Class Test on Lecture Sheet 3

1. If $-4 < x < 12$ and $-2 < y < 13$ which of the following numbers represent the maximum value of $(y - x)$? [IBA BBA 14-15]

   A. 25 B. 1 C. 14 D. 17 E. -1

   সমাধান: Here, for $(y - x)$ to be maximum,
   we need to take highest possible value of y & lowest possible value of x.
   Maximum value of y here = 12 (considering integer)
   & Minimum value of x here = -3 (Considering integer)
   Then, $y - x = 12 - (-3) = 15$
   But, from the given options, if $y = 12$ & $x = -2$
   $y - x = 12 - (-2) = 14$ gives the maximum value.
   Answer: C. 14

2. After 3 quizzes Oli had an average of 12 marks per quiz. In order to increase the average by n marks, what should be the score in his 4^{th} quiz? [IBA MBA '16]

   A. 4n B. $36 + 3n$ C. 12 D. $12 + 4n$ E. None of these

   সমাধান: Total marks after 3 quizzes = $3 \times 12 = 36$
   Let, score in 4^{th} quiz = P
   Then, according to the question,
   $\frac{36+P}{4} = 12 + n$
   $\Rightarrow 36 + P = 48 + 4n$
   $\Rightarrow P = 12 + 4n$
   Answer: D. $12 + 4n$

3. The average age of a group of 10 students is 15 years. When 5 more students joined the group, the average age rose by 1 year. What is the average age of the newly joined students?

   A. 15 B. 16 C. 17 D. 18 E. 19

   সমাধান: Total age of 10 students = $10 \times 15 = 150$
   ধরি, Newly joined 5 students এর total age = x
   প্রশ্নমতে, $\frac{150+x}{15} = 15 + 1$
   $\Rightarrow 150 + x = 240$
   $\Rightarrow x = 90$
   $\therefore$ Total age of the newly joined students = 90
   $\therefore$ Average age of the newly joined students = $\frac{90}{5} = 18$
   Answer: D. 18

4. Which of the following number can be removed from the set $S = \{0, 2, 4, 5, 9\}$ without changing the average of the elements of the set S?

   A. 8 B. 2 C. 4 D. 3 E. None of these

   সমাধান: Let, the number removed = x
   Then, according to question,
   $\frac{0+2+4+5+9-x}{4} = \frac{0+2+4+5+9}{5}$
   $\Rightarrow 20 - x = 16$
   $\Rightarrow x = 4$
   Answer: C. 4

5. The average of 4 different integers is 75. If the largest integer is 90, what is the least possible value of the smallest integer?

A. 1 B. 19 C. 29 D. 33 E 23

সমাধান: Total of 4 integers = $75 \times 4 = 300$

Largest integer = 90

So, sum of remaining 3 integers = $300 - 90 = 210$

To get the lowest integer, the other two have to be as large as possible.

Considering 89 & 88,

Lowest of the integer = $210 - (89 + 88) = 210 - 177 = 33$

Answer: D. 33

6. If $|x - 2| \leq 5$. What is the minimum value of x?

A. -2 B. 2 C. -3 D. 5 E. 0

সমাধান: Given, $|x - 2| \leq 5$

$\Rightarrow -5 \leq x - 2 \leq 5$

$\Rightarrow -5 + 2 \leq x - 2 + 2 \leq 5 + 2$

$\Rightarrow -3 \leq x \leq 7$

So, minimum value of x = -3

7. If $b = 9d - c$ and $d = \frac{a}{6}$, what is the average of a, b, c and d?

A. 2d B. 3d C. 4d D. 5d E. None of these

Solution: $a + b + c + d$

$\Rightarrow 6d + 9d - c + c + d \left[d = \frac{a}{6} \Rightarrow a = 6d\right]$

$\Rightarrow 16d$

Average = $\frac{16d}{4} = 4d$

8. If the average of 'p' numbers is q^2 and that of q numbers is p^2, then the average of $(p + q)$ = ?

A. $p - q$ B. pq C. $p + q$ D. $\frac{p}{q}$ E. $\frac{q}{p+q}$

সমাধান: Here, sum of 'p' numbers = $p \times q^2 = pq^2$

& Sum of 'q' numbers = $q \times p^2 = p^2q$

So, average of $(p + q)$ numbers = $\frac{pq^2+qp^2}{(p+q)} = \frac{pq(p+q)}{(p+q)} = pq$

9. If the is average of 7, 13, p and q is 17. What is the average of $(p + 11)$ and $(q - 9)$?

[City Bank (MTO) 2018]

A. 25 B. 20 C. 7 D. 13. E. None of these

Solution: Average, $\frac{7+13+p+q}{4} = 17$

$\Rightarrow 20 + p + q = 68$

$\Rightarrow p + q = 68 - 20$

$\therefore p + q = 48$

Again, average = $\frac{(P+11)+(q+9)}{2} = \frac{p+q+2}{2} = \frac{48+2}{2} = 25$

10. If $|x - 3| < 5$, then- [৩৫তম বিসিএস]

A. $2 < x < 8$ B. $-2 < x < 8$ C. $-8 < x < -2$ D. $-4 < x < -2$

Solution: $|x - 3| < 5$

$\Rightarrow -5 < x - 3 < 5$

$\Rightarrow -2 < x < 8$ [3 যোগ করে]

Practice Math

1. If 18 is 15 percent of 30 percent of a certain number, the number = ? [Pubali Bank (Cash Officer) 2011]

   A. 9 B. 36 C. 40 **D. 400**

   সমাধান: ধরি, the number = x

   প্রশ্নমতে, $\frac{15}{100} \times \frac{30x}{100} = 18$

   $\Rightarrow x = \frac{18 \times 100 \times 100}{15 \times 30} = 400$

2. If A's income is 25% less than B's income the by what percent is B's income more than that Of A?

   A. 25% B. 30% **C. 33.33%** D. 66.66%

   সমাধান: ধরি, B's income = x

   $\therefore$ A's income = $\frac{75x}{100}$

   $\therefore$ B's income is more than A's income & difference = $x - \frac{70x}{100} = \frac{25x}{100}$

   $\therefore$ Required percentage = $\frac{25x}{100} \times \frac{100}{75x} \times 100\% = 33.33\%$

3. Bob invested in a stock that increased in value by 17% to 25.74. What was the actual increase in the stock's value?

   A. 3.74 B. 3.47 C. 4.25 D. 4.47

   সমাধান: Actual value = $\frac{100}{117} \times 25.74 = 22$

   $\therefore$ increased value = $25.74 - 22 = 3.74$

4. Three-fourth of a number is equal to 60% of another number and the difference between these two numbers is 20. What is the sum of these two numbers?

   A. 170 **B. 180** C. 220 D. Cannot be determined

   সমাধান: Number দুইটি যথাক্রমে x & y

   প্রশ্নমতে, $\frac{3x}{4} = \frac{60y}{100}$

   $\Rightarrow \frac{3x}{4} = \frac{3y}{5}$

   $\Rightarrow 5x = 4y \dots\dots\dots (i)$

   এবং $x = y - 20$ [$\because x < y$]

   (i) হতে পাই,

   $5(y - 20) = 4y$

   $\Rightarrow 5y - 4y = 100$

   $\Rightarrow y = 100$

   $\therefore x = 100 - 20 = 80$

   সুতরাং, $x + y = 80 + 100 = 180$

5. In a market survey 20% response opted for product A whereas 60% opted for the product B. The remaining individuals were not certain. If the difference in number between those who opted for product B and those who were uncertain was 720, how many individuals have covered in the survey?

