Averages and Ages Questions for IBPS PO Prelims

Instructions

For the following questions answer them individually

Question 1

Suresh gave 17.39% of his monthly income to his wife and spent 31.57% of the remaining amount for household expenses. Out of the remaining amount he gave 15.38% to the charity. Again from the remaining amount he gave 18.18% to his friend. Finally if Suresh is left with ___ then monthly income of Suresh is ___ .
Which of the following values can fill in the blanks appropriately?
i) 10035, 25645
ii) 8991, 22977
iii) 16083, 41101
iv) 14085, 35995

A   Only (ii) and (iv)

B   Only (i) and (iv)

C   All (i), (ii), (iii) and (iv)

D   Only (i), (ii) and (iv)

E   Only (ii), (iii) and (iv)

Answer: C

Explanation:
Suresh gave 17.39% of his monthly income to his wife.
Let the monthly income of Suresh = 23p
Amount given to his wife = $\frac{4}{23} \times 23p$ = 4p
Amount remaining = 23p - 4p = 19p

Suresh spent 31.57% of the remaining amount for household expenses.
Amount spent for household expenses = $\frac{6}{19} \times 19p$ = 6p
Amount remaining = 19p - 6p = 13p

Out of the remaining amount he gave 15.38% to the charity.
Amount given charity = $\frac{2}{13} \times 13p$ = 2p
Amount remaining = 13p - 3p = 11p

Again from the remaining amount he gave 18.18% to his friend.
Amount given to friend = $\frac{2}{11} \times 11p$ = 2p
Final amount remaining = 11p - 2p = 9p

Ratio of the final amount remaining with Suresh and his monthly income respectively = 9p : 23p
= 9 : 23

i) 10035, 25645
Ratio of the final amount remaining with Suresh and his monthly income respectively = 10035 : 25645
= 9 : 23
Given values satisfy the condition of the question.

ii) 8991, 22977
Ratio of the final amount remaining with Suresh and his monthly income respectively = 8991 : 22977
= 9 : 23
Given values satisfy the condition of the question.

iii) 16083, 41101
Ratio of the final amount remaining with Suresh and his monthly income respectively = 16083 : 41101
= 9 : 23
Given values satisfy the condition of the question.

iii) 14085, 35995

Ratio of the final amount remaining with Suresh and his monthly income respectively = 14085 : 35995
= 9 : 23
Given values satisfy the condition of the question.
Hence, the correct answer is Option C

Question 2

The average weight of 'a-7' students is 'a+7', 'a+5' students is 'a+17' and '2a-50' students is '2a-26' respectively. What is the value of 'a' if the average weight of all the given students is '2a-29'?

A   2

B   Either 2 or 43

C   41

D   43

E   Either 2 or 41

   Answer: D

Explanation:
The average weight of 'a-7' students is 'a+7'
Sum of the weights of 'a-7' students = (a+7)(a-7)

The average weight of 'a+5' students is 'a+17'
Sum of the weights of 'a+5' students = (a+17)(a+5)

The average weight of '2a-50' students is '2a-26'
Sum of the weights of '2a-50' students = (2a-26)(2a-50)

Total number of students = a - 7 + a + 5 + 2a - 50 = 4a - 52
Overall average weight = 2a - 29
Total weight of all students = (2a-29)(4a-52)

(a+7)(a-7) + (a+17)(a+5) + (2a-26)(2a-50) = (2a-29)(4a-52)
a^2 - 49 + a^2 + 22a + 85 + $4a^2$ - 152a + 1300 = $8a^2$ - 220a + 1508
$6a^2$ - 130a + 1336 = $8a^2$ - 220a + 1508
$2a^2$ - 90a + 172 = 0
a^2 - 45a + 86 = 0
a^2 - 2a - 43a + 86 = 0
a(a - 2) - 43(a - 2) = 0
(a - 2)(a - 43) = 0
a = 2, 43
If a = 2 then number of students(2a - 50) is negative which is not possible.
So a = 43
Hence, the correct answer is Option D

Question 3

The average weight of 63 students in a class is 55 kg. When 63 students were combined with a teacher and 6 more students whose average weight is 58 kg the average weight increased by 0.5 kg. What is the weight of the teacher?

