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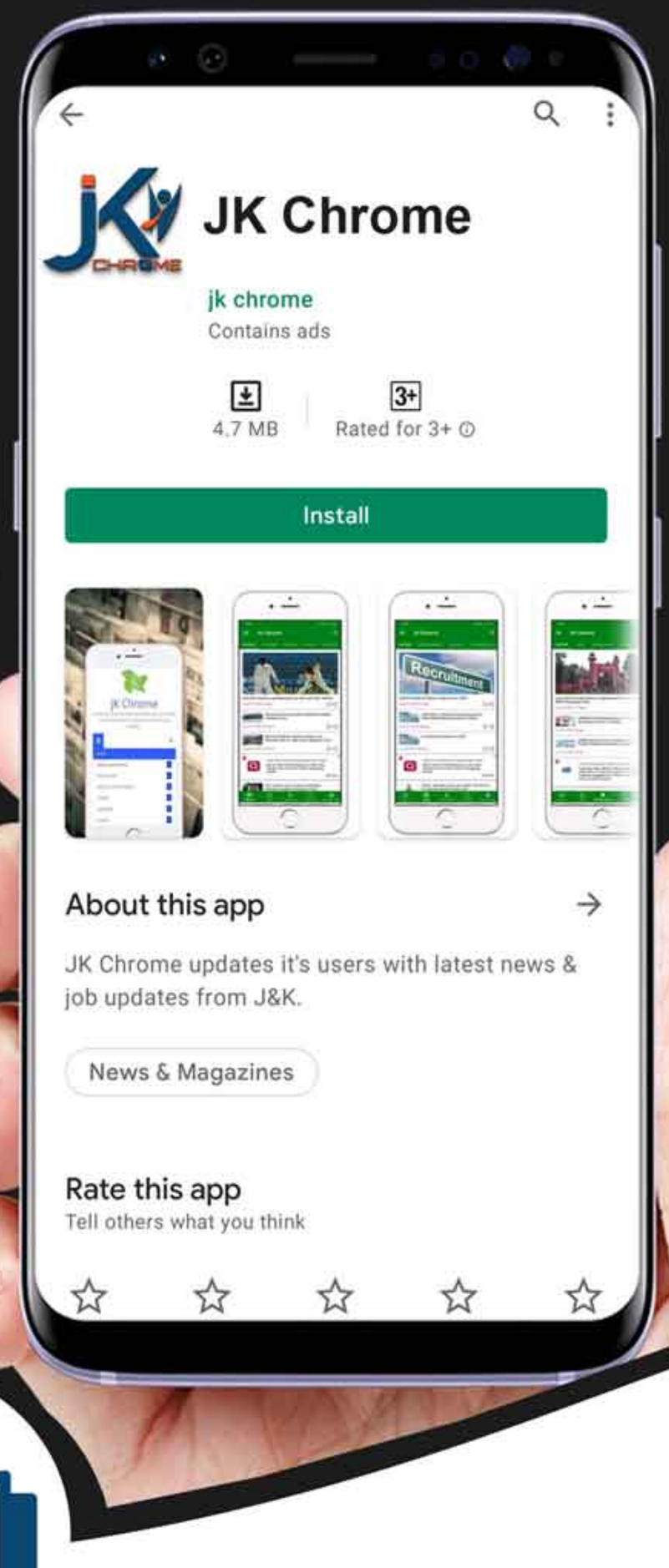

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CHAPTER

4 Average

1. The average of the first 100 positive integers is **(SSC CGL 1st Sit. 2010)**
(a) 100 (b) 51 (c) 50.5 (d) 49.5

2. In a family, the average age of a father and a mother is 35 years. The average age of the father, mother and their only son is 27 years. What is the age of the son ? **(SSC CGL 1st Sit. 2010)**
(a) 12 years (b) 11 years (c) 10.5 years (d) 10 years

3. The average of odd numbers upto 100 is **(SSC CGL 2nd Sit. 2010)**
(a) 50.5 (b) 50 (c) 49.5 (d) 49

4. The mean of 50 numbers is 30. Later it was discovered that two entries were wrongly entered as 82 and 13 instead of 28 and 31. Find the correct mean. **(SSC CGL 1st Sit. 2011)**
(a) 36.12 (b) 30.66 (c) 29.28 (d) 38.21

5. The average of three consecutive odd numbers is 12 more than one third of the first of these numbers. What is the last of the three numbers ? **(SSC CGL 1st Sit. 2011)**
(a) 15 (b) 17
(c) 19 (d) Data inadequate

6. 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 observations. **(SSC CGL 2nd Sit. 2011)**
(a) $111\frac{7}{9}$ (b) 122 (c) 123 (d) $137\frac{3}{7}$

7. The average age of four boys, five years ago was 9 years. On including a new boy, the present average age of all the five is 15 years. The present age of the new boy is **(SSC CGL 1st Sit. 2012)**
(a) 14 years (b) 6 years
(c) 15 years (d) 19 years

8. If the average of 39, 48, 51, 63, 75, 83, x and 69 is 60, then the value of x is **(SSC CGL 1st Sit. 2012)**
(a) 52 (b) 53 (c) 50 (d) 51

9. The average temperature of Monday, Tuesday and Wednesday was 30°C and that of Tuesday, Wednesday and Thursday was 33°C. If the temperature on Monday was 32°C, then the temperature on Thursday was: **(SSC CGL 2012)**
(a) 33°C (b) 30°C (c) 41°C (d) 32°C

10. The mean of 19 observation is 24. If the mean of the first 10 observations is 17 and that of the last 10 observations is 24, find the 10th observation. **(SSC CGL 1st Sit. 2012)**
(a) 65 (b) 37
(c) −46 (d) 53

11. The average age of a jury of 5 is 40. If a member aged 35 resigns and a man aged 25 becomes a member, then the average age of the new jury is **(SSC CGL 2nd Sit. 2012)**
(a) 30 (b) 38 (c) 40 (d) 42

