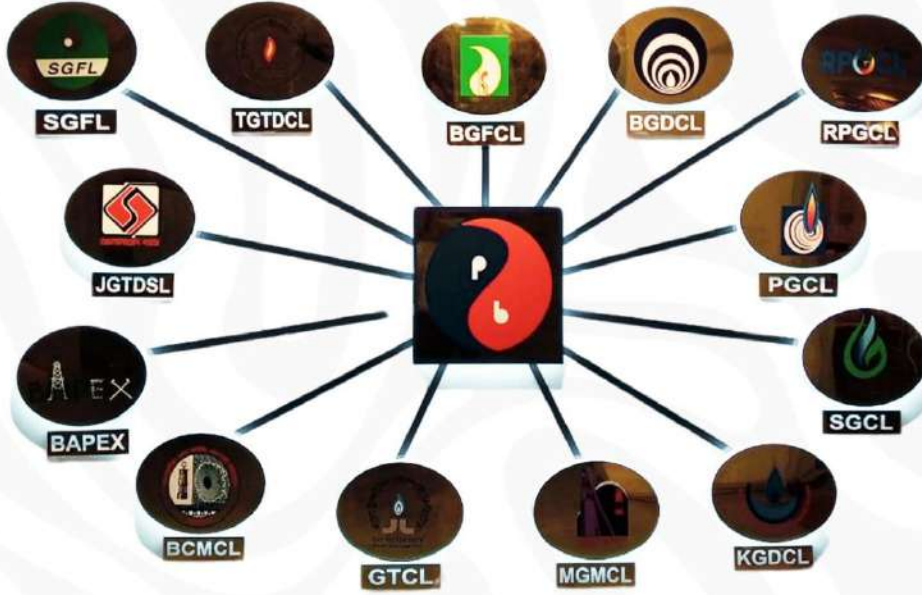


CAPSTONE

Math Lecture#04

পেট্রোবাংলা স্পেশাল কোর্স



Topic: Arithmetic

- Percentage
- Set

Name:

Batch:

Panthapath : 01972-277866

Mirpur : 01970-985421

Mouchak : 01999-017011

Chittangong : 01970-985420

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
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 4th quiz? [IBA MBA '16]
A. $4n$ B. $36 + 3n$ C. 12 D. $12 + 4n$ E. None of these
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
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
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
6. If $|x - 2| \leq 5$. What is the minimum value of x ?
A. -2 B. 2 C. -3 D. 5 E. 0
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
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. $\frac{q}{p+q}$
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
10. If $|x - 3| < 5$, then- [35th BCS]
A. $2 < x < 8$ B. $-2 < x < 8$ C. $-8 < x < -2$ D. $-4 < x < -2$

- ◆ কোনো পণ্যের মূল্য P% বৃদ্ধি পেলে ঐ পণ্যের ব্যবহার = $\left(\frac{100P}{100+P}\right)\%$ হ্রাস করলে এবং পণ্যের মূল্য P% হ্রাস পেলে ব্যবহার = $\left(\frac{100P}{100-P}\right)\%$ বৃদ্ধি করলে মোট খরচের কোন পরিবর্তন হবে না।

6. লবণের মূল্য ২৫% বৃদ্ধি পাওয়ায় কোনো পরিবারের লবণের ব্যবহার শতকরা কতভাগ কমালে লবণের ব্যয় অপরিবর্তিত থাকবে?
ক. ২৫% খ. ২০% গ. ১৫% ঘ. ১০%

সমাধান: ২৫% বৃদ্ধিতে, লবণের পূর্বমূল্য ১০০ টাকা হলে বর্তমান মূল্য = $(100 + 25) = 125$ টাকা।

বর্তমান মূল্য ১২৫ টাকা হলে পূর্বমূল্য ১০০ টাকা

" " ১ " " " $\frac{100}{125}$ টাকা

" " ১০০ " " " $\frac{100 \times 100}{125} = 80$ টাকা

∴ ব্যয় অপরিবর্তিত রেখে ব্যবহার কমাতে হবে = $(100 - 80) = 20\%$

শর্টকাট: ব্যবহার কমাতে হবে = $\frac{100P}{100+P}\% = \left(\frac{100 \times 25}{100+25}\right)\% = \left(\frac{100 \times 25}{125}\right)\% = 20\%$ (উত্তর: খ. ২০%)