   [তিতাস গ্যাস (সহকারী ব্যবস্থাপক) 2021]

   A. 1440 **B. 1800** C. 3600 D. কোনটিই নয়

   সমাধান: মনে করি, মোট লোকসংখ্যা x

   $\therefore$ প্রশ্নমতে, x এর 60% $-x$ এর 20% = 720 [$\because$ অনিশ্চিত ছিল = $(100 - 60 - 20) = 20\%$ লোক]

   $\Rightarrow \frac{60x}{100} - \frac{20x}{100} = 720$

$\Rightarrow \frac{3x}{5} - \frac{x}{5} = 72$

$\Rightarrow \frac{3x-x}{5} = 72$

$\Rightarrow \frac{2x}{5} = 72$

$\Rightarrow 2x = 72 \times 5$

$\Rightarrow x = \frac{72\times5}{2}$

$\therefore x = 1800$

6. If 37 is subtracted from 37% of a number, the result is 37. Find the number? [বেবিচক (সিনিয়র অফিসার) ২০২১]

A. 74 B. 111 C. 148 D. 200

সমাধান: মনে করি সংখ্যাটি x

∴ প্রশ্নমতে, x এর $37\% - 37 = 37$

$\Rightarrow x \times \frac{37}{100} - 37 = 37$

$\Rightarrow \frac{37x}{100} - 37 = 74$

$\Rightarrow 37x = 74 \times 100$

$\Rightarrow x = \frac{74\times100}{37}$

$\Rightarrow x = 200$

7. A man spends 35% of his income on food, 25% on children's education and 80% of the remaining on house rent. What percent of his income he is left with?

A. 8% B. 10% C. 12% D. 14%

সমাধান: Let, total income = x

Expenditure for food = $\frac{35x}{100}$

Expenditure for education = $\frac{25x}{100}$

∴ Remaining = $x - \left(\frac{35x}{100} + \frac{25x}{100}\right) = x - \frac{60x}{100} = \frac{40x}{100}$

& Expenditure for house rent = $\frac{40x}{100} \times \frac{80}{100} = \frac{32x}{100}$

∴ Savings = $\frac{40x}{100} - \frac{32x}{100} = \frac{8x}{100}$

So, He is left with 8% of his income.

8. In a organization, 40% employees are under graduates, 50% of the remainder is graduates and rest of the 180 employees are post graduates. How many employees are graduates? [৪৩তম বিসিএস]

A. 180 B. 240 C. 300 D. 360

সমাধান: মনে করি, মোট কর্মচারী = x জন

∴ আন্ডার গ্র্যাড = x এর $40\% = x \times \frac{40}{100} = \frac{2x}{5}$

বাকি থাকে = $x - \frac{2x}{5} = \frac{5x-2x}{5} = \frac{3x}{5}$

∴ গ্র্যাড = $\frac{3x}{5}$ এর $50\% = \frac{3x}{5} \times \frac{1}{2} = \frac{3x}{10}$

∴ অবশিষ্ট = $\frac{3x}{5} - \frac{3x}{10} = \frac{6x-3x}{10} = \frac{3x}{10}$

∴ প্রশ্নমতে, $\frac{3x}{10} = 180$

$\Rightarrow x = \frac{180\times10}{3}$

$\Rightarrow x = 600$

∴ গ্র্যাড থাকে = $\frac{3\times600}{10} = 180$ জন

9. After increasing choton's salary by 9 percent, he realized that if the increment were 11 percent instead of 9 percent then his salary would be 72150 tk. What is his current salary? [CGDF (Auditor) 2019]

A. 66193 taka B. 65000 taka C. 70850 taka D. 72200 taka

সমাধান: ধরি, ১ মাস পূর্বে বেতন ছিল = x

যদি ১১% বৃদ্ধি পেত, তাহলে বর্তমান মাসিক বেতন হতো ৭২১৫০ টাকা।

অর্থাৎ, $x \times \frac{111}{100} = 72150$

$\Rightarrow x = \frac{72150 \times 100}{111} = 65000$

কিন্তু, বেতন বৃদ্ধি পায় 9%

∴ বর্তমান মাসিক বেতন = $60000 \times \frac{109}{100} = 70850$ টাকা।

10. In country A, the first 1,000 dollar of any inheritances are untaxed. After the first 1,000 dollar, inheritances are taxed at a rate of 65%. How large must an inheritance be, to the nearest dollar, in order to amount to 2,500 dollar after inheritance tax? [বাংলাদেশ অর্থনৈতিক অঞ্চল কর্তৃপক্ষ (বেজা)-এর সহকারী ব্যবস্থাপক-২০২০]

A. 7,143 B. 5,286 C. 4,475 D. 3,475

সমাধান: $(100 - 65)\% = 35\%$

$35\% = (2500 - 1000)$

$1\% = \frac{1500}{35}$

$100\% = \frac{1500 \times 100}{35} = 4285.71$

∴ the inheritance tax $= 4285.71 + 1000 = 5286.714 \approx 5286$

11. If y exceeds the x by 20% then x is less than y by- [BSEC AD 2021]

A. 16.00% B. 16.33% C. 16.67% D. 16.60%

সমাধান: প্রশ্নমতে, y = x + x এর 20% = $x + \frac{20x}{100} = x + \frac{x}{5} = \frac{6x}{5}$

∴ y বেশি = $\left(\frac{6x}{5} - x\right) = \frac{x}{5}$

∴ y শতকরা বেশি = $\frac{\frac{x}{5}}{\frac{6x}{5}} \times 100\% = \frac{x}{5} \times \frac{5}{6x} \times 100\% = 16.367\%$

12. Due to a reduction in book's price by 10%. The number of books sold increased by 35%. What was the percentage increase in revenue? [বাংলাদেশ গ্যাস ফিল্ডস (সহঃ ব্যবস্থাপক) ২০২১]

A. 17 B. 18 C. 19 D. 20 E. None of these

সমাধান: Shortcut: $-10 + 35 + \frac{(-10)(35)}{100} = 25 - \frac{10 \times 35}{100} = 25 - 3.5 = 21.5$

∴ আয় বৃদ্ধি পায় 21.5%

13. On Dhaka-Sylhet highway, 5% of the drivers are fined for exceeding the speed limit. However 80% of the drivers who exceed the speed limit are not fined. What percentage of drivers on this highway exceed the speed limit? [বাংলাদেশ গ্যাস ফিল্ডস (সহঃ ব্যবস্থাপক) ২০২১]

A. 10 B. 15 C. 20 D. 25 E. None of these

সমাধান: মনে করি, মোট গাড়ি চালক = x জন

গতিসীমা লঙ্ঘন করে = y জন

প্রশ্নমতে গতিসীমা লঙ্ঘনকারীদের 80% এর জরিমানা হয় না অর্থাৎ 20% এর জরিমানা হয়। অর্থাৎ y এর 20% হবে x এর 5% এর সমান কেননা মোট গাড়ি চালকের 5% এর জরিমানা হয়।

∴ y এর 20% = x এর 5%

$\Rightarrow \frac{20y}{100} = \frac{5x}{100}$

$\Rightarrow 20y = 5x$

$\Rightarrow \frac{y}{x} = \frac{5}{20} = \frac{1}{4}$

$\Rightarrow \frac{y}{x} \times 100 = \frac{1}{4} \times 100 = 25\%$

বিকল্প সমাধান:

মনে করি, গতিসীমা লঙ্ঘন করে x জন ও মোট গাড়ি চালক 100 জন

∴ গতিসীমা লঙ্ঘন করে 5 জন

শর্তমতে,

x = x এর 80% + ৫

$\Rightarrow x = \frac{80x}{100} + 5$

$\Rightarrow x = \frac{80x+500}{100}$

$\Rightarrow 100x = 80x + 500$

$\Rightarrow 20x = 500$

$\Rightarrow x = 25$

14. The boys and girls in a college are in the ratio 3:2. If 20% of the boys and 25% of the girls are adults, the percentage of students who are not adults is-

A. 58% B. 67.5% C. 78% D. 82.5%

সমাধান: Let, number of boys = 3x & number of girls = 2x

So, total number students = 5x

Now, number of boys who are not adult = $3x \times 80\% = \frac{240x}{100}$

& number of girls who are not adult = $2x \times 75\% = \frac{150x}{100}$

∴ Total number of students who are not adult = $\frac{240x}{100} + \frac{150x}{100} = \frac{390x}{100}$

So, percentage of students who are not adults = $\frac{390x}{100} \times \frac{1}{5x} \times 100\% = 78\%$

15. Income tax is raised from tk. 4 to tk. 5 but the revenue is increased by 10% only. Find the decreased percentage in the amount taxed.

