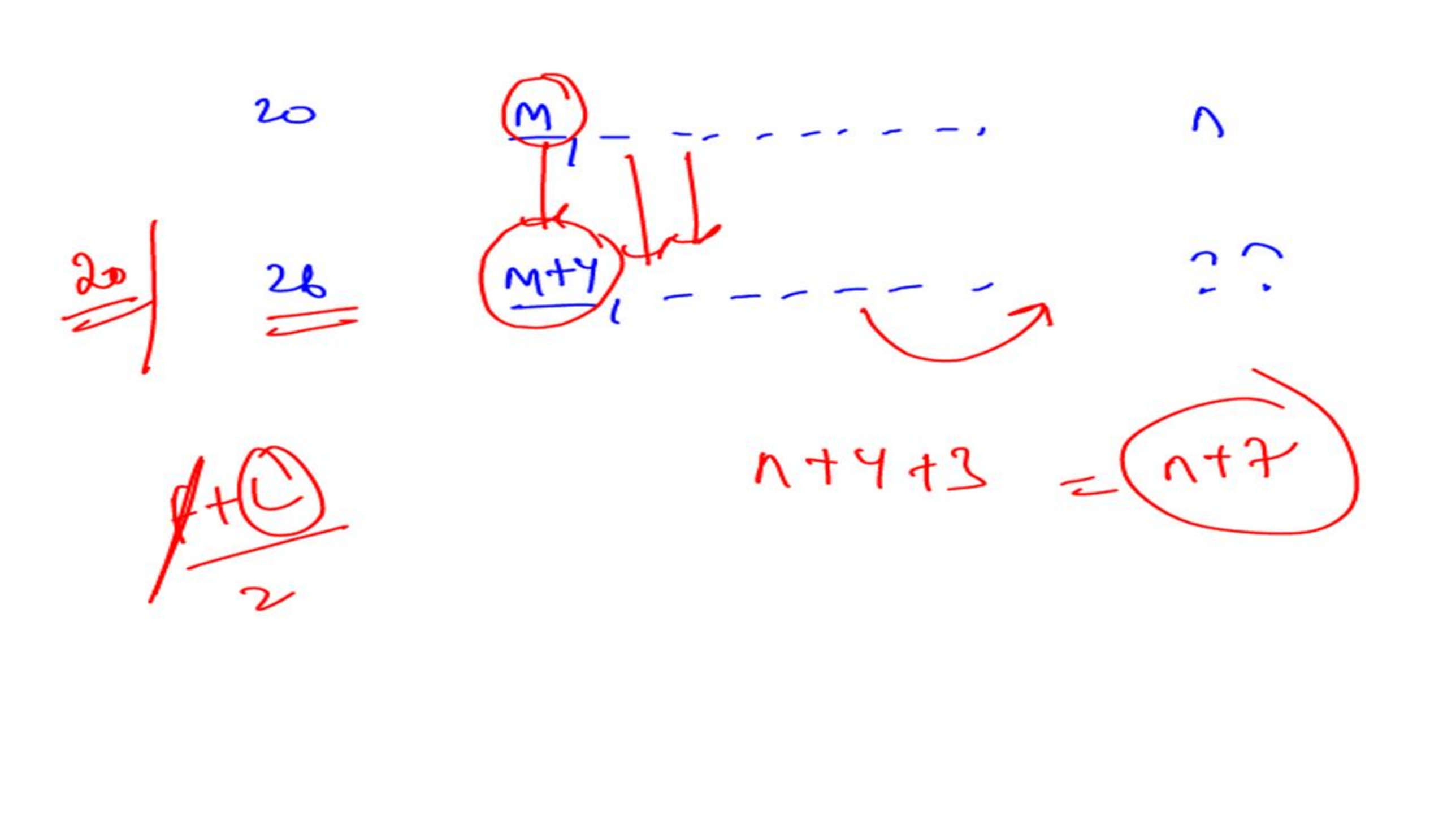
~~A~~ n+4

B n+3

C n+5

D n+2

n+4


20
M
n
M+4
2b
2b
??
f+C
2
n+4+3
n+7

15no (M), - - - - - - - - n

23no (M+2), - - - - , - - . ??

$n+2+4$

$= n+6$

2300

9no

(m) ---------- (n)

m+7 ---------- ??

$\frac{-14}{2}$

n+7 -7

= (n)