A   50 kg

B   62 kg

C   66 kg

D   78 kg

E   72 kg

   Answer: E

Explanation:
The average weight of 63 students in a class is 55 kg.
Sum of the weight of 63 students = 55 x 63 = 3465 kg

Let the weight of the teacher = w
Average weight of 6 new students = 58 kg
Sum of the weight of 6 new students = 58 x 6 = 348 kg

According to the problem, average weight of 70 members = 55 + 0.5 = 55.5
Sum of the weight of 70 members = 55.5 x 70 = 3885 kg
Sum of the weight of 63 students + Weight of the teacher + Sum of the weight of 6 new students = 3885
3465 + w + 348 = 3885
3813 + w = 3885
w = 72 kg
Weight of the teacher = w = 72 kg
Hence, the correct answer is Option E

Question 4

A school distributed sweets to its students in celebration of its 25th anniversary and different students received different number of sweets. The average of the number of sweets received by P and Q is 14.28% more than the average of the number of sweets received by Q and R. Ratio of the number of sweets received by Q and R is 31:25 respectively then which of the following can be the possible number of sweets received by P?

A 50

B 62

C 66

D 78

E 72

Answer: C

Explanation:
Ratio of the number of sweets received by Q and R is 31:25 respectively.
Let the number of sweets received by Q and R are 31a and 25a respectively.
Q = 31a
R = 25a

The average of the number of sweets received by P and Q is 14.28% more than the average of the number of sweets received by Q and R.
$$\frac{P+Q}{2} = \frac{Q+R}{2} + \frac{1}{7} \times \frac{Q+R}{2}$$
$$\frac{P+Q}{2} = \frac{8}{7} \times \frac{Q+R}{2}$$
7P + 7Q = 8Q + 8R
7P - Q - 8R = 0
7P - 31a - 8(25a) = 0
7P - 31a - 200a = 0
7P = 231a
P = 33a
Number of sweets received by P is multiple of 33.
The only multiple of 33 from the options is 66.
Hence, the correct answer is Option C

Question 5

If $(x + 5)$ of $11.11\% = y$ of $12.5\% - 10$ and $(x - 25) = 75\%$ of $(y - 40)$, then find out the value of $40\% \, of \, (y - x)$.

A 39

B   51

C   28

D   13

E   None of the above

   Answer: E

Explanation:

$(x + 5)$ of $11.11\% = y$ of $12.5\% - 10$

$(x + 5) \times \frac{1}{9} = y \times \frac{1}{8} - 10$

$(x + 5) = y \times \frac{9}{8} - 90$

$x = y \times \frac{9}{8} - 90 - 5$

$x = y \times \frac{9}{8} - 95$ Eq.(i)

$(x - 25) = 75\%$ of $(y - 40)$

$(x - 25) = \frac{3}{4} \times (y - 40)$

Put the value of 'x' in the above equation from Eq.(i).

$(y \times \frac{9}{8} - 95 - 25) = \frac{3}{4} \times (y - 40)$

After solving the above equation, y = 240.

Put the value of 'y' in Eq.(i).

$x = 240 \times \frac{9}{8} - 95$

x = 270-95

= 175

value of $40\% of (y - x)$ = 40% of (240 − 175)

= 40% of 65

= 26

Hence, option e is the correct answer.

Question 6

Ketan spent 41.67% of his monthly salary on house rent. Out of the remaining, he spent 20% on food. Out of the remaining, he spent 10% on education. After that the remaining amount was invested in FD and MF in the ratio of 7:5 respectively. If the amount spent on education by him is Rs. 4480, then find out the difference between the amount spent on house rent and the amount invested on FD from his monthly salary.

A   Rs. 15240

B   Rs. 18640

C   Rs. 16480

D   Rs. 12680

E   None of the above

   Answer: C

Explanation:

Let's assume the monthly salary of Ketan is 12z.

Ketan spent 41.67% of his monthly salary on house rent.

Amount spent on house rent = 12z of (5/12) = 5z

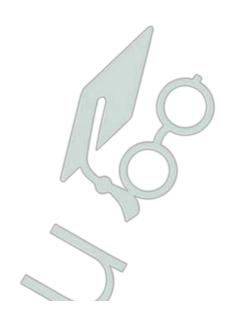Out of the remaining, he spent 20% on food.

Amount spent on food = (12z-5z) of 20%

= 7z of 20%

= 1.4z

Out of the remaining, he spent 10% on education.

Amount spent on education = (7z-1.4z) of 10%

= 5.6z of 10%

= 0.56z

If the amount spent on education by him is Rs. 4480.

0.56z = 4480

z = 8000

After that the remaining amount was invested in FD and MF in the ratio of 7:5 respectively.

Amount invested on FD = 5.04z of (7/12)

= 2.94z

Difference between the amount spent on house rent and the amount invested on FD from his monthly salary = 5z - 2.94z

= 2.06z

Put the value of 'z' in the equation.

