Averages Mixtures and Alligation-Exercise Questions updated on Dec 2024

1) Find the average of first 40 natural numbers.

a. 20.5

b. 18

c. 19.5

d. 19

2) Find the average of all the numbers between 6 and 34 which are divisible by 5

a. 18

b. 20

c. 24

d. 30

3) The average of 2,7,6 and x is 5 and the average of 18,1,6,x and y is 10. What is the value of y?

a. 5

b. 10

c. 20

d. 30

4) The average of 7 consecutive numbers is 20. The largest of these numbers is

a. 20

b. 22

c. 23

d. 24

5) Nine persons went to a hotel for taking their meals. Eight of them spent Rs 12 each on their meals and the ninth spent Rs.8 more than the average expenditure of all the nine. What was the total money spent by them?

a. 117

b. 180

c. 150

d. 200

6) In seven given numbers, the average of first four numbers is 4 and that of the last four numbers is also 4. If the average of these seven numbers is 3, the fourth number is

a. 3

b. 4

c. 7

d. 11

7) The average weight of 29 students is 28 kg. By the admission of a new student, the average weight is reduced to 27.8 kg. The weight of the new student is

a. 22 kg

b. 21.6 kg

c. 22.4 kg

d. 21 kg

8) The average age of a committee of 8 members is 40 years. A member aged 55 years retired and his place was taken by another member aged 39 years . The average age of present committee is;

a. 39 years

b. 38 years

c. 36 years

d. 35 years

9) Eight persons participated in a shooting competition. The top score in the competition is 85 points. Had the top score been 92 points instead of 85 points, the average score would have been 84. Find the number of points actually scored in the competition.

a. 645

b. 655

c. 665

d. 636

10) Find the average of all even numbers upto 75.

a. 35

b. 36

c. 38

d. 34

11) The average mark of a class of twenty students is 64. If three students whose marks are 32,28 and 34 are removed , then find the approximate average mark of the remaining st udents of the class.

a. 71

b. 74

c. 57

d. 70

12) The number of students in the three sections of a class are in the ratio 2:3:4. The average marks scored in each of these sections is in the ratio 4:3:1. By what percent is the a verage mark of the second section more than the class average?

a. 23.27%

b. 28.57%

c. 32.38%

d. 36.74%

13) The average age of 40 students is 8 years. If the age of teacher is also included , then their average age increases by half a year. What is the age of the teacher?

a. 45 years

b. 48.5 years

c. 28.5 years

d. 26.5 years

14) Eight kilograms of rice costing Rs. 16 per kg is mixed with four kilograms of rice costing Rs. 22 per kg. What is the average price of the mixture?

a. 20

b. 18

c. 16

d. 19

15) How many kilograms of tea powder costing Rs. 31 per kg be mixed with 36 kilograms of tea powder costing Rs. 43 per kg, such that the mixture when sold at Rs. 44 per kg gives profit of 10%?

a. 12

b. 15

c. 20

d. 10

16) A solution of 66 litres contains milk and water in the ratio 7:x. If four litres of water is added to the solution, the ratio becomes 3:2, find the value of x?

a. 8

b. 5

c. 3

d. 4

17) A single refined oil can contains 20% impurities. After double – refining it contains 4% impurities. How much of double- refined oil can be obtained from 30 litres of single refined oil?

a. 24.0 litres

b. 24.8 litres

c. 25.0 litres

d. 25.5 litres

18) A mixture of 20 kg of spirit and water contains 10% water. How much water must be added to this mixture to raise the percentage of water to 25%

a. 4 kg

b. 5 kg

c. 8 kg

d. 30 k

19) A can contains a mixture of two liquids A and B in the ratio 7:5. When 9 litres of mixture are drawn off and the can is filled with B, the ratio of A and B becomes 7:9. How many litres of liquid A was contained by the can initially?

a. 25

b. 21

c. 20

d. 10

20) Equal weights of two alloys containing tin, copper and lead in the ratio 3:2:7 and 4:11:3 are melted and mixed together. What is the ratio of tin, copper and lead in the resultant alloy?

a. 41:81:37

b. 33:91:81

c. 17:28:27

d. 51:86:89

Answer & Explanations

1. Exp. Sum of first n natural numbers = $\frac{n(n+1)}{2}$

So, sum of first 40 natural numbers = 40*41/2 = 820

Required average =820/40 =20.5

2. Exp. Multiples of 5 between 6 and 34 are 10,15,20,25,30

Average = (10+15+20+25+30)/5 =5(10+30)/2*5 = 40/2 =20

3. Exp. We have : (2+7+6+x)/4 = 5 or 15+x =20 or x = 5

Also (18+1+6+x+y)/5 = 10, 25+5+y = 50, y =20

4. Exp. Let the first number be x, Then the last number is (x+6)

Average = $\frac{x+(x+1)+(x+2)+(x+3)+(x+3)+(x+4)+(x+5)+(x+6)}{7}$ = 20

7x + 21 = 20*7 = 140, 7x =119, x = 17

The largest number =x+6 =17+6 = 23

5. Exp. Let the total expenditure be x, Then the average = x/9,

8*12+ [x/9+8] =x or [x-x/9] =104.

