Biddabari
your success benchmark

Bank Job

Lecture Sheet

Math
Preliminary

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Mathematical Terms (গাণিতিক শব্দসমূহ)

Word	Meaning	Word	Meaning	Word	Meaning
Integer	পূর্ণসংখ্যা	Whole number	পূর্ণসংখ্যা	Number	সংখ্যা
Digit	অঙ্ক	Fraction	ভগ্নাংশ	Decimal fraction	দশমিক ভগ্নাংশ
Ratio	অনুপাত	Proportion	সমানুপাত	Mean Proportional	মধ্য সমানুপাতিক
Sum	যোগফল	LCM (Least Common Multiple)	ল.সা.গু.	HCF (Highest Common Faction	গ.সা.গু.
Numerator	লব	Denominator	হর	Odd	বিজোড়
Even	জোড়	Product	গুণফল	Division	ভাগ
Dividend	ভাজ্য	Quotient	ভাগফল	Remainder	ভাগশেষ
Divisible	বিভাজ্য	Consecutive	পরপর/ক্রমিক	Consecutive even	পরপর জোড়
Consecutive odd	পরপর বিজোড়	Ascending order	ছোট থেকে বড়	Descending order	বড় থেকে ছোট
Multiplication	গুণক	Multiple	গুণক	Factor	উৎপাদক/গুণনীয়ক
Prime number	মৌগিক সংখ্যা	Perfect square	পূর্ণবর্গ	Square root	বর্গমূল
Cube root	ঘনমূল	Increased to	বৃদ্ধি পেয়ে যতটা হল	Increased by	যতটা বৃদ্ধি পেল
Adjacent angle	সন্নিহিত কোণ	Corresponding angle	অনুরূপ কোণ	vertically opposite angle	বিপ্রতীপ কোণ
Right angle	সমকোণ	Straight angle	সরল কোণ	Alternate angle	একান্তর কোণ
Perpendicular	লম্ব	Hypotenus	অতিভুজ	Base	ভূমি
Complementary angle	পূরক কোণ	Supplementary angle	সম্পূরক কোণ	Right angle triangle	সমকোণী ত্রিভুজ
Obtuse angle	স্থূলকোণ	Reflex angle	প্রবৃদ্ধ কোণ	Acute angle	সূক্ষ্মকোণ
Acute angle triangle	সূক্ষ্মকোণী ত্রিভুজ	Obtuse angle triangle	স্থূলকোণী ত্রিভুজ	Equilateral triangle	সমবাহু ত্রিভুজ
Isosceles triangle	সমদ্বিবাহু ত্রিভুজ	Scalene (স্কেইলিন) triangle	বিষমবাহু ত্রিভুজ	Quadrilateral	চতুর্ভুজ
Square	বর্গক্ষেত্র	Rectangle	আয়তক্ষেত্র	Parallelogram	সামন্তরিক
Rhombus	রম্বস	Trapezium	ট্রাপিজিয়াম	Diagonal	কর্ণ
Perimeter	পরিসীমা	Altitude/Height	উচ্চতা	Area	ক্ষেত্রফল
Vertex	শীর্ষবিন্দু	Diameter	ব্যাস	Radius	ব্যাসার্ধ
Chord	জ্যা	Circumference	পরিধি	Arc	চাপ
Abscissa	ভুজ	Ordinate	কোটি	Slant height	তির্যক উচ্চতা
Horizontal	অনুভূমিক	Vertical	উলম্ব	Thick	পুরু বা উচ্চতা
Tangent	স্পর্শক	Semi-circle	অর্ধবৃত্ত	Ploygon	বহুভুজ
Rectangular Cuboids	আয়তাকার ঘনবস্তু	Total surface area	সমগ্র তলের ক্ষেত্রফল	Curved surface area	বক্রতলের ক্ষেত্রফল
Cube	ঘনক	Sectional area	ভূমিতলের ক্ষেত্রফল	Solid	ঘনবস্তু
Surface area	উপরিতলের ক্ষেত্রফল	Cylinder	চোঙ্গা/বেলন	Sphere	গোলক
Cone	কোণক				

Bank Job Lecture Sheet

Lecture 1

Lecture Contents

☑ **Percentage**

Percentage

Basic Concept:

Percent (%) is a number which is divided by 100. শতকরা হলো এমন একটি সংখ্যা যাকে 100 দিয়ে ভাগ করা যায় । অর্থাৎ প্রতি একশতে কত বোঝানোর জন্য শতকরা শব্দটি ব্যবহার করা হয় ।