12. The average of 5 consecutive numbers is n. If the next two numbers are also included, the average of the 7 numbers will **(SSC CGL 2nd Sit. 2012)**
(a) increase by 2 (b) increase by 1
(c) remain the same (d) increase by 1.4

13. A batsman in his 12th innings makes a score of 63 runs and there by increases his average scores by 2. What is his average after the 12th innings? **(SSC CHSL 2012)**
(a) 13 (b) 41 (c) 49 (d) 87

14. The average of four consecutive even numbers is 9. Find the largest number. **(SSC CHSL 2012)**
(a) 12 (b) 6 (c) 8 (d) 10

15. The average weight of 12 crewmen in a boat is increased by $\frac{1}{3}$ kg, when one of the crewmen whose weight is 55 kg is replaced by a new man. What is the weight of that new men ? **(SSC CHSL 2012)**
(a) 58 (b) 60 (c) 57 (d) 59

16. Out of 10 teachers of a school, one teacher retires and in his place, a new teacher of age 25 years joins. As a result, average age of teachers is reduced by 3 years. The age (in years) of the retired teacher is : **(SSC CGL 1st Sit. 2013)**
(a) 50 (b) 58 (c) 60 (d) 55

17. The average of 50 numbers is 38. If two numbers namely 45 and 55 are discarded, the average of the remaining numbers is : **(SSC CGL 1st Sit. 2013)**
(a) 36 (b) 35 (c) 32.5 (d) 37.5

18. A cricket player after playing 10 tests scored 100 runs in the 11th test. As a result, the average of his runs is increased by 5. The present average of runs is **(SSC CGL 1st Sit. 2013)**
(a) 45 (b) 40 (c) 50 (d) 55

19. The average of nine numbers is 50. The average of the first five numbers is 54 and that of the last three numbers is 52. Then the sixth number is **(SSC CGL 1st Sit. 2013)**
(a) 24 (b) 44
(c) 30 (d) 34

20. The average of the first nine integral multiples of 3 is **(SSC CGL 1st Sit. 2013)**
(a) 15 (b) 18
(c) 21 (d) 12

21. Out of 40 boys in a class, average weight of 30 is 60 kg and the average weight of the remaining is 56 kg. The average weight (in kilogram) of the whole class is **(SSC CGL 2st Sit. 2013)**

(a) 58.5 (b) 58 (c) 57 (d) 59

22. The average of the first five multiples of 7 will be **(SSC CGL 2nd Sit. 2013)**

(a) 14 (b) 21 (c) 17.5 (d) 24.5

23. If a, b, c, d, e are five consecutive odd numbers, their average is **(SSC CGL 2nd Sit. 2013)**

(a) $5(a+4)$ (b) $\frac{abcde}{5}$

(c) $5(a+b+c+d+e)$ (d) $a+4$

24. The average of 20 numbers is 15 and the average of first five is 12. The average of the rest is **(SSC CGL 2nd Sit. 2013)**

(a) 16 (b) 15 (c) 14 (d) 13

25. Out of 20 boys, 6 are each of 1 m 15 cm height, 8 are of 1 m 10 cm and rest of 1 m 12 cm. The average height of all of them is **(SSC Multi-Tasking 2013)**

(a) 1 m 12 cm (b) 1 m 12.1 cm

(c) 1 m 21.1 cm (d) 1 m 21 cm

26. Average of first five prime numbers is **(SSC Multi-Tasking 2013)**

(a) 3.6 (b) 5.3 (c) 5.6 (d) 5

27. The batting average for 30 innings of a cricket player is 40 runs. His highest score exceeds his lowest score by 100 runs. If these two innings are not included, the average of the remaining 28 innings is 38 runs. The lowest score of the player is: **(SSC Sub. Ins. 2013)**

(a) 15 (b) 18 (c) 20 (d) 12

28. On a journey across Kolkata, a taxi averages 50 km per hour for 50% of the distance. 40 km per hour for 40% of it and 20 km per hour for the remaining. The average speed in km/hour, for the whole journey is : **(SSC Sub. Ins. 2013)**

(a) 42 (b) 40 (c) 35 (d) 45

29. The average of 30 numbers is 40 and that of other 40 numbers is 30. The average of all the numbers is **(SSC CHSL 2013)**

(a) 34.5 (b) $34\frac{2}{7}$ (c) 35 (d) 34

30. The average age of boys in the class is twice the number of girls in the class. The ratio of boys and girls in the class of 50 is 4 : 1. The total of the ages (in years) of the boys in the class is **(SSC CGL 2014)**

(a) 2000 (b) 2500 (c) 800 (d) 400

31. There are 100 students in 3 sections A, B and C of a class. The average marks of all the 3 sections was 84. The average of B and C was 87.5 and the average marks of A is 70. The number of students in A was **(SSC CGL 2014)**

(a) 30 (b) 35 (c) 20 (d) 25

32. The average weight of 15 oarsmen in a boat is increased by 1.6 kg when one of the crew, who weighs 42 kg is replaced by a new man. Find the weight of the new man (in kg). **(SSC CGL 1st Sit. 2015)**

(a) 65 (b) 66 (c) 43 (d) 67

33. What is the Arithmetic mean of the first 'n' natural numbers? **(SSC CGL 1st Sit. 2015)**

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

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

34. The average height of 8 students is 152 cm. Two more students of heights 144 cm and 155 cm join the group. What is the new average height ? **(SSC Multi-Tasking 2014)**

(a) 151.5 cm (b) 152.5 cm

(c) 151 cm (d) 150.5 cm

35. A boy found that the average of 20 numbers is 35 when he writes a number '61' instead of '16'. The correct average of 20 numbers is **(SSC Sub. Ins. 2014)**

(a) 32.75 (b) 37.25

(c) 34.75 (d) 34.25

36. The average salary of all the workers in a workshop is ` 8,000. The average salary of 7 technicians is ` 12,000 and the average salary of the rest is ` 6,000. The total number of workers in the workshop is **(SSC CHSL 2014)**