A. 8 B. 10 C. 12 D. 15

সমাধান: Let, Tk. original taxed amount be Tk. x.

and new taxed by tk. y.

Let, Tk. Original revennue be tk. 100.

then, 4% of x = 100 ⇒ x = $\frac{100\times100}{4} = 2500$

Then, revennue = (110% of 100)Tk. = 110tk.

Then 5% of y = 110 ⇒ y = $\frac{110\times110}{5} = 2200$

Decrease in taxed amount = $(2500 - 2200) = 300$ tk.

∴ decrease = $\frac{300}{2500} \times 100 = 12\%$

16. If the price of a commodity is decreased by 20% and its consumption is increased by 30% the what will be the percentage increase or decrease in the expenditure of the commodity?

A. 10% decrease B. 10% increase C. 4% increase D. 4% decrease

সমাধান: Let, previous price = x

& previous consumption = y

So, previous expenditure = xy

Again, present price = $x \times \frac{80}{100} = \frac{80x}{100}$

& present consumption = $y \times \frac{130}{100} = \frac{130y}{100}$

So, present expenditure = $\frac{80x \times 130y}{100 \times 100} = \frac{104xy}{100}$

So, imcrease in expenditure = $\frac{104xy}{100} - xy = \frac{4xy}{100}$

Percentage increase = $\frac{4xy}{100} \times \frac{1}{xy} \times 100\% = 4\%$

17. A reduction of 10% in the price of an apple enables a man to buy 9 apples more for Rs. 540. The reduced price of apples per apple is: [BISIC Chief Auditor-2021]

A. Rs. 6 B. Rs. 7 C. Rs. 8 D. Rs. 9

Solution: Let the price of pen be 10x

Reduced price = 9x

$\frac{540}{9x} - \frac{540}{10x} = 9$

$\Rightarrow \frac{60}{x} - \frac{54}{x} = 9$

$\Rightarrow \frac{6}{x} = 9$

$\Rightarrow 9x = 6$

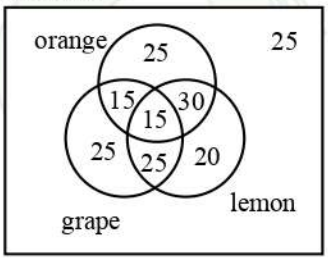
$\Rightarrow x = \frac{6}{9} = \frac{2}{3}$

$9x = Rs.6$

18. A number of people were asked whether they liked drinks of orange, lemon or grape flavor. The responses are as follows:
85 liked orange, 45 liked orange and lemon, 65 liked grapes, 40 liked lemon and grape, 90 liked lemon, 30 liked orange and grape, 15 liked all the three and 25 liked none. Find the member of people who liked only orange and how many people were interviewed? [IBA MBA June 2018]

A. 5 B. 25 C. 55 D. 70 E. None of these

Solution:



শুধু orange পছন্দ করে 25 জন।

19. In Dhaka city 90% of the population own a car, 15% own a motorcycle, and everybody owns one or the other or both. What is the percentage of the motorcycle owners who own cars? [BFIDCM-2013]

A. 5% B. 15% C. $33\frac{1}{3}\%$ D. 50%

সমাধান: Here, If total population = x

Then, car owners = $\frac{90x}{100}$

Motorcycle owners = $\frac{15x}{100}$

So, using formula we get, $n(Total) = n(C) + n(M) - n(C \cap M)$

$\Rightarrow n(C \cap M) = \frac{90x}{100} + \frac{15x}{100} - x = \frac{5x}{100}$

So, percentage of motorcycle owners who own cars = $\frac{5x}{100} \times \frac{100}{15x} \times 100\% = 33\frac{1}{3}\%$

20. In a class of 60 students, 20 students like Math, 25 students like English and 30 students like science. If 5 students like both math and English, 7 students like both math and science, 8 students like both English and science and 3 students like neither of these subjects. How many students like all of the three students? [বাংলাদেশ সেতু কর্তৃপক্ষের সহকারী পরিচালক-২০২০]

A. 2 B. 3 C. 4 D. 5

সমাধান: Now, $n(s) = 60, n(A \cup B \cup C) = 60 - 3 = 57$

$n(A) = 20, n(B) = 25, n(c) = 30$

$n(A \cap B) = 5, n(B \cap C) = 7,\ n(C \cap A) = 8$

We know,

$n(A \cup B \cup C) = n(A) + n(B) + n(c) - n(A \cap B) - n(B \cap C) - n(C \cap A) + n(A \cap B \cap C)$

$\Rightarrow 57 + 20 + 25 + 30 - 5 + 7 - 8 + n(A \cap B \cap C)$

$\therefore n(A \cap B \cap C) = 57 - 55 = 2$

21. In a village of 100 families, 75 have at Laptop, 80 have at least one cell phone, and 55 have at least one Alexa. If x and y are respectively the greatest and lowest possible number of employees that have all three of these devices, what is the value of x – y ? [BB AD 2021]

A. 65 B. 55 C. 45 D. 35

সমাধান: Here, Number of people who don't have DVD player = $100 - 75 = 25$

Number of people who don't have cell phone = $100 - 80 = 20$

Number of people who don't have MP3 player = $100 - 55 = 45$

$\therefore$ Number of people who don't have all the devices = $25 + 20 + 45 = 90$

Minimum number of people who have all the devices = $100 - 90 = 10 = y$

Maximum number of people who have all the devices = $55 = x$

Because it is the least number of people who have MP3 player

$\therefore x - y = 55 - 10 = 45$

22. 70 students are studying physics, mathematics and chemistry. 40 students study mathematics, 35 study physics and 30 students chemistry. 15 students are studying all the subjects. How many students are studying exactly two of the subjects?

A. 4 B. 5 C. 6 D. 7

সমাধান: আমরা জানি, $n(P \cup M \cup C) = n(P) + n(M) + n(C) - \text{Both} + \text{Triple}$

$\Rightarrow 70 = 40 + 35 + 30 - \text{Both} + 15$

$\Rightarrow \text{Both} = 50$

$\therefore$ Number of students studying exactly two of the subjects = $\text{Both} - 3 \times \text{Triple} = 50 - 3 \times 15 = 5$

23. In an exam 62% of the students were declared as passed. However due to compilation error, 20% of the students who have actually passed were shown as failed and 20% of the students who have actually failed were declare as passed. What percent of the students actually passed? [IBA MBA December 2016]

A. 68 B. 70 C. 72 D. 75 E. None of these

সমাধান: Let, total students = 100

No. of students passed = x

So, no. of students failed = $100 - x$

প্রশ্নমতে, $\frac{80}{100} \times x + \frac{20}{100}(100 - x) = 62$

$\Rightarrow 80x + 2000 - 20x = 6200$

$\Rightarrow 60x = 4200$

$\Rightarrow x = 70$

24. Last year, a magazine charged a $50 subscription fee. This year, the price will be increased by 20%. If the magazine could lose 4 subscribers this year and still collects the same revenue as it did last year, how many subscribers did the magazine have last year? [IBA MBA Dec' 2020]

A. 20 B. 21 C. 22 D. 23 E. 24

সমাধান: (E). এই বছরের subscription fee = $\$50 + 20\% \, of \, 50\,\$ = \$50 \times 1.2 = \$160$

ধরি, গত বছরের subscriber এর সংখ্যা ছিল x. অতএব, এ বছরের subscriber সংখ্যা $= x - 4$

যেহেতু, Revennue same থাকছে।

$60(x - 4) = x \times 50 \Rightarrow 60x - 240 = 50x \Rightarrow 10x = 240 \Rightarrow x = 24$

∴ গত বছর subscriber সংখ্যা ছিল 24.