$= 2.06 \times 8000$

= Rs. 16480

Hence, option c is the correct answer.

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Question 7

The average weight of a group of 'y' people is 'z' kg. If five people left the group whose average weight is 52 kg, then the average of weight of the group will be increased by 0.25. If five people joined the group whose average weight is 38 kg, then the average of weight of the group will be (z-1) kg. Find out the value of 'z'.

A   54

B   58

C   56

D   52

E   None of the above

  Answer: C

Explanation:

The average weight of a group of 'y' people is 'z' kg. If five people left the group whose average weight is 52 kg, then the average of weight of the group will be increased by 0.25.

$yz - 5 \times 52 = (y - 5)(z + 0.25)$

$yz - 260 = (y - 5)(z + 0.25)$

After solving the above equation, we obtain an equation which is given below.

y = (20z-1035) Eq.(i)

If five people joined the group whose average weight is 38 kg, then the average of weight of the group will be (z-1) kg.

$yz + 5 \times 38 = (y + 5)(z - 1)$

$yz + 190 = (y + 5)(z - 1)$

After solving the above equation, we obtain an equation which is given below.

y = (5z-195) Eq.(ii)

Eq.(i) = Eq.(ii)

(20z-1035) = (5z-195)

15z = 1035-195 = 840

z = 56

Hence, option c is the correct answer.

Question 8

The monthly savings of A is 58.33% less than the monthly expenditure of B. The monthly income of A is 25% more than the monthly income of B. If the monthly savings of B is Rs. 760 and the sum of the monthly expenditure of A and B together is Rs. 2490, then find out the difference between the monthly income of A and B.

A   Rs. 500

B Rs. 200

C Rs. 300

D Rs. 400

E None of the above

Answer: D

Explanation:
The monthly savings of A is 58.33% less than the monthly expenditure of B.
Let's assume the monthly expenditure of B is 12y.
monthly savings of A = (5/12) of 12y = 5y
The monthly income of A is 25% more than the monthly income of B.
Let's assume the monthly income of B is 4z.
monthly income of A = 5z
monthly expenditure of A = (5z-5y)
monthly savings of B = (4z-12y)
The monthly savings of B is Rs. 760.
(4z-12y) = 760
z-3y = 190
z = (190+3y) Eq.(i)
The sum of the monthly expenditure of A and B together is Rs. 2490.
(5z-5y)+12y = 2490
(5z+7y) = 2490
Put Eq.(i) in the above equation.
$5 \times (190 + 3y) + 7y = 2490$
950+15y+7y = 2490
15y+7y = 2490-950 = 1540
22y = 1540
y = 70
Put the value of 'y' in Eq.(i).
z = (190+210) = 400
Difference between the monthly income of A and B = (5z-4z) = 400
Hence, option d is the correct answer.

Question 9

The sum of the squares of the two odd numbers is 1450 and the product of the numbers is 525, then what is the average of cubes of both the numbers?

A 25250

B 23125

C 20750

D 27425

E None of the above

Answer: B

Explanation:
Let the two odd numbers be p and q
The product of the two odd numbers is 525 $\Rightarrow$ pq = 525............(1)
The sum of the squares of the two odd numbers is 1450
$\Rightarrow p^2 + q^2 = 1450$
$\Rightarrow (p + q)^2 - 2pq = 1450$
$\Rightarrow (p + q)^2 - 2(525) = 1450$
$\Rightarrow (p + q)^2 - 1050 = 1450$

$\Rightarrow (p + q)^2 = 2500$

$\Rightarrow p + q = 50$........(2)

Average of cubes of the two odd numbers = $\frac{1}{2} \times (p^3 + q^3)$

= $\frac{1}{2} \times [(p+q)^3 - 3pq(p+q)]$

= $\frac{1}{2} \times [(50)^3 - 3(525)(50)]$

= $\frac{1}{2} \times [125000 - 78750]$

= $\frac{1}{2} \times 46250$

= 23125

Hence, the correct answer is Option B

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Question 10

The ratio of income of Rahul and Amit is 9:13 respectively. The ratio of savings and expenditure of Amit is 6:7 respectively. If the savings of Amit is 20% more than the savings of Rahul, then the expenditure of Amit is how much percent more or less than the expenditure of Rahul?