◆ ধারাবাহিক পরিবর্তন:

1. প্রথম পর্যায়ে X% বৃদ্ধি পেলে, অতঃপর Y% বৃদ্ধি পেলে মোট পরিবর্তন = $\left(x + y + \frac{xy}{100}\right)\%$

2. প্রথম পর্যায়ে X% হ্রাস পেলে, অতঃপর আরও Y% হ্রাস পেলে মোট পরিবর্তন = $\left(-x - y + \frac{xy}{100}\right)\%$

3. প্রথম পর্যায়ে X% বৃদ্ধি পেলে, অতঃপর Y% হ্রাস পেলে মোট পরিবর্তন = $\left(x - y - \frac{xy}{100}\right)\%$

7. চিনির মূল্য ২০% হ্রাস পেলে। কিন্তু চিনির ব্যবহার ২০% বৃদ্ধি পেলে। এতে চিনি বাবদ ব্যয় শতকরা কতভাগ বাড়লো বা কমলো?
ক. ৫% কমলো খ. ৫% বাড়লো গ. ৪% কমলো ঘ. ৪% বাড়লো

সমাধান: চিনির মূল্য ২০% হ্রাসে, পূর্বমূল্য ১০০ টাকা হলে বর্তমান মূল্য = $(100 - 20) = 80$ টাকা।

১০০ টাকার পরিবর্তে চিনির ব্যবহার হয় ১২০ টাকা

১ " " " " " $\frac{120}{100}$ টাকা

৮০ " " " " " $\frac{120 \times 80}{100} = 96$ টাকা।

∴ চিনি বাবদ ব্যয় কমলো = $(100 - 96) = 4$ টাকা। ∴ ৪% হ্রাস পাবে।

শর্টকাট: মোট পরিবর্তন = $20 - 20 - \frac{20 \times 20}{100} = -4$ [ঋণাত্মক চিহ্ন থাকলে হ্রাস বুঝায়] (উত্তর: গ. ৪% কমলো)

8. In a country, 60% of the male citizen and 70% of the female citizen are eligible to vote. 70% of male citizens eligible to vote voted, and 60% of female citizens eligible to vote voted. What fraction of the citizens voted during the election?

A. 0.42 B. 0.48 C. 0.49 D. 0.54

Solution: Men Eligible to vote = 60% of 100m = 60m

Women Eligible to vote = 70% of 100w = 70w

Men actually voted = 70% of 60m = 42m

Women actually voted = 60% of 70w = 42w

Total men and women voted = 42m + 42w = 42(m + w)

Total population = 100m + 100w = 100(m + w)

Fraction of the citizens voted during the election = $\frac{42(m+w)}{100(m+w)} = 0.42$ (Answer: A. 0.42)

9. If X is 60 percent more than Y and Y is 40 percent less than Z, then what percent of Z is X?

A. 64% B. 80% C. 96% D. 120%

Solution: Let, Z = 100

Y = 40% less than Z = 60% of Z = 60

X = 60% more than Y = 160% of Y = $\frac{160}{100} \times 60 = 96$. Hence X is 96% of Z (Answer: C. 96%)

10. Of the films Empty Set Studios released last year, 60% were comedies and the rest were horror films. 75% of the comedies were profitable, but 75% of the horror moves were unprofitable. If the studio made a total of 40 films, and broke even on none of them, how many of their films were profitable?
 A. 18 B. 19 C. 20 D. 22

Solution: There are a total of 40 movies and 60% were comedy, then 40% were horror. therefore:

$$40 \times 0.60 = 24 \text{ comedy movies} \& \ 40 \times 0.40 = 16 \text{ horror movies}$$

Now we know that 75% of the comedy were profitable.