(a) 20 (b) 21 (c) 22 (d) 23

37. 3 years ago the average age of a family of 5 members was 17 years. A baby having been born, the average age of the family is the same today. The present age of the baby is **(SSC CHSL 2014)**

(a) 1 year (b) 1½ years

(c) 2 years (d) 3 years

38. What is the arithmetic mean of first 20 odd natural numbers? **(SSC CGL 1st Sit. 2015)**

(a) 17 (b) 19 (c) 22 (d) 20

39. The average of some natural numbers is 15. If 30 is added to first number and 5 is subtracted from the last number the average becomes 17.5 then the number of natural numbers is: **(SSC Sub. Ins. 2015)**

(a) 20 (b) 30 (c) 15 (d) 10

40. The average of 13 results is 70. The average of first seven is 65 and that of the last seven is 75, the seventh result is : **(SSC CHSL 2015)**

(a) 70 (b) 70.5 (c) 68 (d) 67

41. The average of 100 observations was calculated as 35.It was found later, that one of the observation was misread as 83 instead of 53. The correct average is: **(SSC CGL 1st Sit. 2016)**

(a) 32.7 (b) 34.7 (c) 35.7 (d) 36.7

42. At an average of 80 km/hr Shatabdi Express reaches Ranchi from Kolkata in 7 hrs. Then the distance between Kolkata and Ranchi is **(SSC CGL 1st Sit. 2016)**

(a) 560Km (b) 506Km (c) 560m (d) 650m

43. Visitors to a show were charged ` 15 each on the first day, ` 7.50 on the second day, ` 2.50 on the third day and total attendance on three days were in the ratio 2:5:13 respectively. The average charge per person for the entire three days is **(SSC CGL 2nd Sit. 2016)**

(a) ` 5 (b) ` 5.50

(c) ` 6 (d) ` 7

44. The average marks obtained by a class of 60 students is 65. The average marks of half of the students is found to be 85. The average marks of the remaining students is **(SSC CGL 2nd Sit. 2016)**

(a) 35 (b) 45 (c) 55 (d) 65

45. The average of 9 observations was found to be 35. Later on, it was detected that an observation 81 was misread as 18. The correct average of the observations is **(SSC CGL 2nd Sit. 2016)**

(a) 28 (b) 42 (c) 32 (d) 45

46. The average monthly income of A and B is ` 15,050, the average monthly income of B and C is ` 15,350 and the average income of A and C is ` 15, 200. The monthly income of A is **(SSC Sub. Ins. 2016)**

(a) ` 15,900 (b) ` 15,200 (c) ` 14,900 (d) ` 15,500

47. The average of 17 results is 60. If the average of first 9 results is 57 and that of the last 9 results is 65, then what will be the value of 9th result? **(SSC CGL 2017)**

(a) 39 (b) 78 (c) 117 (d) 156

48. The average of 5 members of a family is 24 years. If the youngest member is 8 years old, then what was the average age (in years) of the family at the time of the birth of the youngest member? **(SSC CGL 2017)**

(a) 16 (b) 20 (c) 24 (d) 32

49. The average age of 120 members of a society is 60.7 years. By addition of 30 new members, the average age becomes 56.3 years. What is the average age (in years) of newly joined members? **(SSC CGL 2017)**

(a) 36.5 (b) 37.2 (c) 38.3 (d) 38.7

50. The average runs conceded by a bowler in 5 matches is 45 and 15.75 in other 4 matches. What is the average runs conceded by the bowler in 9 matches? **(SSC CGL 2017)**

(a) 15 (b) 32 (c) 35 (d) 53.5

51. The mean of marks secured by 60 students in division A of class X is 64, 40 students of division B is 60 and that of 60 students of division C is 58. Find the mean of marks of the students of three divisions of Class X. **(SSC CHSL 2017)**

(a) 60.05 (b) 59.35 (c) 62.15 (d) 60.75

52. The average age of 30 students is 20 years and average age of 20 other students is 30 years. The average age of total number of students is: **(SSC MTS 2017)**

(a) 24 years (b) 48 years

(c) 25 years (d) 50 years

53. What is the average of the squares of the first 19 natural numbers? **(SSC Sub. Ins. 2017)**

(a) 124 (b) 127.5 (c) 130 (d) 133.5

54. In a match, average of runs scored by 5 players is 49. If the runs scored by four players are 75, 30, 62 and 21 respectively, then how many runs did the 5th player had scored?**(SSC Sub. Ins. 2017)**

(a) 43 (b) 49 (c) 57 (d) 89

55. The average of 18 numbers is 52. The average of the first 8 numbers is 62 and the average of the next 7 numbers is 45. If the 16th number is 6 less than the 17th number and the 17th number is one more than the 18th nmber, then what is the average of the 16th and 18th numbers? **(SSC Sub. Ins. 2018)**

(a) 40.5 (b) 40 (c) 39 (d) 39.5

56. The difference between the average of first ten prime numbers and the first ten prime numbers of two digit is : **(SSC CHSL-2018)**

(a) 14.5 (b) 16.5 (c) 12.5 (d) 13.5

57. The average marks of 40 students was found to be 68. If the marks of two students were incorrectly entered as 48 and 64 instead of 84 and 46 respectively, then what is the correct average? **(SSC CGL 2018)**

(a) 68.25 (b) 68.15 (c) 68.45 (d) 68.35

58. In a class of 50 students, 40% are girls. The average marks of the whole class are 64.4 and the average of the boys' marks is 62. What is the average marks of the girls? **(SSC CGL 2018)**

(a) 67 (b) 66.8 (c) 66.4 (d) 68

59. What is the average of first 15 odd numbers among the natural numbers? **(SSC MTS 2018)**

(a) 18 (b) 15 (c) 16 (d) 17

60. The present age of a Manoj is twice the sum of the ages of his two children. After 20 years, the age of Manoj will become equal to the sum of the ages of his two children. What is the present age of Manoj? **(SSC MTS 2018)**