A   75% less

B   25% more

C   25% less

D   75% more

E   None of the above

Answer: D

Explanation:
The ratio of income of Rahul and Amit is 9:13 respectively.
Let the income of Rahul and Amit are 9p and 13p respectively.
The ratio of savings and expenditure of Amit is 6:7.
Let the savings and expenditure of Amit are 6q and 7q respectively.
Income of Amit = 13p

$\Rightarrow$ 6q + 7q = 13p

$\Rightarrow$ 13q = 13p

$\Rightarrow$ q = p........(1)

The savings of Amit is 20% more than the savings of Rahul.
Let the savings of Rahul = t

Savings of Amit = $\frac{120}{100}t$

$\Rightarrow$ 6q = $\frac{6}{5}t$

$\Rightarrow$ t = 5q

$\Rightarrow$ t = 5p

Savings of Rahul = t = 5p
Expenditure of Rahul = Income of Rahul - Savings of Rahul
= 9p - 5p
= 4p
Expenditure of Amit = 7q = 7p

Required percentage = $\frac{7p-4p}{4p} \times 100$

= $\frac{3p}{4p} \times 100$

= 75% more
Hence, the correct answer is Option D

Question 11

There are six numbers and the average of the first four numbers is equal to 35. The average of the last four numbers is 40. The average of the first and sixth number is 45 whereas the average of the second and fifth number is 55. What is the average of the first, third, fourth and sixth numbers?

A   35

B   41

C   33

D   31

E   None of the above

   Answer: A

Explanation:
Let the six numbers are a, b, c, d, e and f respectively.

The average of the first four numbers is equal to 35.
$\Rightarrow \frac{a+b+c+d}{4}$ = 35
$\Rightarrow$ a + b + c + d = 140...........(1)

The average of the last four numbers is 40.
$\Rightarrow \frac{c+d+e+f}{4}$ = 40
$\Rightarrow$ c + d + e + f = 160...........(2)

The average of the first and sixth number is 45.
$\Rightarrow \frac{a+f}{2}$ = 45
$\Rightarrow$ a + f = 90...........(3)

The average of the second and fifth number is 55.
$\Rightarrow \frac{b+e}{2}$ = 55
$\Rightarrow$ b + e = 110...........(4)

Adding (1) and (2),
a + b + c + d + c + d + e + f = 140 + 160
(a + f) + (b + e) + 2(c + d) = 300
90 + 110 + 2(c + d) = 300
2(c + d) = 100
c + d = 50...............(5)

Average of the first, third, fourth and sixth numbers = $\frac{a+c+d+f}{4}$
= $\frac{a+f+c+d}{4}$
= $\frac{90+50}{4}$
= $\frac{140}{4}$
= 35
Hence, the correct answer is Option A

Question 12

A man spent 20% of his monthly income on house rent. Out of the remaining amount he spent 22% for shopping. Out of the remaining amount one fourth was spent on food and the remaining amount was saved. If the amount spent on shopping was ₹9504, then what was the amount saved by the man?

A   ₹26732

B   ₹27892

C   ₹24382

D ₹25272

E None of the above

   Answer: D

Explanation:
Let the monthly income of man = p
Man spent 20% of his monthly income on house rent.
Remaining amount after spending on house rent = 80% of p
$= \frac{80}{100}p$
Amount spent on shopping was ₹9504.
22% of $\frac{80}{100}p$ = 9504
$\frac{22}{100} \times \frac{80}{100}p$ = 9504
p = ₹54000
Amount saved by the man = 54000 of (100-20)% of (100-22)% of (3/4)
= 54000 of 80% of 78% of (3/4)
$= 54000 \times \frac{80}{100} \times \frac{78}{100} \times \frac{3}{4}$
= ₹25272
Hence, the correct answer is Option D

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Question 13

Average weight of 45 students in a class is 65 kg. Another six students joined the class and the average weight of the class increased by 3 kg. What is the average weight of the six students who joined later?

A 80.25

B 85.50

C 60.75

D 70.25

E 90.50

   Answer: E

Explanation:
Given, average weight of 45 students = 65 kg
$\Rightarrow$ Sum of the weights of 45 students = 65 x 45 = 2925 kg
Average weight of 51 students = 65 + 3 = 68 kg
$\Rightarrow$ Sum of the weights of 51 students = 68 x 51 = 3468 kg
Sum of weights of the 6 students who joined later = 3468 - 2925 = 543 kg
$\therefore$ Average weight of the 6 students who joined later = $\frac{543}{6}$ = 90.5 kg
Hence, the correct answer is Option E

Question 14

In 2010, the number of bears in the zoo was increased by 35% and next year these were decreased by 16.67%. Now the number of bears in the zoo is 405, then find out the 20% of the number of bears in the zoo two years ago.