25. In a box there are 60 more black marbles than red marbles. If the number of red marbles is 40% of the total number of marbles, how many marbles are there in the box? [IBA MBA Dec' 2015]

A. 270 B. 280 C. 300 D. 360 E. None of these

সমাধান: Here, B = R + 60 ... ... (i) & R = $\frac{40}{100}(B + R)$ ... ... (ii)

From equation (ii), we get,

100R = 40B + 40R

$\Rightarrow$ 60R = 40B

$\Rightarrow$ 6R = 4B

$\Rightarrow$ 6R = 4(R+60) [From (i)]

$\Rightarrow$ 6R−4R = 240

$\Rightarrow$ 2R = 240

$\Rightarrow$ R = 120

So, B = R+60 = 120+60 = 180+120 = 300

26. Box 1 contains 500 marbles, 24% of which are black. Box 2 contain some marble of which 10% are black. You put the marbles together in another box and found that the percentage of black marbles is 20%. How many marbles were there in box 2? [IBA MBA June 2017]

A. 100 B. 150 C. 200 D. 250 E. None of these

সমাধান: Total marbles in Box (1) = 500

So, Black marbles = $500 \times 24\% = 120$

Let, total marbles in Box (2) = x

So, Black marbles = $x \times 10\% = \frac{x}{10}$

ATQ, $120 + \frac{x}{10} = (500 + x) \times \frac{20}{100}$

$\Rightarrow 120 + \frac{x}{10} = \frac{500+x}{5}$

$\Rightarrow 1200 + x = 1000 + 2x$

$\Rightarrow x = 200$

27. In a group of 1200 people, 80% were women, a certain amount of women left and new percentage of women is 70%, how many women left the group? [IBA MBA Dec 2019]

A. 200 B. 280 C. 36 D. 400 E. None of these

সমাধান: (D) Total 1200 people,

Women 80% হলে women-এর সংখ্যা= $1200 \times 0.8 = 960$

ধরি, x সংখ্যক women চলে যায়, তাহলে নতুন women সংখ্যা= $960 - x$

নতুন women-এর percentage, $(1200 - x)$ সংখ্যক মানুষের মধ্যে= $\frac{960-x}{1200-x}$

প্রশ্নমতে, $\frac{960-x}{1200-x} = 70\% = 0.7$

$\Rightarrow 960 - x = 840 - 0.7x$

$\Rightarrow 0.3x = 120 \Rightarrow x = 400$

28. The total of company C's assets was 300% greater than the total in 1993, which in turn was 400% greater than the total in 1992. If the total of company C's assets in 1992 was N dollars, which one of the following represents company C's assets in 1994: [IBA MBA, Dec' 2019]

A. 7N B. 8N C. 9N D. 12N E. 20N

সমাধান: Company C's assets in 1992 = N

So, Asset in 1993 = $N + \frac{N\times400}{100} = 5N$

& according to the given condition,

Asset in 1994 = $5N + \frac{5N\times300}{100} = 20N$

29. In a club, 60% are male and $\frac{2}{3}$ of them like games. If all the members in the club like music or game and 70% of the members like games, what percent of the females like music? [IBA MBA Dec' 2019]

A. 15 B. 25 C. 30 D. 60 E. None of these

সমাধান: ধরি, Total club members= 100 জন ∴ Male = 60 জন

	Male	Female	Total
Like Games	40	30	70
Like Music	20	10	
	60	40	100

Male দের $\frac{2}{3}^{rd} = 60 \times \frac{2}{3} = 40$ জন Game like করে।

∴ Male দের মধ্যে Music Like করে $= 60 - 40 = 20$ জন।

Female দের মধ্যে Music Like করে $= \frac{10}{40} = 25\%$

30. A certain boat sales lot sells both sailboats and boats that are not sailboats. 25% of the boats are used sailboats. Of non-sailboats, $\frac{3}{5}$ are new. If 33% of all boats are used, approximately what percentage of the sailboats is new? [IBA MBA, Dec' 2022]

A. 31% B. 33% C. 67% D. 68% E. 69%

Solution: Let total boats = 100

Non-sail boats = y

We know, used sailboats = 25 (from qu.) and new non-sail boats = 3y/5

So, used NON-sailboats = 2y/5

Also, total used boats = 33

so, $25 + \frac{2y}{5} = 33 \Rightarrow$ y = 20

so new non-sail boats = 12 (3y/5)

67% of all boats are new.

So new sail boats = $67 - 12 = 55$

Total sail boats (used + non used) = 55+25 = 80

%age of new sail boats = 55/80 * 100 ≈ 69% E

31. A student first reduced a number by 20 percent and then increase it again by 20 percent. If the difference between the two new numbers was 8, then what was the original number? [DBBL (Asst. Off.) 2009]

A. 15 B. 25 C. 35 D. 50

সমাধান: ধরি, number-টি x।

20% reduce করার পর, $x \times 80\% = 0.8x$

আবার, 20% increase করার পর $0.8x \times 120\% = 0.96x$

এখন, $0.96x - 0.8x = 8$

$\Rightarrow 0.16x = 8$

$\Rightarrow x = \frac{8}{0.16} = 50$

32. An employer pays 3 workers X, Y and Z a total of Tk. 36,600 a week. X is paid 125% of the amount Y is paid and 80% of the amount Z is paid. How much does X make a week?

[কর্ণফুলী গ্যাস ডিস্ট্রিবিউশন কোম্পানী লি. -সহকারী ব্যবস্থাপক (সাধারণ) ২০২১]

A. 9000 B. 10800 C. 11700 D. 12000

সমাধান: দেওয়া আছে, x = y এর 125%

$x = y \times \frac{125}{100}$

$x = y \times \frac{5}{4}$

$\frac{x}{y} = \frac{5}{4}$

$\frac{y}{x} = \frac{4}{5} = \frac{4\times4}{5\times4} = \frac{16}{20}$

আবার, x = z এর 80%

$\Rightarrow x = z \times \frac{80}{100}$

$\Rightarrow x = \frac{4z}{5}$

$\Rightarrow \frac{x}{z} = \frac{4}{5}$

$\Rightarrow \frac{x}{z} = \frac{4\times5}{5\times5} = \frac{20}{25}$

$\therefore y : x : z = 16 : 20 : 25$

$\therefore$ x পায় $= \frac{20}{16+20+25} \times 36600$

$= \frac{20}{61} \times 36600$

$= 12000$ টাকা

বিকল্প সমাধান: $x : y : z = 20 : 16 : 25$

মনে করি, x পায় 20x

y পায় 16x

z পায় 25x

$\therefore 20x + 16x + 25x = 36600$

$\Rightarrow 61x = 36600$

$\Rightarrow x = \frac{36600}{61} = 600$

$\therefore$ x পায় $= (600 \times 20) = 12000$

33. The population of a certain town increase by 50 percent every 50 years. If the population in 1950 was 810, in what year was the population 160?

A. 1650 B. 1700 C. 1750 D. 1800

সমাধান: 1950 সালে population ছিলো 810

ধরি, 1900 সালে population ছিলো x

এখন, $x + x \times \frac{50}{100} = 810$

$\Rightarrow 1.5x = 810$

$\Rightarrow x = \frac{810}{1.5} = 540$

একইভাবে, ধরি 1850 সালে population x

$\therefore 1.5x = 540 \Rightarrow x = \frac{540}{1.5} = 360$

আবার, 1800 সালের population x

$1.5x = 360 \Rightarrow x = \frac{360}{1.5} = 240$

আবার, 1750 সালের population x

$1.5x = 240 \Rightarrow x = \frac{240}{1.5} = 160$

$\therefore$ 160 population ছিলো 1750 সালে।

34. A box contains 200 marbles, 25% of which are of black color. Maria took some marbles from the box and found that 30% of them are black. Of the remaining marbles, 10% were black marbles. How many marbles did Maria take?