8x/9 = 104, x =104*9/8 =117.

6. Exp. Let the fourth number be x, Then , $\frac{\text{First three} + x}{4}$ = 4

First three +x = 16, $\frac{x + \text{last three}}{4}$ = 4, x + last three = 16,

$\frac{(\text{First three} + x) + \text{last three}}{3}$ = 3, First three +x + last three = 7*3 = 21

16 + (16 -x) = 21, x = 32 – 21 = 11

7. Exp . The total weight of 29 students = 29* 28

The total weight of 30 students = 30* 27.8

Weight of the new student = (30*27.8 – 29*28)

= 834 - 812 = 22

8. Exp. Total age of the committee = 40*8 = 320,

Total age when a member is retired

and a new one was joined = 320-55 +39, =304

Average age of present committee = 304/8 = 38.

9. Exp. Let the actual number of points scored be x,

Then [x + (92 –85)] /8 = 84, (x + 7) /8 = 84 , x = (84*8)- 7,

= 672 - 7 = 665

10. Exp. Average of all even numbers upto 75 = [35/2* (first even number + greatest even number before 75)]/35 = ½ *(2 +74) = 76/2 = 38.

11. Exp. Total mark of 20 students = 64*20 = 1280,

Total mark after the removal of 3 students = 1280 –(32 +28+34)

= 1280 – 94 = 1186

Approximate average mark = 1186/(20-3) = 1186/ 17 = 70

12. Exp. Let the number of students be 2x, 3x, 4x.

Let the average marks be 4y,3y,y.

Average mark of class = (8xy+9xy+4xy)/(2x+3x+4x) =21xy/9x=7y/3

Percentage difference = (3y - 7y/3)/7y/3 *100 = 28.57%

13. Exp. Total age of 40 students = 40*8 = 320

Let the age of the the teacher be x, Then (320+x)/41 = 8+1/2 =8 ½.

320+x =17/2*41 =697/2 = 348.5, x =348.5-320 = 28.5

14. Exp. P1 = Rs.16 per kg, p2 = Rs. 22 per kg, q1 = 8 kg, q2 = 4 kg

Now , p = (p1q1+p2q2)/(q1+q2)

Average price of the mixture = 8*16+4*22/12 = 128+88/12

= 216 /12 = 18

15. Exp. SP of the mixture = 44, Profit =10%, Then CP = SP*100/110

44*100/110 = Rs. 40 per kg

Using alligation rule, the required ratio = 1:3

If 36 kg is 3 part then 1 part is 36*1/3 =12

16. Exp. Total new quantity = original sol + water =66+4 =70

New ratio = 3:2, New quantity of milk =3/5*70 = 42 Lit,

New quantity of water = 2/5*70 = 28 Lit

Water present initially = (28-4) = 24 Lit

Ratio = 42/24 =7/4 There for x = 4

17. Exp. On double- refining impurity decreases from 20% to 4%., but the amount of pure oil in both cases remains constant,

i.e, 96% of double refined oil = 80% of single refined oil.

Let x be the quantity of double-refined oil

Then 96*x/100 = 80*30/100, x = 30*80 /96 = 25

18. Exp. Water in the given mixture = 10*20/100 =2 kg,

And spirit = (20-2) = 18 kg

Let x kg of water added, Then, x+2/20+x *100 ==25

4x+8 =20+x, or x =4 kg

19. Exp. Suppose the can initially contains 7x and 5x litres mixtures A and B respectively

Quantity of A in mix. left =[7x –7/12 * 9] =[7x –21/4]

Quantity of B in mix. left =[5x –5/12 *9] = [5x - 15/4]

Therefore [7x-21/4] =7/9 or 28x-21 = 7/9

[5x-15/4]+9 20x+21

252x -189 =140x+147 or 112x =336 , x = 3.

Quantity of A in the can initially =7*3 =21

20. Exp. Let the weight of the two alloys be w each

Required ratio =

(3w/12 +4w/18): (2w/12 +11w/18): (7w/12+3w/18)

= 17w/36 : 28w/36 : 27w/36

= 17:28: 27