A 66

B 54

C 60

D 78

Answer: E

Explanation:

Let's assume the number of bears in the zoo two years ago is 'y'.

y of (100+35)% of (100-16.67)% = 405

$y \times 1.35 \times \frac{5}{6} = 405$

6.75y = 2430

y = 360

20% of the number of bears in the zoo two years ago = 20% of 360

= 72

Hence, option e is the correct answer.

Question 15

The price of icecream has increased by 40%. Lekha has decided to spend only 4% more than what he initially did on buying icecream. What is the percentage decrease in Lekha's rice consumption?

A   19%

B   60%

C   15%

D   30%

E   25%

Answer: D

Explanation:

Let the initial price of icecream be Rs. 100 per unit and Lekha's consumption be 10 units.

∴ Initial amount spent = 100 × 10 = Rs. 1,000

New price of icecream = 140% of 100 = Rs. 140 and new total amount spent = 104% of 1000 = Rs. 1,040

therefore , the new consumption will be $\frac{1040}{150}$ = 6.93 (let us take approximate value as 7)

Decrease in consumption = 3 units

% decrease = $\frac{3}{10} \times 100$ = 30%

Hence answer is option d

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Question 16

A shopkeeper has a sale of Rs. 4475, Rs. 8657, Rs. 4755, Rs. 4230 and Rs. 4542 for 5 consecutive months respectively. How much sale must he have in the sixth month so that he gets an average sale of Rs. 4500?

A   320

B   348

C   341

D   478

E   321

Answer: A

Explanation:
Total sale for 5 months = Rs. (4475+ 8657+ 4755 + 4230+ 4542) = Rs.26659
Required sale = Rs. [(4500 x 6) - 26659]
= Rs. (27000 - 26659)
= Rs. 341

Question 17

Three students has birthday on same day they received 126, 786 and 986 gifts respectively from their friends What percentage of the total gifts did the person with more gifts get?

A 52%

B 55%

C 75%

D 90%

E 80%

Answer: A

Explanation:
Total number of gifts = (126+786+986) = 1898

Required percentage = $\frac{986}{1898} \times 100$

=> 51.95% which is approximately 52%

hence answer is option a

Question 18

The average marks of 40 students is 67.875. If two more students whose marks are (y-3) and (y+3) added then the average will be 67.5. Find out the value of 'y'.

A 57

B 60

C 63

D 54

E None of the above

Answer: B

Explanation:
The average marks of 40 students is 67.875.
Total marks of 40 students = 67.875×40
= 2715
If two more students whose marks are (y-3) and (y+3) added then the average will be 67.5.
2715 + (y-3) + (y+3) = 67.5×42
2715 + 2y = 2835
2y = 2835-2715
2y = 120
y = 60
Hence, option b is the correct answer.

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Question 19

The average age of a group of 18 people is 54 years. Two more people joined the group in which one's age is 12 years more than the other's age. If after joining the two people in the group, the average age will be 52 years, then find out the age of the youngest person among those people who joined the group later.

A 44 years

B 40 years

C 28 years

D 32 years

E Cannot be determined

   Answer: C

Explanation:
The average age of a group of 18 people is 54 years.
Total age of the group initially = 18×54 = 972
If after joining the two people in the group, the average age will be 52 years.
Total age of the group after joining the two people = 20×52 = 1040
Sum of the age of those two people = 1040-972 = 68
Two more people joined the group in which one's age is 12 years more than the other's age.
z + z+12 = 68
2z = 68-12 = 56
Youngest person among those people who joined the group later = z = 28
Hence, option c is the correct answer.

Question 20

If 35% of a number P is 82 less than the 45% of a number Q and the sum of numbers P & Q is 1320, then find out the sum of the 55% of P and 25% of Q.

A 546

B 568

C 584

D 522

E None of the above

   Answer: D

Explanation:
35% of P = 45% of Q - 82
0.35P = 0.45Q - 82 Eq.(i)
Sum of numbers P & Q is 1320.
P+Q = 1320
Q = 1320-P Eq.(ii)
Put Eq.(ii) in Eq.(i).
0.35P = 0.45(1320-P) - 82
0.35P = 594-0.45P - 82
0.35P+0.45P = 594 - 82
0.8P = 512
P = 640
Put the value of P in Eq.(ii).
Q = 1320-640 = 680
Sum of the 55% of P and 25% of Q = 55% of 640 + 25% of 680
= 352+170

= 522

Hence, option d is the correct answer.

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