A. 120 B. 125 C. 140 D. 150

সমাধান: 200 marble এর মধ্যে Black = $200 \times 25\% = 50$

ধরি, Maria xটি marble নিয়েছে, যার 30% অর্থাৎ 0.3x black

অবশিষ্ট $(200 - x)$ এর 10% অর্থাৎ $0.1(200 - x)$ black

এখন, $0.3x + 0.1(200 - x) = 50$

$\Rightarrow 0.3x + 20 - 0.1 = 50$

$\Rightarrow 0.2x = 30$

$\Rightarrow x = \frac{30}{0.2} = 150$

35. In an election between two candidates, one got 55% of the total valid votes. 20% of the voters were invalid. If the total number of votes was 7500. There number of valid votes that the other candidate, got was? [Exim Bank Ltd (MTO) 2013]

A. 2500 B. 2600 C. 2700 D. 2800

সমাধান: Total vote 7500

Invalid vote = $7500 \times \frac{20}{100} = 1500$

Valid vote = $(7500 - 1500) = 600$

অন্য candidate valid এর $(100 - 55) = 45\%$ পেয়েছে।

$\therefore$ তার vote = $6000 \times \frac{45}{100} = 2700$

36. A passenger paid 50% customs duty on accompanied baggage items. He paid another 20% sales tax on the total value of the items plus the custom duty paid. The total custom duty and sales tax is Tk. 350. What is the value of the item excluding custom duty and sales tax? [BB AD 2022]

A. Tk. 400 B. Tk. 450 C. Tk. 500 D. None

Solution: প্রশ্নে বলা হচ্ছে, একটি পণ্যের মূল্যের সাথে আরো 50% শুল্ক দিতে হয়। এরপর শুল্ক ও পণ্য বাবদ যা পরিশোধ করা হয়েছিল তার উপর আরো 20% বিক্রয়কর হিসেবে পরিশোধ করতে হয়। এখন মোট শুল্ক ও বিক্রয়কর 350 টাকা হলে শুল্ক ও বিক্রয় কর ব্যতীত পণ্যের মূল্য কত?

ধরি, পণ্যটির মূল্য = 100 টাকা

50% শুল্কসহ মূল্য = 100 + 50 = 150 টাকা

আবার, 20% বিক্রয় করসহ মূল্য = 150 + 150 এর 20% = 150 + 30 = 180 টাকা

এখানে, শুল্ক ও বিক্রয়কর = $180 - 100 = 80$ টাকা

প্রশ্নমতে, পণ্যটির 80 এককের সমান হলো = 350 টাকা

∴ পণ্যটির 100 এককের সমান হলো = $\frac{350\times100}{80} = 437.5$ টাকা

37. In a certain class, $\frac{1}{5}$ of the boys are shorter than the shortest firls in the class and $\frac{1}{3}$ of the girls are taller than the tallest boy in the class. If there are 16 students in the class and no two people have the same height, what percent of the students are taller than the shortest girls and shorter than the tallest boy?

A. 62.5% B. 60.5% C. 63.5% D. 67.5% [BB AD '09]

সমাধান: Given that, students = 16

As, the number of boys is the multiple of 5.

So, the possible number of boys may be 5, 10, 15, 20, ...

And the number of girls is the multiple of 3

So, the possible number of girls may be 9, 12, 15, ...

According to the question,

The numbebr of boys may be = 10 and the number of boys may be = 6

∴ The number of boys taller than the shrocut girl, and the number of girls shorter than the tallest boy = $6 \times \frac{1}{3} = 2$

Here, there is 1 shortest boy and 1 tallest girl.

∴ The number of students taller than shortest girls and the shorter than the tallest boy = $16 - (2 + 2 + 1 + 1) = 10$

∴ Requred percentage = $\left(\frac{10}{16} \times 10\right)\% = 62.5\%$

38. In town X, 64 percent of the populations are employed and 48 percent of the populations are employed males. What percent of the employed people in town X are females?

A. 16% B. 25% C. 32% D. 48%

সমাধান: ধরি, মোট মানুষ 100 জন।

Employed 64 জন

Employed male 48 জন।

Employed female 16 জন।

So, percentage of female in employed population $\frac{16}{64} \times 100 = 25\%$

39. Out of 120 students, 70% students passed in Math and 80% students passed in English. if only 12 students failed in both subjects. How many students passed only English?

[বাংলাদেশ সেতু কর্তৃপক্ষের সহকারী পরিচালক-২০২০]

A. 10 B. 12 C. 24 D. None

সমাধান: Let, Numbers of students passed Math and English = x

Only passed in math = $(70 - x)\%$

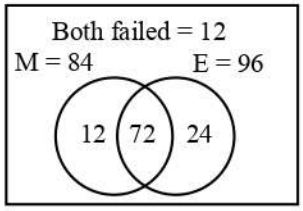
Only passed in English = $(80 - x)\%$

Both Subject fail = $\frac{12}{120} \times 100 = 10\%$

∴ $70 - x + x + 80 - x + 10 = 100$

$\Rightarrow -x + 160 = 100$
$\Rightarrow -x = 100 - 160$
$\Rightarrow -x = -60 \ \therefore x = 60$
Student passed only English $= (80 - x)\% = (80 - 60)\% = 20\%$
$= 20\%$ of $120 = 24$

বিকল্প সমাধান:



$120 \times 70\% = 84$
$120 \times 80\% = 96$
এখন, $n(M \cup E) = n(M) + n(E) - n(M \cap E)$
$\Rightarrow 120 - 12 = 84 + 96 - x$
$\Rightarrow x = 72$
$\therefore$ শুধু English এ পাশ $94 - 72 = 24$

40. A number when 35 is subtracted from it, reduces to its 80 percent. What is four-fifth of that number?
A. 70 B. 90 C. 120 D. 140 E. 180
Solution: ধরি, number-টি x
এখন, $x - 35 = 0.8x$
$\Rightarrow 0.2x = 35$
$\Rightarrow x = \frac{35}{0.2} = \frac{35\times10}{2}$
$\Rightarrow \frac{4}{5}x = \frac{4}{5} \times \frac{35\times10}{2} = 140$

41. 50% of a% of b is 75% of b% of c. Which of the following is c?
A. 1.5a B. ·0667a C. 0.5a D. 1.25a E. 0.667a
Solution: $(b \times a\%) \times 50\% = (c \times b\%) \times 75\%$
$\Rightarrow b \times \frac{a}{100} \times \frac{50}{100} = c \times \frac{b}{100} \times \frac{75}{100}$
$\Rightarrow 2ab = 3c$
$\Rightarrow c = \frac{2a}{3} = 0.667a$

42. Three workers X, Y and Z are paid a total of tk. 5,500 for a particular job. X is paid 133.33% of the amount paid to Y and Y is paid 75% of amount paid to Z. How much paid to Z?
A. tk. 1780 B. tk. 1890 C. tk. 1975 D. tk. 2000 E. tk. 2500
Solution: ধরি, Z পায় m টাকা
Y পায় $m \times \frac{75}{100} = \frac{3m}{4}$ টাকা
X পায় $\frac{3m}{4} \times 133.33\% = \frac{3m}{4} \times \frac{4}{3} = m$ টাকা
এখন, $m + \frac{3m}{4} + m = 5500$ টাকা
$\Rightarrow \frac{11m}{4} = 5500$
$\Rightarrow m = 2000$
$\therefore$ Z পায় 2000 টাকা।

43. P is 6 times a large as q. The % that q is less than p is:

A. $83\frac{1}{3}$ B. $16\frac{2}{3}$ C. 90 D. 60 E. 0.02

সমাধান: ধরি, Q = 10 ∴ P = 60

∴ Q is less than P by $\frac{60-10}{60} \times 100\% = \frac{50}{60} \times 100\% = 83\frac{1}{3}\%$

44. An employer pays 3 workers X, Y and Z a total of tk. 36600 a week. X is paid 125% of the amount Y is paid and 80% of the amount Z is paid. How much does X make a week?