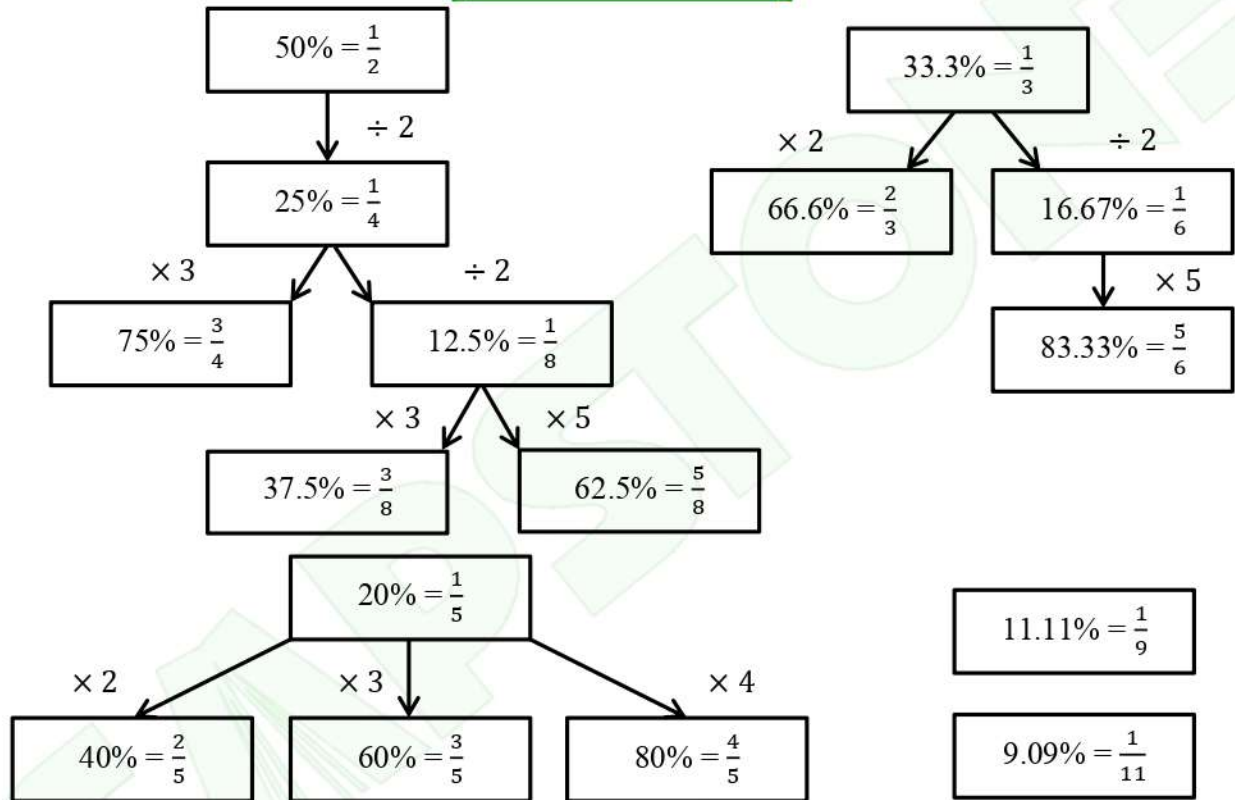
$$24 \times 0.75 = 18 \text{ profitable comedy movies}$$

If 75% of the horror were not profitable, then 25% were.

$$16 \times 0.25 = 4 \text{ profitable horror movies}$$

$$\text{Total profitable movies} = 18 + 4 = 22 \text{ (Answer: D. 22)}$$

Ratio Equivalence



সেট (Set)

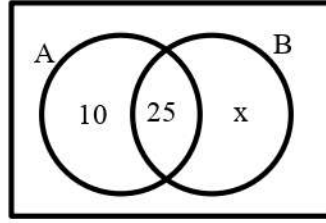
সেটের ধারণা দেন জার্মান গণিতবিদ জর্জ ক্যান্টর। তাকে সেট থিওরীর জনক বলা হয়।

- ◆ সেট: বাস্তব জগতের সু-সংজ্ঞায়িত বস্তুর সমাবেশ বা সংগ্রহকে সেট বলা হয়। সেটকে '{ }' দ্বারা প্রকাশ করা হয় এবং উপাদানগুলোকে আলাদা করার জন্য কমা ব্যবহার করা হয়। যেমন: $S = \{a, b, c\}$
- ◆ উপসেট: একটি সেটের ভেতর যতগুলো উপাদান থাকে তাদের দ্বারা পৃথকভাবে গঠিত সেটসমূহকে উপসেট বলা হয়। কোনো সেটের উপাদান সংখ্যা n হলে ঐ সেটের উপসেট সংখ্যা $= 2^n$ ।