যেমন- $x\% = \dfrac{x}{100}$

$$2\% = \dfrac{2}{100}$$

$$1\% = \dfrac{1}{100}$$

$$\% = \dfrac{1}{100}$$

অর্থাৎ % বলতে $\dfrac{1}{100}$ বুঝায় ।

$$30 \times 20\%$$

$$= 30 \times \dfrac{20}{100}$$

$$= 6$$

Question: 3 কে শতকরায় প্রকাশ করুন।

$$3$$

$$= 3 \times \dfrac{100}{100} \quad = 3 \times 100 \times \dfrac{1}{100}$$

$$= 300\% \text{ (Ans.)} \qquad \left[\because \% = \dfrac{1}{100} \right]$$

Tips: কোন কিছুকে শতকরায় প্রকাশ করতে হলে তাকে অবশ্যই 100% দিয়ে গুণ করতে হবে । এখানে 100% বলতে 1 বুঝায় । যেমন-

$$100\% = \dfrac{100}{100} = 1.$$

তাহলে দুটি জিনিস অবশ্যই মনে রাখতে হবে । যেমন-

(i) % ভাঙতে হলে % এর পরিবর্তে $\dfrac{1}{100}$ দিবো বা 100 দিয়ে ভাগ করবো ।

(ii) % নিয়ে আসতে 100% দিয়ে গুণ করবো ।

Qestions: $\dfrac{7}{8}$ % of 20 is 20% of what number?

Tips: Be verb (am, is, are, was, were.........) → থাকলে সমান চিহ্ন দিবো

of → গুণন চিহ্ন দিবো

times → গুণন চিহ্ন দিবো

% (percent) → $\dfrac{1}{100}$ দিবো বা 100 দিয়ে ভাগ করবো

What বা which → চলক দিবো । যেমন- x, y, z ...... ইত্যাদি ।

$$\dfrac{7}{8} \times \dfrac{1}{100} \times 20 = \dfrac{20}{100} \times x$$

$$\Rightarrow x = \dfrac{7}{8} \times \dfrac{1}{100} \times 20 \times \dfrac{100}{20}$$

$$\Rightarrow x = \dfrac{7}{8} \text{ (Ans.)}$$

Question: 0.01 is what percent of 0.1?

$$0.01 = x \times \frac{1}{100} \times 0.1$$

$$\Rightarrow x = 0.01 \times \frac{100}{0.1} = 10 \text{ (Ans.)}$$

Question: (i) তেলের দাম 25% বেড়ে গেলে ব্যবহার শতকরা কত কমালে তেলে দামের কোন পরিবর্তন হবে না?

(ii) চিনির দাম 20% কমে গেলে ব্যবহার শতকরা কত বাড়ালে খরচ পূর্বের সমান থাকবে?

এই ধরনের ম্যাথ করার ক্ষেত্রে–

Tips: $\frac{100p}{100 \pm p}$, p অর্থ % যেটা বাড়ে বা কমে।

(i) $\frac{100 \times 25}{100 + 25} = \frac{100 \times 25}{125} = 20\%$ কমাতে হবে।

(ii) $\frac{100 \times 20}{100 - 20} = \frac{100 \times 20}{120} = 25\%$ বাড়াতে হবে।

Increase	Decrease
20%	16.66%
25%	20%
33.33%	25%
50%	33.33%
60%	37.5%
75%	42.85%
100%	50%

☑ Overall কত % বাড়লো বা কমলো এটি বের করার Short নিয়ম:

$$\pm P \pm Q \pm \frac{PQ}{100}.$$

ব্যবহার:

(i) একই জিনিসের increase বা decrease হলে।
　যেমন- চিনির দাম 10% বেড়ে গেল। পরের দিন 10% কমে গেল। তাহলে overall কত% বাড়লো বা কমলো।

$$+ 10 - 10 \pm \frac{(10) \times (-10)}{100} \quad \bigg| \quad P = + 10\%$$
$$\Rightarrow - 1\% \text{ (Ans.)} \quad\quad\quad\quad\quad\quad Q = - 10\%$$
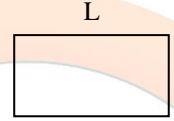
(ii) পর্যায়ক্রমিক increase বা decrease হলে।
　যেমন: successive discount of 20% and 15% are equal to a single discount of?
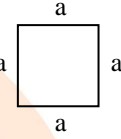
$$- 20 - 15 + \frac{20 \times 15}{100}$$
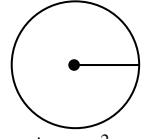$$= - 35 + 3$$
$$= - 32\% \text{ (Ans.)}$$