A. 9000 B. 12000 C. 10800 D. 11700 E. 12800

Solution: ধরি, X পায় a টাকা

আবার, X পায় Y এর 125%

∴ Y পায় $\frac{a}{125} \times 100 = 0.8a$ টাকা

X পায় Z এর 80% টাকা

∴ Z পায় $\frac{a}{80} \times 100 = 1.25a$ টাকা

∴ Total টাকা $a + 0.8a + 1.25a = 3.05a$

$3.05a = 3600$ টাকা

∴ $a = \frac{36600}{3.05} = 12000$ টাকা

45. In a class, 120 students are finance major and 100 students are marketing major, 25% of finance students and 20% of the marketing students are male. 20% of the male finance students and 25% of the male marketing students passed the final exam. What percentage of male students passed the exam?

A. 5% B. 10% C. 15% D. 20% E. None of these

Solution: 120 জন finance major এ,

male 25% of 120 = 30 জন

100 জন marketing major এ, 20% of 100 = 20 জন male

Male finance student এর 20% অর্থাৎ $30 \times 20\% = 60$ জন পাশ করেছে।

Male marketing student এর 25% অর্থাৎ $20 \times 25\% = 50$ পাশ করেছে।

Male student পাশ করার percentage $\frac{6+5}{30+20} \times 100\% = \frac{11}{50} \times 100\% = 22\%$

46. In a transportation, 60% apples and 40% Oranges. due to some reason 40% oranges are damaged and 70% apples are fresh what % fruits were fresh? [IBA MBA, Dec' 2022]

A. 68 B. 66 C. 62 D. 68.8 E. None

Solution: Let's assume that there are 100 fruits in total. Out of these, 60 are apples and 40 are oranges.

After the damage, 40% of the oranges are damaged, which means:

40/100 * 40 = 16 oranges are damaged

So, there are 24 oranges that are not damaged.

Similarly, 70% of the apples are fresh, which means:

70/100 * 60 = 42 apples are fresh

So, there are 18 apples that are not fresh.

Thus, the total number of fresh fruits is:

42 (fresh apples) + 24 (not damaged oranges) = 66

Therefore, the percentage of fresh fruits is:

66/100 * 100% = 66%

So, 66% of the fruits were fresh.

47. In a sample of 900 university students, all students are either freshmen or sophomores or junior or seniors, 24 percent are juniors and 72 percent are not sophomore. If there are 144 seniors, how many more freshmen than sophomores are there among the sample of students? [IBA BBA 10-11]

A. 252 B. 36 C. 48 D. 288 E. None of these

Solution: Junior 24%

sophomore $(100 - 72) = 28\%$

senior $= \frac{144}{900} \times 100 = 16\%$

$\therefore$ freshman $= 100 - (24 + 28 + 16) = 32\%$

freshman $-$ sophomore $= 900 \times (32 - 28)\% = 36$

48. In an election, 30% of the voters voted for candidate A whereas 60% of the remaining voted for candidate B. The remaining voters did not vote. If the difference between those who voted for candidate A and these who did not vote was 1200, how many individuals were eligible for casting vote in the election?

A. 10,000 B. 6,000 C. 45,000 D. 60,000 E. 72,000

সমাধান: ধরি, মোট ভোটার x জন।

candidate A কে ভোট দিয়েছে 0.3x

candidate B কে ভোট দিয়েছে $(x - 0.3x) \times 0.6 = 0.7x \times 0.6 = 0.42x$

vote দেয়নি $x - (0.42x + 0.3x) = 0.28x$

এখন, $0.3x - 0.28x = 1200$

$\Rightarrow 0.02x = 1200$

$\Rightarrow x = 60000$

49. In a club, 40% of the members were female. Forty new male become members of the club and as a result the percent of female members dropped to 30%. How many female members are there in the club now? [IBA MBA June 2015]

A. 40 B. 42 C. 46 D. 48 E. None of these

Solution: ধরি, মোট member x

female 0.4x, male 0.6x

40 জন male আসার পর, $\frac{0.4x}{x+40} \times 100 = 30$

$\Rightarrow 40x = 30x + 1200$

$\Rightarrow x = 120$

$\Rightarrow 0.4x = 120 \times 0.4 = 48$

50. In a group, 30% of the men are more than 25 years old and 80% of the men are less than or equal to 50 years old. Twenty percent of all men play football. If 20% of the men above the age of 50 play football, what percentage of the football players are less than or equal to 50 years? [IBA MBA December 2017]

A. 50% B. 60% C. 75% D. 80% E. None of these

Solution: 80% men are less than or equal to 50 years old

men more than 50 years old = 20%

20% men more than 50 years old play

football → 20% of 20% = 4%

number of men play football → 20%

percentage of men who play football less than or equal to 50 years old $\frac{20-4}{20} \times 100\% = 80\%$

51. The organizers of a fair projected 25% increase of visitors this year over that of the last year but the actual turnover was 20% less than that of the last year. What percent of projected visitor attended the fair?

A. 60% B. 50% C. 84% D. 64% E. 54%

Solution: ধরি, Last year মানুষ ছিলো 100 জন ও turnover 100 টাকা

এ বছর expected মানুষ 125 জন

turnover হয়েছে 80 টাকা

expected থেকে মানুষ এসেছে $\frac{80}{125} \times 100 = 64\%$

52. In a club, 20% of the members are below 25 years of age. The number of members above 25 years of age is 16. Which is two-third of the number of members of 25 years of age. What is the total number of members in the club? [IBA MBA December 2017]

A. 50 B. 52 C. 60 D. 72 E. None of these

Solution: ধরি, মোট member x জন

Below 25 = 0.2x

Above 25 = 16

$\therefore$ Age 25 = $16 \times \frac{3}{2} = 24$

এখন, $0.2x + 16 + 24 = x$

$\Rightarrow 0.8x = 40$

$\Rightarrow x = \frac{40}{0.8} = 50$

53. In an exam, A scoring 40% marks fails by 10 marks, B scoring 50% marks gets 10 more than the passing marks. What was the total marks in the exam? [IBA MBA December 2017]

A. 88 B. 100 C. 160 D. 200 E. None of these

Solution: ধরি, Total mark x

প্রথম ক্ষেত্রে pass mark = $0.4x + 10$

দ্বিতীয় ক্ষেত্রে pass mark = $0.5x - 10$

এখন, $0.4x + 10 = 0.5x - 10$

$\Rightarrow 0.1x = 20$

$\Rightarrow x = 200$

54. The wage earned by Arif is 30% more than that earned by Babu. If the wage earned by Salek is 60% more than that earned by Babu. How much is the wage earned by Salek more than that earned by Arif? [IBA MBA December 2015]

A. 23% B. 18.75% C. 30% D. 50% E. None of these

সমাধানঃ ধরি, Babu এর wage 100 টাকা

Arif এর wage 130 টাকা

Salek এর wage 160 টাকা

Salek Arif থেকে বেশি পায় $(160 - 130) = 30$ টাকা

percentage = $\frac{30}{130} \times 100 = \frac{300}{13} \approx 23\%$

55. In a class, a certain number of students opted to participate in a cultural competition comprising of 3 items- music, recitation and drama. Of these students, 53% showed interest for music and 35% showed interest for recitation. If 8% of the students of the whole class showed interest for dram, what percent of the students did not participate in the cultural program? [IBA MBA Dec' 2016]

A. 12% B. 16.33% C. 25% D. 33.33% E. None of these

সমাধান: ধরি, class এ মোট student 100 জন

participate করেছে x জন

participate করেনি $100 - x$ জন

এখন, $0.53x + 0.35x + 0.08x \times 100 + 100 - x = 100$

$\Rightarrow 0.88x - x + 8 = 0$

$\Rightarrow 0.12x = 8$

$\Rightarrow x = \frac{8}{0.12} = \frac{800}{12}$

participate করেনি $100 - \frac{800}{12} = \frac{400}{12}$

percentage $\frac{\frac{400}{12}}{100} \times 100\% = 33.33\%$

56. Of that total amount that Sadia spent on a shopping trip, excluding taxes, she spent 50% on clothing, 20% on food and 30% on another item. If Sadia paid 4% tax on clothing, no tax on the food and an 8% tax on all other items, then the total tax that she paid was what percent of the total amount she spent, excluding taxes?