সেটকে দুই পদ্ধতিতে প্রকাশ করা হয়:

- ◆ তালিকা পদ্ধতি: এ পদ্ধতিতে সেটের সব উপাদান সুনির্দিষ্টভাবে উল্লেখ করে দ্বিতীয় বন্ধনী '{ }' দ্বারা আবদ্ধ করা হয়। যেমন: $A = \{1, 2, 3\}$
- ◆ সেট গঠন পদ্ধতি: এ পদ্ধতিতে সেটের উপাদানসমূহকে সুনির্দিষ্টভাবে উল্লেখ না করে উপাদান নির্ধারণের জন্য সাধারণ বৈশিষ্ট্য উল্লেখ থাকে। যেমন: $A = \{x: x \text{ স্বাভাবিক বিজোড় সংখ্যা}\}$
- ◆ দুটি সেটের উপাদানের মধ্যে \cup (Union) চিহ্ন থাকলে মিল-অমিল সব রাশি নিতে হবে। তবে কোনো রাশি একাধিকবার নেয়া যাবে না। যেমন: $\{1, 3, 5, 6\} \cup \{2, 3, 5, 6\} = \{1, 2, 3, 5, 6\}$
- ◆ দুটি সেটের উপাদানের মধ্যে \cap (Intersection) চিহ্ন থাকলে শুধু মিল আছে যে রাশিগুলো সেগুলো নিতে হবে এবং অমিলগুলোকে বাদ দিতে হবে। যেমন: $\{1, 3, 5, 6\} \cap \{2, 3, 5, 6\} = \{3, 5, 6\}$

অথবা,



যেহেতু প্রত্যেকেই অন্তত একটি ভাষায় কথা বলতে পারেন, $10 + 25 + x = 50$

$$\Rightarrow x = 15$$

$$\therefore n(B) = 25 + x = 25 + 15 = 40 \text{ (উত্তর: গ. 40)}$$

14. 70 জন শিক্ষার্থী গণিত, পদার্থবিদ্যা ও রসায়ন-এ অধ্যয়ন করে। তার মধ্যে 35 জন পদার্থবিদ্যা, 40 জন গণিতে এবং 30 জন রসায়নে অধ্যয়ন করে। 15 জন শিক্ষার্থী তিনটি বিষয়েই অধ্যয়ন করে। কতজন শিক্ষার্থী দুইটি বিষয়ে অধ্যয়ন করে?

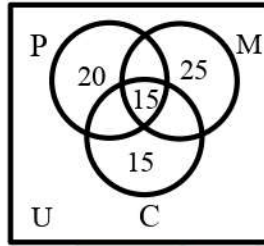
ক. 5

খ. 65

গ. 15

ঘ. 40

সমাধান:



তিনটি বিষয়েই অধ্যয়ন করা 15 জন সবগুলো থেকে বাদ দিলে,

শুধু পদার্থ = $35 - 15 = 20$ জন; শুধু গণিত = $40 - 15 = 25$ জন; শুধু রসায়ন = $30 - 15 = 15$ জন

\therefore কেবল দুইটি বিষয়ে অধ্যয়ন করে = $(20 + 25 + 15 + 15) - 70 = 5$ জন

বিকল্প সমাধান: $n(M \cup P \cup C) = 70$

$$n(M) = 40; n(P) = 35; n(C) = 30$$

$$\text{triple} = 15$$

$$\therefore n(M \cup P \cup C) = n(M) + n(P) + n(C) - \text{both} + \text{triple}$$

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

$$\Rightarrow \text{both} = 50$$

$$\therefore \text{কেবল দুইটি বিষয় অধ্যয়ন করে} = \text{both} - 3 \times \text{triple} = 50 - (3 \times 15) = 5 \text{ (উত্তর: ক. 5)}$$

Shortcut technique:

i. কেবল দুটি বিষয়ে অধ্যয়ন করে = $(\text{both} - 3 \times \text{triple})$

ii. কমপক্ষে দুটি বিষয়ে অধ্যয়ন করে = $(\text{both} - 2 \times \text{triple})$

iii. কেবল একটি বিষয় অধ্যয়ন করে = $n(A) + n(B) + n(C) - 2 \times \text{both} + 3 \times \text{triple}$

15. In a class of 120 students 80 enrolled for a mathematics seminar, 60 enrolled for business basics seminar, while 12 did not enrolled for either of the two seminar. How many students enrolled for both the seminars?