(iii) গুণনের সম্পর্ক থাকলে।

Area = L × W　　　Area = a × a　　　$A = \pi r^2$
　　　　　　　　　　　　　　　　　　　　　　$= \pi.r.r$

eg- The percentage increase in the area of a rectangle if each of its sides is increased by 20% is.....

$$20 + 20 + \frac{20 \times 20}{100}$$
$$= 40 + 4$$
$$= 44\% \textbf{ (Ans.)}$$

To be remembered:

$\frac{1}{1} \times 100\% = 100\%$	$\frac{2}{3} \times 100\% = 66.66\%$
$\frac{1}{2} \times 100\% = 50\%$	$\frac{3}{4} \times 100\% = 75\%$
$\frac{1}{3} \times 100\% = 33.33\%$	$\frac{3}{5} \times 100\% = 60\%$
$\frac{1}{4} \times 100\% = 25\%$	$\frac{4}{5} \times 100\% = 40\%$
$\frac{1}{5} \times 100\% = 20\%$	$\frac{6}{7} \times 100\% = 55.71\%$
$\frac{1}{6} \times 100\% = 16.67\%$	$\frac{7}{8} \times 100\% = 87.5\%$
$\frac{1}{7} \times 100\% = 14.28\%$	
$\frac{1}{8} \times 100\% = 12.5\%$	

Teacher's Discussion

1. **What percent of 700 is 2.1?** [Combined 7 Bank Officer (Cash)-2023]
   A. 3   B. 0.3   C. 0.03   D. 30   **Ans: B**

2. **Nafiza bought a ticket of a cricket march for Tk. 25 and later sold the ticket to Raida for Tk. 75. What was the percent increase in the price of the ticket?** [Combined 7 Bank Officer (Cash)-2023]
   A. 200%   B. 150%   C. 300%   D. 100%   **Ans: C**

3. **Mr. Khan's salary is Tk. 500.00 and he gets 10% commission of the salary. If his salary increased by 10% by what percent his commission will increase?** [Combined 7 Bank Officer (Cash)-2023]
   A. 5%   B. 10%   C. 20%   D. 30%   **Ans: B**

4. **If it is 250 miles from Dhaka to Dinajpur and 120 miles from Dhaka to Pabna, what percentage of the distance from Dhaka to Dinajpur is the distance from Dhaka to Pabna?** [Combined 5 Banks Officer- 2022]
   A. 12   B. 24   C. 36   D. 48   **Ans: D**

5. **If A's income is 25% less than that of B, then how much percent is B's income more than that of A?**
   (A) $33\frac{1}{3}\%$ (B) $66\frac{2}{3}\%$ (C) $11\frac{2}{3}\%$ (D) 25%   **Ans: A**

6. **Jasim's weight is 140% of Masum's weight. Bashir's weight is 90% of Limon's weight. Limon weighs twice as much as Masum. What percentage of Jasim's weight is Bashir's weight?** [Combined 5 Banks Officer- 2022]
   A. $64\frac{4}{7}$ %   B. $77\frac{2}{9}$ %   C. $128\frac{4}{7}$ %   D. $45\frac{5}{9}$ %   **Ans: C**

7. **An employee's annual salary was increased Tk. 15000. If her new annual salary now equals Tk. 90000, what was the percent increase?** [Bangladesh Bank (AD)- 2021]
   A. 15%   B. 22%   C. 24%   D. 20%   **Ans: D**

8. **Bus fares were recently increased from Taka 1.70 to Taka 2.00. What was the approximate percentage of increase?** [Bangladesh Bank Officer- 2019]
   A. 18%   B. 15%   C. 0.015%   D. 0.18%   **Ans: A**

9. **What percentage of numbers from 1 to 80 (inclusive) has 0 or 1 in the unit's digit?** [DBBL PO- 2019]
   A. 10%   B. 16%   C. 20%   D. 21%   **Ans: C**

10. **What percentage should be added to 40 to make it 50?** [IFIC Bank TO- 2019]
    A. 15   B. 25   C. 75   D. 80   **Ans: B**

11. **If w is 10 percent less than x, and y is 30 percent less than z, then wy is what percent less than xz?** [DBBL PO- 2019]
    A. 10%   B. 20%   C. 37%   D. 63%   **Ans: C**

12. **A student multiplied a number by $\frac{3}{5}$ instead of $\frac{5}{3}$. What is the percentage error in the calculation?** [Uttara Bank AO- 2022]
    A. 60%   B. 64%   C. 70%   D. 74%   **Ans: B**