(a) 40 years (b) 30 years

(c) 36 years (d) 35 years

61. The ratio of the age of a father and his son is 3 : 1. If the product of their ages is 432, then what is the sum of their ages? **(SSC MTS 2018)**

(a) 36 years (b) 48 years

(c) 60 years (d) 54 years

62. The average of four numbers is 20. If the average of the first two numbers is 15, then what is the average of the last two numbers? **(SSC MTS 2018)**

(a) 22 (b) 18 (c) 25 (d) 20

63. If $x - y = 4$ and $xy = 45$, then the value of $x^3 - y^3$ is : **(SSC CGL 2019-20)**

(a) 604 (b) 822 (c) 151 (d) 82

64. The average of 13 numbers is 42. If a 14th number is included, then the average becomes 44. What is the 14th number? **(SSC MTS 2019-20)**

(a) 70 (b) 62 (c) 66 (d) 68

65. The daily average rainfall on 5 days of a weeek is 30 mm. If the rainfall on 6th and 7th day are 42 mm and 25 mm respectively, then what is the average daily rainfall for the 7 days? **(SSC MTS 2019-20)**

(a) 31 (b) 29.5 (c) 33 (d) 28.5

66. The average of the runs of a cricket player in 20 matches is 35. If the average of the first 12 matches is 45, find the average of the last 8 matches. **(SSC CHSL 2019-20)**

(a) 20 (b) 16 (c) 22 (d) 18

67. The average of eleven number is 56. The average of first three numbers in 52 and that of next five numbers is 60. The 9th and 10th number are 3 and 1 more than the 11th number respectively. What is the average of 9th and 11th numbers? **(SSC CGL 2020-21)**

(a) 53.5 (b) 54 (c) 52.5 (d) 52

68. A, B, C and D are four positive numbers such that A is $\frac{3}{4}$ times of B, B is $\frac{4}{5}$ times of C, and C is $\frac{3}{8}$ times of D. If the average of 4 times of A and 7 times of D is 316, then the average of all the four numbers, A, B, C and D is:

(SSC CHSL 2020-21)

(a) 28 (b) 34 (c) 38 (d) 36

69. There are 100 students in a class, out of which 70% are girls and others are boys. The average score of girls in a test is 20% more than that of boys. If the average score of all the students is 57, then what is the average score of boys?

(SSC MTS 2020-21)

(a) 60 (b) 45 (c) 75 (d) 50

70. The average monthly exenditure of a family was ` 10,000 during the first three months, ` 12,500 during the next four months, and ` 13,500 during the last five months of a year. If the total savings during the year were ` 32,500 then the average monthly income (in `) of the family was:

(SSC MTS 2020-21)

(a) 15,000 (b) 13,750 (c) 17,250 (d) 14,250

71. The average of twelve numbers is 39. The average of the last five numbers is 35, and that of rhe firsr four numbers is 40. The fifth number is 6 less than the sixth number and 5 more than the seventh number. The average of the fifth and sixth numbers is : **(SSC Sub-Inspector 2020-21)**

(a) 47 (b) 39 (c) 44 (d) 50

72. The average weight of A, B and C is 65 kg. If the average weight of A and B is 63.5 kg, and the average weight of A and C is 67.5 kg, then the weight of A (In kg) is:

(SSC Sub-Inspector 2020-21)

(a) 67 (b) 60 (c) 68 (d) 65

HINTS & EXPLANATIONS

1. (c) $1+2+3+.....+n=\frac{n(n+1)}{2}$

$\therefore$ Average $=\frac{n+1}{2}=\frac{100+1}{2}=50.5$

Alternate Method:
Average of consecutive numbers or A.P.
$=\frac{\text{First term + Last term}}{2}$

Required average $=\frac{1+100}{2}=50.5$

2. (b) Father + mother
$=2\times35=70$ years
Father + mother + son
$=27\times3=81$ years
$\therefore$ Son's age $=81-70=11$ years

3. (b) Average of first n natural odd numbers $=n$
No. of odd numbers upto $100=50$
Sum of 50 odd numbers $=50^2$

Average $=\frac{50\times50}{50}=50.$

4. (c) Required average

$=30+\frac{(28+31-82-13)}{50}$

$=30+\left(-\frac{36}{50}\right)=30-0.72=29.28$

5. (c) Let 3 consecutive odd no. be x, x + 2 and x + 4
ATQ

$\frac{x+x+2+x+4}{3}=12+\frac{1}{3}x$

$\frac{3x+6}{3}-\frac{x}{3}=12$

$\Rightarrow 2x+6=36\Rightarrow x=\frac{36-6}{2}=15$

last no $=15+4=19$

6. (b) Difference in observations
$=64+28-46-82=-36$
$\therefore$ Correct average

$=124-\frac{36}{18}=122$

7. (d) Sum of the present ages of four boys
$=9\times4+20=56$ years
Sum of the present ages of five boys
$=15\times5=75$ years
$\therefore$ Present age of new boy
$=75-56=19$ years

8. (a) $39+48+51+63+75+83+x+69=60\times8$
$\Rightarrow 428+x=480$
$\Rightarrow x=480-428=52$

9. (c) $M+T+W=90°$ ...(i)
$T+W+Th=99°$ ...(ii)
By equation (ii) – (i)
$Th-M=9°\Rightarrow Th-32°=9°$
$\Rightarrow Th=9°+32°=41°$

10. (c) 10th observation
$= 24 \times 10 + 17 \times 10 - 19 \times 24$
$= 240 + 170 - 456 = -46$