A. 3.6% B. 4.4% C. 5.2% D. 6% E. 7.2%

Solution: ধরি, মোট খরচ x টাকা

clothing এ খরচ 0.5x টাকা

tax = $0.5x \times \frac{4}{100} = 0.02x$

Another item এ খরচ 0.3x টাকা

tax = $0.3x \times \frac{8}{100} = 0.024x$

percentage = $\frac{0.02x+0.024x}{x} \times 100\% = \frac{0.044x}{x} \times 100\% = 4.4\%$

57. Sadib and Tazul each saved tk. 5000 in 2012. In 2013 Tazul saved 10% more than what he saved the previous year and together they both saved a total of tk. 9000 that year. Approximately what percent less did Sadib save in 2013 compared to 2012?

A. 59% B. 41% C. 30% D. 25% E. 44%

Solution: Tazul 2012 এ save করে 5000 টাকা

Tazul 2013 এ save করে $5000 \times 1.1 = 5500$ টাকা

2013 এ Sadib save করে $(9000 - 5500) = 3500$ টাকা

∴ Sadib এর saving কমেছে = $\frac{5000-3500}{5000} \times 100\% = \frac{1500}{5000} \times 100 = 30\%$

58. In a class, 200 chocolates were distributed equally among the students in such a way that the number of chocolate received by each student is 12.5% of the total number of students. How many chocolate did each student receive? [IBA MBA Dec' 2017]

A. 4 B. 5 C. 8 D. 10 E. None of these

Solution: ধরি, মোট Student x

প্রতি student chocolate পেয়েছে $x \times 12.5\% = 0.125x$

এখন, $x \times 0.125x = 200$

$\Rightarrow x^2 = \frac{200}{0.125} = \frac{200\times1000}{125}$

$\Rightarrow x^2 = 1600$

$\Rightarrow x = 40$

$\therefore 0.125x = 40 \times 0.125 = 5$

59. There are n students in school. If r% among the students are 12 years or younger, which of the following expressions represents the number of the students who are older than 12?

A. $n(1-r)$ B. $100(1-r)n$ C. $\frac{n(1-r)}{100}$ D. $\frac{n(100-r)}{100}$ E. None of these

Solution: r% student এর বয়স 12 এর কম।

∴ 12 বা 12 এর বেশি student $n \times (100-r)\% = n \times \frac{100-r}{100} = \frac{n(100-r)}{100}$

60. Kamal can have his mobile phone repaired for tk. 4000 or he can trade it in and receive tk. 2000 credit toward the purchase of new mobile that sells for tk. 8400. If Kamal trades in his current mobile phone, the cost to him of purchasing the new mobile is what percent greater than the cost of having his current mobile phone repaired? [IBA MBA June 2015]

A. 44 B. 60 C. 70 D. 75 E. None of these

Solution: Kamal এর repair খরচ 4000 tk.

Exchange করে নতুন phone নিলে খরচ $(8400-2000) = 6400$ tk.

অতিরিক্ত খরচ $(6400-4000) = 2400$ tk.

Repair এর সাপেক্ষে অতিরিক্ত খরচের percentage $\frac{2400}{4000} \times 100\% = 60\%$

61. In a club, one half of the members are male and of the other half of the members are female. Forty percent of the members are engineers and the rest are architects. If 15% of the members are male engineers, what percent of the members are female architects? [IBA MBA June 2016]

A. 15 B. 25 C. 30 D. 35 E. None of these

Solution: ধরি, Male = 100 ও Female = 100

Total member = 200 জন

Total engineer = $200 \times 40\% = 80$ জন

Male engineer = $200 \times 15\% = 30$ জন

Male architect = $(100-30) = 70$ জন

Total architect = $(200-80) = 120$ জন

∴ Female architect = $(120-70) = 50$ জন

percentage $\frac{5}{200} \times 100 = 25\%$

62. Among the members of a club there are three times as many doctors as engineers. Half of the club members are female and $\frac{4}{5}$ of the male members are doctors. What percent of the club members are female engineers? [IBA MBA December 2016]

A. 10 B. 15 C. 20 D. 25 E. None of these

Solution: ধরি, Engineer 100 জন।

∴ Doctor 300 জন

Total = $(300+100) = 400$ জন

Female member = $\frac{1}{2} \times 400 = 200$ জন

∴ Male $(400-200) = 200$ জন

Male doctor = $200 \times \frac{4}{5} = 160$ জন

Female doctor = $(300-160) = 140$ জন

Female engineer = $(200-140) = 60$ জন

Percentage = $\frac{60}{400} \times 100\% = 15\%$

63. If the price of pen is discounted by 40%, for tk. 120 you can buy 4 more pens than you could buy at the original price. How many pens could be bought for tk. 120 at the original price?[IBA MBA June 2015]

A. 6 B. 8 C. 10 D. 12 E. None of these

সমাধান: ধরি, pen এর price x টাকা

discount এর পর price 0.6x টাকা

এখন, $\frac{120}{0.6x} - \frac{120}{x} = 4$

$\Rightarrow \frac{120-72}{0.6x} = 4$

$\Rightarrow 48 = 2.4x$

$\Rightarrow x = 20$

Original price এ কলম কেনা যাবে $= \frac{120}{20} = 6$

64. A reduction of 25% of the price of an article enables a buyer to buy 50 kilograms more for tk. 500. What is the reduced price per kilogram in taka?

A. 2 B. 2.25 C. 2.5 D. 2.75 E. 3

সমাধান: ধরি, Original price x টাকা

reduction এরপর price 0.75x টাকা

এখন, $\frac{500}{0.75x} - \frac{500}{x} = 50$

$\Rightarrow \frac{500-375}{0.75x} = 50$

$\Rightarrow 125 = 37.5x$

$\Rightarrow x = \frac{125}{37.5} = \frac{125\times10}{375} = \frac{10}{3}$

Discount এরপর price $= \frac{10}{3} \times 0.75 = 0.25$

65. There are 87 balls in a jar. Each ball is painted with at least one of two colors, red and green. It is observed that $\frac{2}{7}$ of the balls that have red color also have green color, while $\frac{3}{7}$ of the balls that have green also have red color. What fraction of the balls in the jar has both red and green colors?

[IBA MBA June 2016]

A. $\frac{6}{14}$ B. $\frac{2}{7}$ C. $\frac{6}{35}$ D. $\frac{6}{29}$ E. None of these

সমাধান: মোট বল $= 87$টি। ধরি, উভয় রঙের বল আছে $=$ xটি।

প্রশ্নে বলা আছে লাল বলগুলোর $\frac{2}{7}$ টিতে সবুজ রং আছে অর্থাৎ লাল বলের $\frac{2}{7}$ টিতে উভয় রং রয়েছে।

$\therefore x = \frac{2}{7} \times$ লাল বল $\Rightarrow$ লাল বল $= \frac{7x}{2}$

একইভাবে সবুজ বলগুলোর $\frac{3}{7}$ টিতে লাল রং রয়েছে অর্থাৎ সবুজ বলের $\frac{3}{7}$ টিতে উভয় রং রয়েছে।

$\therefore x = \frac{3}{7} \times$ সবুজ বল $\Rightarrow$ সবুজ বল $= \frac{7x}{3}$

$\therefore$ মোট বল $=$ লাল বল $+$ সবুজ বল $-$ উভয় রংয়ের বল

$\Rightarrow 87 = \frac{7x}{2} + \frac{7x}{3} - x \Rightarrow 87 \times 6 = 29x \Rightarrow x = \frac{87\times6}{29} = 18$

$\therefore$ উভয় রঙের বল আছে $= 18$টি $\therefore \frac{\text{উভয় রঙের বল}}{\text{মোট বল}} = \frac{18}{87} = \frac{6}{29}$

Written Math

1. A car dealer received a shipment of cars, half of which were black, with the remainder consisting of equal numbers of blue, silver, and white cars. During the next month, 70 percent of the black cars, 80 percent of the blue cars, 30 percent of the silver cars, and 40 percent of the white cars were sold. What percent of the cars in the shipment were sold during that month? [Dhaka Bank (Trainee Officer) 2021]

   সমাধান: Let number of total car is 60

   ∴ number of black car is $\frac{60}{2} = 30$

   ∴ number of blue car is $\frac{30}{3} = 10$

   ∴ number of silver car is $= 10$

   ∴ number of white car is $= 10$

   ∴ Black car sold = $70\%\ of\ 30 = 30 \times \frac{70}{100} = 21$

   Blue car sold = $80\%\ of\ 10 = 10 \times \frac{80}{100} = 8$

   Silver car sold = $30\%\ of\ 10 = 30 \times \frac{10}{100} = 3$

   White car sold = $40\%\ of\ 10 = 10 \times \frac{40}{100} = 4$

   ∴ Total car sold = $21 + 8 + 3 + 4 = 36$

   ∴ Sale percentage = $\frac{36}{60} \times 100 = 60\%$ (Answer)

2. She planted 4 times as many apple seeds as she planted orange seeds .15% of the apple seeds grew into trees and 10% of the orange seeds grew into trees. If a total of 420 apple trees and orange trees grew from the seed, how many orange seeds did she plant?