13. **If an inspector rejects 0.08% of a product as defective, how many units of the product will he examine in order to reject 2?** [Combined Recruitment Test for 3 Banks- 2018]
    A. 1500   B. 500   C. 2000   D. 2500   **Ans: D**

14. **If a 10% deposit that has been paid toward the purchase of a certain goods is Tk. 110, how much Tk. remains to be paid?** [Combined 5 Banks Officer- 2022]
    A. 880   B. 1100   C. 1010   D. 990   **Ans: D**

15. **The percentage increase in the area of a rectangle, if each of its sides is increased by 20%, is:** [Bangladesh Bank AD- 2016]
    A. 42%   B. 40%   C. 44%   D. 46%   **Ans: C**

16. The price of corn rose 20% two years ago and 15% las year. What is the combined percent increase in price? [Bangladesh Bank AD- 2011]
A. 5%   B. 17.5%   C. 25%   D. 38%   **Ans: D**

17. If the length of a rectangle is increased by 20% and width is decreased by 20%, what is the change in area of the rectangle? [Bangladesh Bank Officer- 2019]
A. unchanged   B. decreased by 4%
C. increased by 4%   D. increased by 5%   **Ans: B**

18. The length of a rectangle is increased by 25%. By what percentage should the width be decreased so that the area of the rectangle remains unchanged? [Bangladesh Bank AD-2012]
A. 30%   B. 25%   C. 20%   D. 35%   **Ans: C**

19. The price of diesel increases by 50%. Find by how much percent a truck owner must reduce his consumption in order to maintain the same budget? [One Bank, Special Cadre Officer- 2022]
A. 10.74%   B. 17.64%   C. 20.46%   D. 33.33%   **Ans: D**

20. The price of sugar increases by 20%. By what percent must a housewife reduce the consumption of sugar so that the expenditure on sugar is the same as before?
(A) 80%   (B) 20%   (C) 16.66%   (D) 83.33%   **Ans: C**

21. If 25% of a number is 75, 80% of the number is: [Combined 5 Banks Officer- 2022]
A. 300   B. 180   C. 375   D. 240   **Ans: D**

22. If 6.4 is 80 percent of 20 percent of a certain number, what is the number? [Combined 5 Banks Officer-2022]
A. 9   B. 36   C. 40   D. 81   **Ans: C**

23. If 18 is 15% of 50% of a certain number, what is the number? [Combined 8 Banks Officer- 2022]
A. 360   B. 120   C. 240   D. 900   **Ans: C**

24. In a class, 120 students are male and 100 students are female. 25% of male students and 20% of female students are engineering student. 20% of the male engineering students and 25% of the female engineering students passed the final exam. What percentage of engineering students passed the exam? [Combined 9 Bank Senior Officer (General)-2023]
A. 10%   B. 16%   C. 22%   D. 25%   **Ans: C**

25. A man sells 2 commodities for Tk. 400 each, neither losing nor gaining in the deal. If he sold one commodity at a gain of 25%, then what is the cost price of another commodity? [Combined 9 Bank Senior Officer (General)-2023]
A. Tk. 3200   B. Tk. 4800   C. Tk. 4000   D. Tk. 3600   **Ans: B**

26. In a factory, there are workers, executives and clerks. 58% of the employees are workers, 660 are executives and the remaining 264 employees are clerks. How many employees are three in the factory? [Combined 9 Bank Senior Officer (General)-2023]
A. 1500   B. 200   C. 2200   D. 2500   **Ans: C**

27. As a salesperson, poly can choose one of two methods of annual payment; either an annual salary of Tk. 35000 with no commission or an annual salary of Tk. 10000 plus a 20 percent commission on her total annual sales. What must her total annual sales be to give her the same annual pay with either method? [Combined 9 Banks Officer- 2022]
A. Tk. 100000   B. Tk. 120000   C. Tk. 125000   D. Tk. 130000   **Ans: C**

28. Every 3 minutes, 4 liters of water are poured into a 2000 liters tank. After 2 hours, what percent of the tank will be full? [Bangladesh Bank Officer- 2019]
A. 0.4%   B. 4%   C. 8%   D. 12%   **Ans: C**

29. If 25% of a number is subtracted from a second number, the second number reduces to its five-sixth. What is the ratio of the first number to the second number? [Bangladesh Bank AD- 2016]
    A. 1 : 3   B. 2 : 3   C. 3 : 2   D. None of these   **Ans: B**