11. (b) Required average

$$= \frac{40 \times 5 - 35 + 25}{5} = \frac{190}{5} = 38 \text{ years}$$

12. (b) Let the numbers be $n-2$, $n-1$, n, $n+1$ and $n+2$.
Their average $= n$.
Next two consecutive numbers are $n+3$ and $n+4$.
Therefore the average of 7 consecutive numbers

$$= \frac{(n-2)+(n-1)+n+(n+1)+(n+2)+(n+3)+(n+4)}{7}$$

$$= \frac{5n+2n+7}{7} = n+1$$

13. (b) Let the average of batsman after 11th innings = A

$$\frac{\text{Total score made by batsman at the end of 11th innings}}{11} = A$$

$\therefore$ Total score after 11th innings = 11 A

$$\text{Now, } \frac{\text{Total score after 11th innings + score made in 12th innings}}{12} = A + 2$$

$\Rightarrow 11A + 63 = (A+2) \times 12$
$\Rightarrow 11A - 12A = 24 - 63$
$\Rightarrow A = 39$
12th innings average $= 39 + 2 = 41$

Alternate Method:
He is playing 12th inning with an increment made in all previous innings
Total increment $= 2 \times 11 = 22$ runs
His current score = 63
Required average + increment = current score
Required average $= 63 - 22 = 41$

14. (a) Let the consecutive even numbers are 2n, 2n + 2, 2n + 4 and 2n + 6

$$\text{Average} = \frac{2n+2n+2+2n+4+2n+6}{4}$$

$8n + 12 = 4 \times 9 \Rightarrow n = 3$
Hence, the numbers are 6, 8, 10 and 12. Largest among them is 12.

15. (d) **Short-cut method:**
Weight of new crewmen
= Replaced man's weight + [No. of crew men $\times$ increment in average]

$$= 55 + 12 \times \frac{1}{3} = 59 \text{ kg}$$

16. (d) Age of retired teacher $= 25 + 3 \times 10 = 55$ years

17. (d) New average

$$= \frac{38 \times 50 - 45 - 55}{48} = \frac{1800}{48} = 37.5$$

18. (c) If the average in 10 tests be x, then,

$$\frac{x \times 10 + 100}{11} = x + 5$$

$x \times 10 + 100 = (x+5) \times 11$
$\Rightarrow 11x - 10x = 100 - 55$
$\Rightarrow x = 45$
$\therefore$ Required average = 50

19. (a) The sixth number $= 9 \times 50 - 5 \times 54 - 3 \times 52$
$= 450 - 270 - 156 = 24$

20. (a) Required average

$$= \frac{3(1+2+3+.....+9)}{9} = \frac{9 \times 10}{2 \times 3} = 15$$

21. (d) Average weight of 30 = 60 kg
$\Rightarrow$ Sum of weight of 30 boys = 1800
Average weight of 10 = 56 kg
$\Rightarrow$ Sum of weight of 10 boys = 560
Average weight of the whole class

$$= \frac{\text{Sum of weight of all boys}}{40}$$

$$= \frac{\text{sum of weight of 30 boys + sum of weight of 10 boys}}{40}$$

$$= \frac{60 \times 30 + 56 \times 10}{40} = 59 \text{ kg}$$

Alternate Method:
30 : 10 or 3 : 1 (Total 40 boys)
Averages 60 and 56 kgs.

$$\text{Final average} = \frac{3 \times 60 + 1 \times 56}{3+1} = \frac{236}{4} = 59 \text{ kg}$$

22. (b) $\text{Average} = \frac{7+14+21+28+35}{5} = 21$

23. (d) $b = a + 2$
$c = b + 2 = a + 4$
$d = c + 2 = a + 6$
$e = d + 2 = a + 8$
$\therefore$ Required average

$$= \frac{a+a+2+a+4+a+6+a+8}{5}$$

$$= \frac{5a+20}{5} = a + 4$$

24. (a) If the average of remaining numbers be x, then
$20 \times 15 = 5 \times 12 + 15x$
$\Rightarrow 300 = 60 + 15x$
$\Rightarrow 15x = 300 - 60 = 240$

$$\Rightarrow x = \frac{240}{15} = 16$$

25. (b) Average height $= \frac{6\times(1.15)+8\times(1.10)+6(1.12)}{20}$

$\Rightarrow \frac{22.42}{20} = 1.121$ or $1m\ 12.1cm$

26. (c) First five prime numbers are 2, 3, 5, 7, 11

$\text{Average} = \frac{2+3+5+7+11}{5} = \frac{28}{5} = 5.6$

27. (b) Lowest score $= x$

Highest score $= x + 100$

$\therefore\ 28\times 38 + x + x + 100 = 30\times 40$

$\Rightarrow 1064 + 2x + 100 = 1200$

$\Rightarrow 2x = 1200 - 1164 = 36$

$\Rightarrow x = 18$

28. (b) Total distance = 100 km.

$\text{Total time} = \frac{50}{50} + \frac{40}{40} + \frac{10}{20} = 1 + 1 + \frac{1}{2} = \frac{5}{2}$ hours

$\therefore$ Average speed $= \frac{100\times 2}{5} = 40$ kmph

29. (b) Sum of 30 numbers $= 30 \times 40 = 1200$

Sum of 40 numbers $= 40 \times 30 = 1200$

$\text{Average of 70 numbers} = \frac{1200+1200}{70} = \frac{2400}{70} = 34\frac{2}{7}$

30. (c) Number of boys $= \frac{4}{5}\times 50 = 40$

Number of girls $= \frac{1}{5}\times 50 = 10$

Average age of boys $= 2 \times 20 = 40$

Total ages of the boys $= 40 \times 20 = 800$ years

31. (c) Total marks of all three sections $= 84 \times 100 = 8400$

Total marks of $(B + C) = 87.5\ (n_2 + n_3)$

total marks of $A = 70 \times n_1$

$n_1 + n_2 + n_3 = 100$ ...(1)

$70n_1 + 87.5\ n_2 + 87.5\ n_3 = 8400$ ...(2)

Multiplying equation (1) by 87.5 and subtract from equation (2)