ক. 28

খ. 32

গ. 40

ঘ. 48

সমাধান:

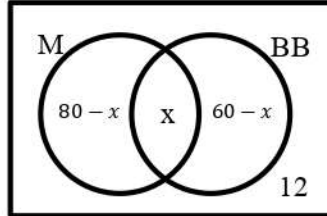
Double Matrix Method: Total student = 120

	BB	No BB	
Math			80
No Math		12	
	60		

⇒

	BB	No BB	
Math	32	48	80
No Math	28	12	40
	60	60	

Venn diagram: M = Math, BB = Business Basics



$$\therefore 120 = 80 - x + x + 60 - x + 12 \quad \Rightarrow 120 = 152 - x \quad \Rightarrow x = 32 \text{ (উত্তর: খ. 32)}$$

Using Formula: $n(U) = 120$; $n(BB) = 60$; $n(M) = 80$; both = x ; none = 12

$$\therefore n(U) = n(BB) + n(M) - \text{both} + \text{none}$$

$$\Rightarrow 120 = 80 + 60 - x + 12$$

$$\therefore x = 32 \text{ (উত্তর: খ. 32)}$$

16. Each of the 59 members in a high school class is required to sign up for a minimum of one and a maximum of three academic clubs. The three clubs to choose from are the poetry club, the history club and the writing club. A total of 27 students sign up for the poetry club, 27 students for the history club, and 28 students for the writing club. If 6 students sign up for exactly two clubs, how many students sign up for all three clubs?

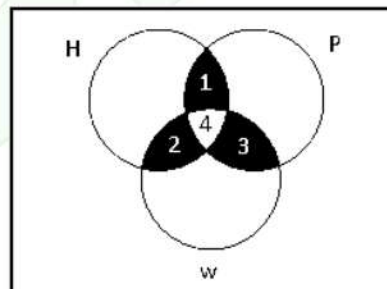
ক. 2

খ. 5

গ. 6

ঘ. 8

সমাধান: **Venn diagram:**



$$\text{Total} = 59; \text{Neither} = 0; P = 22; H = 27; W = 28$$

$$\text{Exactly two club} = 6 \text{ [section 1, 2, 3]}$$

$$\text{Triple} = x$$

$$\text{As we know, Exactly 2 group} = \text{both} - 3 \times \text{triple}$$

$$\Rightarrow \text{both} = (\text{Exactly 2 group} + 3 \times \text{triple})$$

$$\text{Again, } n(T) = n(P) + n(H) + n(W) - \text{both} + \text{triple} + \text{neither}$$

$$n(T) = n(P) + n(H) + n(W) - \text{Exactly two club} - 3 \times \text{triple} + \text{triple} + \text{neither}$$

$$n(T) = n(P) + n(H) + n(W) - \text{Exactly two club} - 2 \times \text{triple} + \text{neither}$$

$$59 = 22 + 27 + 28 - 6 - 2 \times x + 0$$

$$59 = 71 - 2x$$

$$x = 6 \text{ (উত্তর: গ. 6)}$$

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
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%
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
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
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. None of these
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
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%
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?
[43rd BCS]
A. 180 B. 240 C. 300 D. 360
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
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
11. 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%
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 (সহ: ব্যবস্থাপক) ২০২১]
A. 17 B. 18 C. 19 D. 20 E. None of these

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 (সহ: ব্যবস্থাপক) ২০২১]
- A. 10 B. 15 C. 20 D. 25 E. None of these
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%
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
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
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
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
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%
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
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
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

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
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
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
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
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
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
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
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%

Home Task Math

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
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

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
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
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
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
37. In a certain class, $\frac{1}{5}$ of the boys are shorter than the shortest girls 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 2009]
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%
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
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
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
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
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
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

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
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
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
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
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
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
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%
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
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
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

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
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%
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%
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
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
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
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
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
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
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

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

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]
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?
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?
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]
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?
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?
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]
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]
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]
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?