30. In an election, a candidate who gets 84% of the votes is elected by a majority of 476 votes. What is the total number of votes polled? [Bangladesh Bank AD- 2012]
    A. 672   B. 700   C. 749   D. 848   **Ans: B**

31. Riaz spent 20% of his income on taxes and 20% of the remainder on rent. What percent of his income has he spent on rent? [Bangladesh Bank AD- 2011]
    A. 12   B. 14   C. 16   D. 18   **Ans: C**

32. 75% of students of a class answered Question No. 1 correct and 55% answered Question No. 2 correct and 20% answered neither question correctly. What percent of students answered both questions correctly? [Bangladesh Bank AD- 2011]
    A. 20%   B. 25%   C. 35%   D. 50%   **Ans: D**

33. As the price of mango has reduced 20%, it is now possible to buy 2 more mangoes at Tk. 12. What is the correct price of 50 mangoes? [Southeast Bank PO- 2020; IBBL PO- 2019]
    A. Tk. 50   B. Tk. 40   C. Tk. 30   D. Tk. 60   **Ans: D**

34. The price of a loaf of bread was increased by 20%. How many loaves can be purchased for the amount of money that used to buy 300 loaves? [Shadharon Bima Corporation Junior Officer- 2019]
    A. 240   B. 250   C. 280   D. 320   **Ans: B**

35. A man spends 75% of his income. His income is increased by 20% and he increased his expenses by 10%. His savings are increased by- [Shadharon Bima Corporation Junior Officer- 2019]
    A. 50%   B. 37.50%   C. 25%   D. 10%   **Ans: A**

36. If the salary of an employee is reduced by 10 percent for his late attendance and then increased by 10 percent can a pardon, how much does he lose? [IBBL PO- 2019]
    A. 2%   B. 1%   C. $\frac{1}{2}$ D. 9%   **Ans: B**

37. 35% of Nabila's income is equal to 25% of Sakila's income. The ratio of their income is- [IBBL PO- 19]
    A. 5 : 7   B. 4 : 7   C. 7 : 3   D. 4 : 3   **Ans: A**

38. A cricket team has won 40 games out of 60 played. It has 32 more games to play. How many of these must the team win to make it record 70% win for the season? [Uttara Bank AO- 2022]
    A. 20   B. 23   C. 25   D. 32   **Ans: C**

39. One third of the faculty members of a department are female. Sixteen of the male teachers are unmarried, while 60% of them are married. The total number of faculty members in the department is: [Probashi Kallayan Bank Senior Officer- 2021]
    A. 25   B. 30   C. 60   D. 90   **Ans: C**

Student's Drill

1. A number M is 8 times another number N. The percentage that N is less than M is-
    (A) 90%   (B) 87.25%   (C) 66.66%   (D) 12.50%   **Ans: B**

2. If two positive numbers are in the ratio $\frac{1}{8} : \frac{1}{5}$, then by what percent is the second number more than the first?
    (A) 40%   (B) $33\frac{1}{3}\%$ (C) 60%   (D) $66\frac{2}{3}\%$ **Ans: C**

3. If A's income is 25% less than that of B, then how much percent is B's income more than that of A?
    (A) $33\frac{1}{3}\%$ (B) $66\frac{2}{3}\%$ (C) $11\frac{2}{3}\%$ (D) 25%   **Ans: A**

4. **A number on subtracting 15 from it, reduces to its 80% what is 40% of that number?**
   (A) 28   (B) 30   (C) 32   (D) 35   **Ans: B**

5. **In a batch of 500 students, forty percent are girls. Twenty-five percent of the boys and half of the girls agreed to go for a study tour. What percent of the entire batch did not sign up for the tour?**
   (A) 35%   (B) 65%   (C) 25%   (D) None   **Ans: B**

6. **In a two-candidate election, a candidate who gets 84% of the votes is elected by a majority of 476 votes. what is the total number of votes polled?**
   (A) 848   (B) 749   (C) 700   (D) 672   **Ans: C**

7. **What percentage of number from 1 to 70 has 1 or 9 in the unit digits?**
   (A) 1%   (B) 14%   (C) 20%   (D) 21%   **Ans: C**

8. **What percent of number from 11 to 90 has 0 or 5 in the unit digit?**
   (A) 10%   (B) 15%   (C) 20%   (D) 21%   **Ans: C**

9. **If x is 30% greater than y, what percent of y is x?**
   (A) 70%   (B) 77%   (C) 120%   (D) 130 %   **Ans: D**