We get $17.5\ n_1 = 350$

$n_1 = 20$

32. (b) Let the average weight of 15 Oarsmen at the start = x kg

Let the new man's weight = y kg

According to question

$15x - 42 = 15\ (x + 1.6) - y$

$15x - 42 = 15x + 24 - y$

$y = 24 + 42 = 66$ kg

33. (a) Arithmetic mean of first 'n' natural number

$= \frac{\text{Sum of 'n' natural number}}{\text{Number of observations}} = \frac{(n)(n+1)}{2\times n} = \frac{n+1}{2}$

34. (a) Total height of 8 students $= 8 \times 152$ cm $= 1216$ cm

Total height of 10 students $= 1216$ cm $+ 144$ cm $+ 155$ cm $= 1515$ cm

new average $= \frac{1515}{10}$ cm $= 151.5$cm

35. (a) Sum of 20 numbers $= 20 \times 35 = 700$

Sum of 20 numbers when 61 is replaced by 16

$\Rightarrow 700 - 61 + 16 = 655$

Correct average of 20 numbers $= \frac{655}{20} = 32.75$

36. (b) Let total number of workers be n

total salary of all workers = 8000 n

total salary of 7 technicians $= 7 \times 12000 = 84{,}000$

total salary of remaining workers $= (n - 7) \times 6000$

$84000 + (n - 7) \times 6000 = 8000\ n$

$84 + 6n - 42 = 8n$

$42 = 2n$

$n = 21$

37. (c) Let total age of family be S years

3 years ago, total age $= S - 3 \times 5 = S - 15$

$\frac{S-15}{5} = 17$

$S = 17 \times 5 + 15 = 100$

Let present age of baby be x years

$\frac{S+x}{6} = 17$

$100 + x = 17 \times 6$

$x = 102 - 100 = 2$ years

38. (d) For 20 natural last odd number

$= 1 + (20 - 1) \times 2 = 39$

$\text{Arithmetic mean of odd number} = \frac{n+1}{2}$

$= \frac{40}{2} = 20$

$\text{Sum of } \frac{\text{Shortcut Method}}{\text{20 odd numbers}} = 20 \times 20 = 400$

$\therefore\ \text{Mean} = \frac{400}{20} = 20$

39. (d) Let number of natural numbers be x

$\therefore\ 15x + 30 - 5 = 17.5\ x$

$25 = 2.5x$

$x = \frac{25}{2.5} = 10$

So 10 natural numbers are there.

40. (a) Sum of 13 results $= 13 \times 70 = 910$

Sum of 7 results $= 7 \times 65 = 455$

Sum of last 7 results $= 7 \times 75 = 525$

So, 7^{th} result $= (455 + 525) - 910 = 70$

41. (b) Average of difference

$= \frac{83-53}{100} = \frac{30}{100} = 0.3$

Correct Average $= 35 - 0 \cdot 3 = 34.7$

42. (a) Distance = Speed × Time

$= 80 \times 7 = 560$ km

43. (a) Let the attendance on the three day be $2x$, $5x$ and $13x$ respecting

Total charges = ` $(15\times 2x + 7.50\times 5x + 2.50\times 13x)$

= ` $(30x + 37.5x + 32.5x)$

= ` $100x$

$\therefore$ Average = ` $\dfrac{100x}{2x+5x+13x}$ = ` 5

44. (b) Total students = 60

$$\frac{30\times 85 + 30x}{60} = 65$$

$30x = 65\times 60 - 30\times 85$

$30x = 30[65\times 2 - 85]$

$x = \dfrac{30}{30}[130 - 85] = 45$

45. (b) Average of 9 observations = 35

Total = $9\times 35 = 315$

Misread Difference = $81 - 18 = 63$

New total = $315 + 63 = 378$

Average = $\dfrac{378}{9} = 42$

Shortcut Method:

$81 - 18 = 63$

$\therefore \dfrac{\cancel{63}}{\cancel{9}} = 7$

$35 + 7 = 42$

46. (c) Sum of monthly income of A + B = 30100 ...(i)

Sum of monthly income of B + C = 30700 ...(ii)

Sum of monthly income of A + C = 30400 ...(iii)

Subtracting eqn. (i) from (ii)

$B + C - A - B = 30700 - 30100$

$C - A = 600$ ...(iv)

$C + A = 30400$ ...(v)

Subtracting eqn. (v) from (iv)

$C - A - C - A = 600 - 30400 - 2A = -29800$

A = ` 14900

47. (b) Value of 9th result = $(9\times 57 + 9\times 65) - (17\times 60)$

$= 1098 - 1020$

$= 78$

48. (b) Required average age $= \dfrac{(24\times 5 - 8\times 5)}{4}$

$= \dfrac{120-40}{4} = \dfrac{80}{4} = 20$ years

49. (d) Let average age of newly joined member = x

According to question,

$120\times 60.7 + 30\times x = 150\times 56.3$

$7284 + 30x = 8445$

$\therefore$ $30x = 8445 - 7284$

$30x = 1161$

$\therefore$ $x = \dfrac{1161}{30} = 38.7$

50. (b) Required average runs

$$= \frac{(45\times 5) + (15.75\times 4)}{9} = \frac{288}{9} = 32.$$

51. (d) Mean of marks of the students

$$= \frac{(60\times 64 + 40\times 60 + 60\times 58)}{160}$$

$$= \frac{9720}{160} = 60.75$$

52. (a) The average age of total number of students

$$= \frac{(30\times 20) + (20\times 30)}{50}$$

$$\Rightarrow \frac{600+600}{50} = \frac{1200}{50} = 24 \text{ years.}$$

53. (c) $\because$ Average of the square of the first 19 natural numbers

$$= \frac{n(n+1)(2n+1)}{6n}$$

$$= \frac{19(19+1)(19\times 2+1)}{6\times 19}$$

$$= \frac{19\times 20\times 39}{6\times 19} = 130$$

54. (c) Total runs scored by 5 players = $(49\times 5) = 245$

Total runs scored by 4 players = $(75 + 30 + 62 + 21)$

$= 188$

$\therefore$ Total runs did the 5^{th} player had scored

$= (245 - 188) = 57.$

55. (a) Sum of 18 numbers = $18\times 52 = 936$

Sum of first 8 numbers = $62\times 8 = 496$

Sum of next 7 numbers = $45\times 7 = 315$

Sum of 16^{th}, 17^{th} and 18^{th} numbers = $936 - 496 - 315$

$= 125$

Now, let 17^{th} number is x.