   সমাধান: Suppose, he planted x orange sees.

   So, he planted 4x apples seeds.

   according to the question,

   $(15\%\ \text{of}\ 4x) + (10\%\ \text{of}\ x) = 420 \Rightarrow 70\%\ \text{of}\ x = 420 \Rightarrow x = 600$ (Answer)

3. The price of raw materials has gone up by 15%, labor cost has also increased from 25% of the cost of raw material to 30% of the cost of raw material. By how much percentage should there be a reduction in the usage of material so as to keep the cost same?

   সমাধান: ধরি, Previous raw materials cost = x

   So, previous labour cost = x এর 25% = $\frac{x}{4}$

   ∴ Total cost = $x + \frac{x}{4} = \frac{5x}{4}$

   এক্ষেত্রে, usuage 'y' unit হলে, cost = $\frac{5x}{4} \times y = \frac{5xy}{4}$

   আবার, Present raw materials cost = $x \times \frac{115}{100} = \frac{23x}{20}$

   Presents labour cost = $\frac{23x}{20} \times \frac{30}{100} = \frac{69x}{200}$

   Total cost = $\frac{23x}{20} + \frac{69x}{200} = \frac{299x}{200}$

   ধরি, এক্ষেত্রে usuasge 'N' unit,

   সেক্ষেত্রে cost same রাখতে হলে, $\frac{299x}{200} \times N = \frac{5xy}{4}$

   $\Rightarrow N = \frac{200 \times 5xy}{4 \times 299x} = \frac{250y}{299}$

   So, Reduction = $y - N = y - \frac{250y}{299} = \frac{49y}{299}$

   Reduction (%) = $\frac{49y}{299} \times \frac{1}{y} \times 100\% = 16.387\%$

   [এক্ষেত্রে exam hall-এ 299 এর পরিবর্তে 300 ধরে নিলে calculation সহজ হবে]

   Answer: 16.39%

4. A total of 50 employees work in a bank branch of these 22 have taken the accounting course, 15 have taken finance, 14 marketing, 9 of them taken exactly 2 of the courses, 1 of them has taken all. How many of the 50 employees have taken none of the course? [BB AD 2001]

Solution: $50 = n(A) + n(F) + n(M) - n(A \cap F) - n(F \cap M) - n(M \cap A) + n(A \cap F \cap M) + n(\emptyset)$

$\Rightarrow 50 = 22 + 15 + 14 - (9 + 3 \times 1) + 1 + x$

$\Rightarrow 50 = 40 + x$

$\Rightarrow x = 10$ (Answer)

5. In a survey for three perfumes, it was found that 40% of the respondent used Fa, 25% used Havoc, 60% used Nido, 16% used none of the three perfumes. 13% used all three perfumes. How many used exactly two of the three perfumes?

Solution: $100 = n(F) + n(H) + n(N) - n(F \cap H) - n(H \cap N) - n(N \cap F) + n(F \cap H \cap N) + n(\emptyset)$

$\Rightarrow 100 = 40 + 25 + 60 - x + 13 + 16$

$\Rightarrow x = 54$

$\therefore$ শুধু দু'টি perfume use করে $= 54 - 3 \times 13 = 15$ (Answer)

6. A total of employee works in a branch of their 22 have taken the accounting course, 15 have taken finance, 14 marketing, 9 of them taken exactly 2 of the courses, 1 of them has taken all. How many of the 40 employees have taken none of course?

সমাধান: Here, One of the employees has taken all of the courses and nine of the employees have taken exactly 2 of the courses.

Number of employee have taken only accounting $= 22 - (9 + 1) = 12$

Numbers of employee have taken only Finance $= 15 - (9 + 1) = 5$

Number of employees have taken only Marketing $= 14 - 1 = 13$

Numbers of total employee have taken 1, 2 or 3 courses,

$= 12 + 5 + 13 + 9 + 1 = 40$

So, employees who have not taken any courses $= 40 - 40 = 0$

No one take none any other the course.

7. The output of a glass factory was increased by 12% to keep up with the rising demand. Later this new output was increased by another 25%. By approximately what percentage would the output now have to be decreased in order to restore to the original output? [EXIM Bank (Trainee Officer) 2020]

Solution: Let, the output of a factory is 100

First increased by 12% = 112

New output increase by 25% = $112 + 25\% = 112 + \frac{25}{100} = 112 + 28 = 140$

$\therefore \frac{Final - Initial}{Final \times 100} = \frac{140 - 100}{140 \times 100} = 28.6\%$ (Answer)

8. Tanvir has 450 coins of 50 paisa and 500 coins of 1 Tk. If he gives 46% of 50 Paisa coins and 54% of 1 Tk. coins to his brother, the amount of money remaining with Tanvir will be-

[EXIM Bank (Trainee Officer) 2020]

সমাধান: তানভীরের কাছে মোট 50 পয়সার মুদ্রা আছে $= (450 \times 0.5) = 225$ টাকার

এবং মোট 1 টাকার মুদ্রা আছে $= (500 \times 1) = 500$ টাকার

ভাইকে 50 পয়সার 46% দেওয়ার পর রইল $= 225 \times \frac{54}{100} = 121.50$ টাকা

এবং ভাইকে 1 টাকার 54% দেওয়ার পর রইল $= 500 \times \frac{46}{100} = 230$ টাকা

$\therefore$ তানভীরের কাছে মোট রইল $= 121.50 + 230 = 351.50$ টাকা (উত্তর)

9. In a group of people solicited by a charity, 30% contributed Tk. 40 each, 45% contributed Tk. 20 each and the rest contributed Tk. 12 each. What percentage of the total amount came from people who gave Tk. 40 each? [ICB Ltd (Officer) 2011]

সমাধানঃ Let, total participant = 100

30% Contributed = $40 \times 30\% = 40 \times \frac{30}{100} = 12$ tk.

45% Contributed = $20 \times 45\% = 20 \times \frac{45}{100} = 9$ tk.

Test = $\{100 - (30 + 45)\}\% = 25\%$ Contributed = $12 \times \frac{25}{100} = 3$ tk.

% of total amount came from people who gave tk. 40 each = $\frac{12}{12+9+3} \times 100 = 50\%$ (Answer)

10. A salesmen is paid monthly salary of tk. 15000 plus 12.5 percent commission on all of his sales. What should be his total annual sales in taka so that his total annual earnings from salary and commission is tk. 265000?

Solution: Given that, Monthly salary = tk. 15000

So, annual salary = (15000×12) = tk. 180000 [evrmwiK ejv Av‡Q ZvB 12 gv‡mi †eZb]

So, annual commission he got = $(265000 - 180000)$ = tk. 85000

Suppose, his annual sales = tk. x

ATQ, 12.5% of x = 85000

$\Rightarrow \frac{12.5x}{100} = 85000$

$\Rightarrow 12.5x = 85000 \times 100$

$\therefore x = \frac{85000 \times 100}{12.5}$ = tk. 680000

So, his annual sales is tk. 680000 (Answer)