10. **A man spent 75% of his income. His income increased by 20% and expenditure increased by 10%. His savings increased by?**
    (A) 10%   (B) 25%   (C) 37.50%   (D) 50%   **Ans: D**

11. **The percentage increase in the area of a rectangle, if each of its sides is increased by 20% is:**
    (A) 40%   (B) 42%   (C) 44%   (D) 46%   **Ans: C**

12. **The price of corn rose 20% two years ago and 15% last year. What is the combined percent increase/decrease in price?**
    (A) 5%   (B) 17.5%   (C) 25%   (D) 38%   **Ans: D**

13. **The price of sugar increases by 20%. By what percent must a housewife reduce the consumption of sugar so that the expenditure on sugar is the same as before?**
    (A) 80%   (B) 20%   (C) 16.66%   (D) 83.33%   **Ans: C**

14. **The length of a rectangle is decreased by 20%. What percentage should the width be increased so that the area of the rectangle remains unchanged?**
    (A) 30%   (B) 25%   (C) 20%   (D) 35%   **Ans: B**

15. **A towel, when bleached, was found to have lost 20% of its length and 10% of its breadth. The percentage of decrease in area is**
    (A) 10%   (B) 10.08%   (C) 20%   (D) 28%   **Ans: D**

16. **Successive discount of 20% and 15% are equal to a single discount of**
    (A) 30%   (B) 32%   (C) 34%   (D) 35%   **Ans: B**

17. **Successive discount of 30% and p% are equal to a single discount of 44%. What is the value of p?**
    (A) 20   (B) 25   (C) 30   (D) 35   **Ans: A**

18. **In a class, the number of girls is 20% more than that of the boys. The strength of class is 66. If 4 more girls are admitted to the class, the ratio of the number of boys to that of the girls is**
    (A) 1:2   (B) 1:4   (C) 3:5   (D) 3:4   **Ans: D**

19. **Two numbers individually are less than the third number by 60% and 64% respectively. By what percent is the second number less than the first?**
    (A) 10%   (B) 27%   (C) 30 %   (D) 35%   **Ans: A**

20. **In a box, 40% of the pens are red. If half of the red pens are removal, the percentage of red pens in the box will be:**
    (A) 20%   (B) 22.5%   (C) 25 %   (D) 30%   **Ans: C**

21. **A student first reduced a number by 20%, then increased by 20%. If the difference between the last number and the original number is 8, then the original number was:**
    (A) 200   (B) 250   (C) 300   (D) 450   **Ans: A**

22. Half of 1 percent written as a decimal is:

   (A) 0.05   (B) 0.005   (C) 0.02   (D) 0.2   **Ans: B**

23. If 25% of a number is subtracted from a second number, the second number reduces to its five-sixth. What is the ratio of the first number to the second number?

   (A) 1:2   (B) 3:2   (C) 2:3   (D) None   **Ans: C**

24. If 40% of a number is equal to two –third of another number, what is the ratio of 1st to 2nd number?

   (A) 4:3   (B) 3:4   (C) 5:3   (D) 3:5   **Ans: C**

Solution of Student's Drill

1. Let, N = x, M = 8x

$$\therefore \text{Required \%} = \frac{7x}{8x} \times 100\% = 87.25\% \textbf{ (Ans.)}$$

2. $1^{st} : 2^{nd} = \frac{1}{8} : \frac{1}{5}$

$$= \frac{1}{8} \times 40 : \frac{1}{5} \times 40 = 5 : 8$$

$$\therefore \text{Required \%} = \frac{3}{5} \times 100\% = 60\% \textbf{ (Ans.)}$$

3. Let, B = 100   ∴ A = 75

$$\therefore \text{Required \%} = \frac{25}{75} \times 100\% = 33.33\% \textbf{ (Ans.)}$$

4. Let, number = x

Let, $x - 15 = x \times \frac{80}{100}$

$$\Rightarrow x - 15 = \frac{4x}{5}$$

$$\Rightarrow x - \frac{4x}{5} = 15$$

$$\Rightarrow \frac{5x - 4x}{5} = 15 \Rightarrow x = 75$$

$$\therefore 75 \times 40\% = 75 \times \frac{2}{5} = 30 \textbf{ (Ans.)}$$

5. Total = 500

∴ G = 500 × 40% = 200

B = 300

On tour, B = 300 × 25% = 75

$$G = 200 \times \frac{1}{2} = 100$$

Not sign up for tour = 500 – (175) = 325

$$\therefore \text{Required \%} = \frac{325}{500} \times 100\% = 65\% \textbf{ (Ans.)}$$

6. Let, Total votes = 100%

winner = 84%   ∴ Loser = 16%

In condition,

84% – 16% = 476

⇒ 64% = 476

$$\Rightarrow 1\% = \frac{476}{68}$$

$$\therefore 100\% = \frac{476 \times 100}{68} = 700 \textbf{ (Ans.)}$$

7.