then, 16^{th} number is $(x-6)$.

and 18^{th} number is $(x-1)$.

so, $(x-6) + x + (x-1) = 125.$

$3x - 7 = 125 \Rightarrow 3x = 132.$

$$x = \frac{132}{3} = 44.$$

Average of 16^{th} and 18^{th} number $= \dfrac{(44-6)+(44-1)}{2}$

$= 40.5.$

56. (d) x = first ten prime numbers are, 2, 3, 5, 7, 11, 13, 17, 19, 23 and 29

y = first ten prime numbers of two digits are 11, 13, 17, 19, 23, 29 31, 37, 41 and 43.

Average of x $= \frac{2+3+5+7+---23+29}{10} = 12.9$

Average of y $= \frac{11+13+17+.....+41+43}{10} = 26.4$

Difference in Average $= 26.4 - 12.9 = 13.5$

57. (c) Correct Average

$= 68 + \frac{(84+46-48-64)}{40}$

$= 68 + 0.45 = 68.45$

58. (d) Number of girls in the class

$= 50 \times \frac{40}{100} = 20$

Number of boys in the class $= 50 - 20 = 30$

Average marks of the girls

$= \frac{64.4 \times 50 - 62 \times 30}{20} = 68$

59. (b) Here the first 15 odd natural number are

1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29

Sum of first 15 odd numbers are $1 + 3 + 5 ..... + 29 = 225$

Hence the average is $= \frac{225}{15} = 15$

60. (a) Let present age of Manoj is x years.

and their two sons present age are y and z years.

According to the question,

$x = 2(y + z)$ ...(i)

Their ages after 20 years.

$x + 20 = (y + 20) + (z + 20)$

$x = y + z + 20$

From equation (1),

$x = \frac{x}{2} + 20$

$x - \frac{x}{2} = 20$

$\frac{x}{2} = 20$

$\Rightarrow x = 40$

Hence, present age of father = 40 years.

61. (b) The ratio of their ages

Father : Son

$3x : 1x$

Product of their ages is 432

i.e. $3x^2 = 432$

$x^2 = 144$

$x = \pm 12$

Age connot be negative so we have to opt + 12.

Hence, the age of father $= 3 \times 12 = 36$

Age of son $= x = 12$

Sum of their ages $= 12 + 36 = 48$ years.

62. (c) Let the 4 no's be x_1, x_2, x_3 and x_4

Average $\frac{x_1 + x_2 + x_3 + x_4}{4} = 20$

$x_1 + x_2 + x_3 + x_4 = 80$

Average of first two numbers are 15

$\frac{x_1 + x_2}{2} = 15$

$x_1 + x_2 = 30$ ...(1)

$x_1 + x_2 + x_3 + x_4 = 80$

From the eq. (1) we have put the value of

$x_1 + x_2 = 30$

$x_3 + x_4 = 80 - 30$

$x_3 + x_4 = 50$

Hence the average of last two no. is

$\frac{x_3 + x_4}{2} = \frac{50}{2} = 25$

63. (a) According to question,

$x - y = 4$, and $xy = 45$

Now, $(x - y)^2 = (4)^2$

$\Rightarrow \quad x^2 + y^2 - 2xy = 16$

$\Rightarrow \quad x^2 + y^2 - 2 \times 45 = 16$

$\Rightarrow \quad x^2 + y^2 = 16 + 90 = 106$

$\therefore \quad x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

$\Rightarrow \quad (4)(x^2 + y^2 + xy)$

$\Rightarrow \quad (4)(106 + 45)$

$\Rightarrow \quad 4 \times 151 = 604$

64. (a) $13 \times 42 + 14^{th} = 14 \times 44$

$\Rightarrow 546 + 14^{th} = 616$

Number, $14^{th} = 70$

65. (a) Average of 7 days

$= \frac{5 \times 30 + 42 + 25}{7} \quad = \frac{150 + 67}{7} = \frac{217}{7} = 31$

66. (a) Total runs in 20 matches $= 20 \times 35 = 700$.

Total runs in first 12 matches $= 12 \times 45 = 540$.

Total runs in last 8 matches $= 700 - 540 = 160$.

Average runs in last 8 matches $= \frac{160}{8} = 20$.

67. (a) The sum of eleven number $= 56 \times 11 = 616$

The sum of first three number $= 52 \times 3 = 156$

The sum of next five numbers $= 60 \times 5 = 300$

The sum of remaining three numbers

$= 616 - (156 + 300) = 616 - 456 = 160$

Let the 11^{th} number is x.

Then, 9^{th} number $= x + 3$

and 10^{th} number $= x + 1$

$\therefore \quad x + 3 + x + 1 + x = 160$

$\Rightarrow \quad 3x + 4 = 160$

$\Rightarrow \quad 3x = 156$

$\Rightarrow \quad x = 52$

$\therefore$ 9th number = 52 + 3 = 55

11th number = 52

$\therefore$ Required average

$$= \frac{55+52}{2} = \frac{107}{2} = 53.5$$

68. (c) Let D number is $40x$.