01	09
11	19
21	29
31	39
41	49
51	59
61	69

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$$\therefore \text{Required \%} = \frac{14}{70} \times 100\% = 20\% \textbf{ (Ans.)}$$

8.

20	15
30	25
40	35
50	45
60	55
70	65
80	75
90	85

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$$\therefore \text{Required \%} = \frac{16}{80} \times 100\% = 20\% \textbf{ (Ans.)}$$

9. Let, y = 100   ∴ x = 130

$$\text{Required \%} = \frac{x}{y} \times 100\%$$

$$= \frac{130}{100} \times 100\% = 130\% \textbf{ (Ans.)}$$

10. Let, Income = 100 | If, Income = 120

     spent = 75 | spent = 75 × 1.10 = 82.5

     ∴ saving = 25 | ∴ saving = 37.5

∴ Required % = $\dfrac{12.5}{25} \times 100\% = 50\%$ **(Ans.)**

11. $\pm P \pm Q \pm \dfrac{PQ}{100}$

$= 20 + 20 + \dfrac{20 \times 20}{100}$

$= 40 + 4 = 44\%$ **(Ans.)**

12. $\pm P \pm Q \pm \dfrac{PQ}{100}$

$= 20 + 15 + \dfrac{20 \times 15}{100}$

$= 35 + 3 = 38\%$ **(Ans.)**

13. Let, price = 100

At 20% increase, price = 120

∴ Required % = $\dfrac{20}{120} \times 100\% = 16.66\%$ **(Ans.)**

14. Let, length = 5, width = 4

If length is decreased by 20%

Length = 5 × .80 = 4

So, width will be increased by 1.

∴ Required % = $\dfrac{1}{4} \times 100\% = 25\%$ **(Ans.)**

15. $\pm P \pm Q \pm \dfrac{PQ}{100}$

$= -20 - 10 + \dfrac{20 \times 10}{100}$

$= -30 + 2 = -28\%$ **(Ans.)**

16. $\pm P \pm Q \pm \dfrac{PQ}{100}$

$= -20 - 15 + \dfrac{20 \times 15}{100}$

$= -35 + 3 = -32\%$ **(Ans.)**

17. $\pm P \pm Q \pm \dfrac{PQ}{100}$

$\Rightarrow -30 - P + \dfrac{30 \times P}{100} = -44$

$\Rightarrow -30 - P + \dfrac{3P}{10} = -44$

$\Rightarrow \dfrac{-300 - 10P + 3P}{10} = -44$

$\Rightarrow -7P = -44 + 300$

$\Rightarrow -7P = -140$ ∴ P = 20 **(Ans.)**

18. Let, B = 5x

∴ G = 5x × 1.20 = 6x

$\Rightarrow 5x + 6x = 66$

$\Rightarrow 11x = 6$ ∴ x = 6

∴ B = 5 × 6 = 30

G = 6 × 6 = 36

After 4 girls added, B : G = 30 : 40 = 3 : 4 **(Ans.)**

19. Let, 3rd = 100

∴ 1st = 40, 2nd = 36

∴ Required % = $\dfrac{4}{40} \times 100\% = 10\%$ **(Ans.)**

20. Let, total = 100

∴ red = 40

red removal = $40 \times \dfrac{1}{2} = 20$

∴ Remaining red = 20

Remaining total = 80

∴ $\dfrac{20}{80} \times 100\% = 25\%$ **(Ans.)**

21. Let, number = 100x

∴ 20% decrease, the number = 80x

Again, 20% increase, the number = 80x × 1.20

$= 96x$

∴ 100x − 96x = 8

$\Rightarrow 4x = 8$ ∴ x = 2

∴ Original number = 100 × 2 = 200 **(Ans.)**

22. $\dfrac{1}{2} \times \dfrac{1}{100}$

$= \dfrac{1}{200} = \dfrac{5}{1000} = .005$ **(Ans.)**

23. Let, 1st = x & 2nd = y

$y - x \times \dfrac{25}{100} = y \times \dfrac{5}{6}$

$\Rightarrow y - \dfrac{5y}{6} = \dfrac{x}{4}$

$\Rightarrow \dfrac{6y - 5y}{6} = \dfrac{x}{4}$

$\Rightarrow 4y = 6x \Rightarrow 6x = 4y$

$\Rightarrow \dfrac{x}{y} = \dfrac{4}{6} = \dfrac{2}{3} \Rightarrow 2 : 3$ **(Ans.)**