$$C = \frac{3}{8} \times 40x = 15x$$

$$B = \frac{4}{5} \times 15x = 12x$$

$$A = \frac{3}{4} \times 12x = 9x$$

According to question,

$$\frac{4 \times 9x + 7 \times 40x}{2} = 316$$

$\Rightarrow 36x + 280x = 316 \times 2$

$\Rightarrow 316x = 316 \times 2$

$\Rightarrow x = 2$

So, four positive numbers are,

$A = 2 \times 9 = 18$, $B = 12 \times 2 = 24$

$C = 2 \times 15 = 30$, $D = 2 \times 40 = 80$

Hence, average of all four numbers A, B, C and D

$$= \frac{18+24+30+80}{4} = \frac{152}{4} = 38$$

69. (d) Number of girls $= \frac{70}{100} \times 100 = 70$

Number of boys $= 100 - 70 = 30$

Average score of girls

$$= \frac{120}{100} \text{(average score of boys)}$$

$$\Rightarrow \text{Average score of girls} = \frac{6}{5} \text{(Average score of boys)}$$

$$\Rightarrow \frac{6x \times 70 + 5x \times 30}{100} = 57 \Rightarrow \frac{420x + 150x}{100} = 57$$

$\Rightarrow 570x = 5700$

$\Rightarrow \boxed{x = 10}$

Average score of boys $= 5 \times 10 = 50$

70. (a) Average monthly expenditure of family during the first three months = ` 10,000

Total expenditure of first three months

$= 3 \times 10{,}000 =$ ` 30,000

Average expenditure of family during next four months = ` 12,500

Total expenditure of next four months

$=$ ` $4 \times 12{,}500 =$ ` 50,000

Average expenditure of family during last five months = ` 13,500

Total expenditure of last five months

$= 5 \times 13{,}500 =$ ` 67,500

Total expenditure in a year

$=$ ` 30,000 + ` 50,000 + ` 67,500

$=$ ` 147500

Total saving during the year = ` 32,500

$\therefore$ Total income = ` 147500 + ` 32500 = 180000

$$\therefore \text{Monthly income} = \frac{180000}{12} = \text{` } 15{,}000$$

71. (a) Sum of 12 numbers $= 12 \times 39 = 468$

Sum of last five numbers $= 5 \times 35 = 175$

Sum of first 4 numbers $= 4 \times 40 = 160$

5th number = 6th number – 6

5th number = 5 + 7th number

$a_5 + a_6 + a_7 = 468 - 175 - 160$

$= 468 - 335$

$a_5 + a_5 + 6 + a_5 - 5 = 133$

$3a_5 = 132$

$a_5 = 44$

$a_6 = 50$

$$\frac{a_5 + a_6}{2} = \frac{94}{2} = 47$$

72. (a) Sum of weight $= 65 \times 3 = 195$ kg

Sum of weight A & B $= 2 \times 63.5 = 127$ kg

Sum of weight A & C $= 2 \times 67.5 = 135$ kg

Weight of C $= 195 - 127 = 68$

Weight of A $= 135 - 68 = 67$ kg

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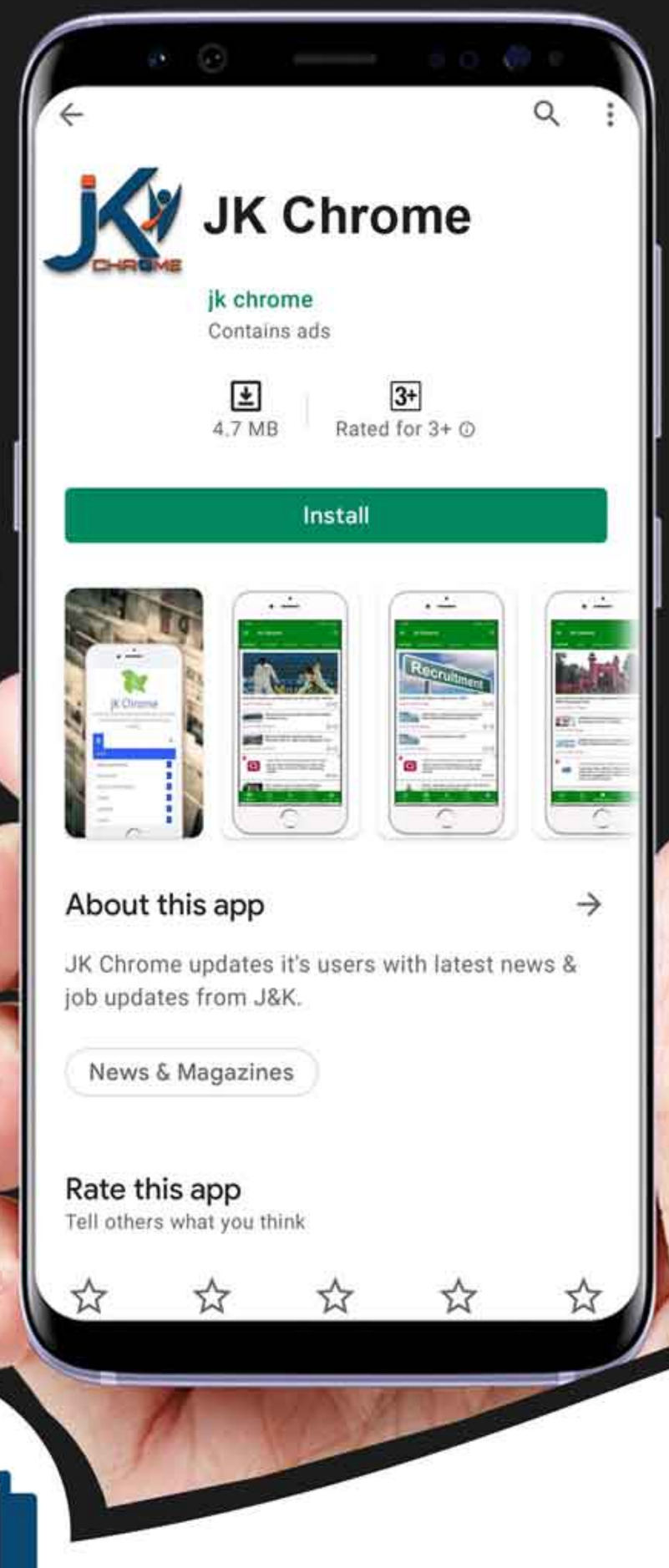

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