24. Let, 1st number = x & 2nd number = y

∴ $x \times \dfrac{40}{100} = \dfrac{2}{3} \times y$

$\Rightarrow \dfrac{2x}{5} = \dfrac{2y}{3}$

$\Rightarrow \dfrac{x}{y} = \dfrac{2}{3} \times \dfrac{5}{2} = \dfrac{5}{3} \Rightarrow 5 : 3$ **(Ans.)**

Home Practice

1. **3.5 can be expressed as a percent?**
   (A) 0.35%   (B) 3.5%   (c) 35%   (D) 350%   **Ans: D**

2. **What percent of x is y?**
   (A) 100xy   (B) $\dfrac{100x}{y}$ (C) $\dfrac{x}{100y}$ (D) $\dfrac{100y}{x}$ **Ans: D**

3. **0.01 is what percent of 0.1?**
   (A) 10%   (B) .10%   (C) 1%   (D) 0.01%   **Ans: A**

4. **Q is what percent of 20% of 15?**
   (A) $\dfrac{Q}{300}$ %   (B) $\dfrac{3}{100}$ %   (C) $\dfrac{3Q}{100}$ %   (D) $\dfrac{100Q}{3}$%   **Ans: D**

5. **$\dfrac{7}{8}$ % of 20 is 20% of what number?**
   (A) $\dfrac{7}{8}$ (B) $\dfrac{7}{100}$ (C) $\dfrac{8}{100}$ (D) 7   **Ans: A**

6. **In a college, 45% of the students are boys. If 40% of the boys and 20% of the girls went on a picnic, what percentage of the total students went to the picnic?**
   (A) 18%   (B) 24%   (C) 29%   (D) 30%   **Ans: C**

7. **In an examination, it is required to get 36% Maximum Marks to pass. A student got 113 marks and declared failed by 85 Marks. The examination marks are:**
   (A) 500   (B) 550   (C) 640   (D) 1008   **Ans: B**

8. **In a class, 34% of the students are female. Given that there are 16 more male than female, How many female students are there in the class?**
   (A) 17   (B) 32   (C) 34   (D) 42   **Ans: A**

9. **If 60% of x is equal to 50% of y, then x + y =?**
   (A) 1.25x   (B) 1.80x   (C) 2.20x   (D) 3.20x   **Ans: C**

10. **If x = 80% what percent is x larger than x^2?**
    (A) 81%   (B) 167%   (C) 25%   (D) 80%   **Ans: C**

11. **Of the 3600 employees of a company X, $\dfrac{1}{3}$ are clerical. If the clerical staff were to be reduced by $\dfrac{1}{3}$, what percent of the total number of remaining employees would be clerical?**
    (A) 25%   (B) 22.2%   (C) 20%   (D) 12.5%   **Ans: A**

12. **At an election involving two candidates, 68 votes were declared invalid. The winning candidate secures 52% and wins by 98 votes. The total number of votes polled is:**
    (A) 2382   (B) 2450   (C) 2518   (D) 2323   **Ans: C**

13. **20% of the computer technicians have passed the certification test conducted by BCS. Among the technicians who have not passed the test, 21 have taken the preparatory course and 15 haven't taken the course. How many computer technicians are there?**
    (A) 17   (B) 32   (C) 36   (D) 45   **Ans: D**

14. **In an exam, A scoring 40% marks fails by 10 marks, B scoring 50% marks get 10 more than the passing marks. What was the total marks in exam?**
    (A) 88   (B) 100   (C) 160   (D) 200   **Ans: D**

15. A certain suit's price was reduced by 25% in the first week and 20% in the next week. In the third week, the shop owner decided to offer additional 10% discount on the suit. What percent of the regular price was the final price of the suit after the three reductions?

(A) 45%   (B) 54%   (C) 40%   (D) 36%   **Ans: B**

16. A retail store regularly sells all stock at a discount of 25% to 40%. If an additional 25% were deducted from the discount price during a special sale, what would be the lowest possible price of an item costing Tk.140 before any discount?

(A) Tk.63   (B) Tk. 84   (C) Tk.78.75   (D) Tk.49   **Ans: A**

17. In a class, 200 chocolates were distributed equally among the students in such a way that the number of chocolates received by each student is 12.5% of the total number of the students. How many chocolates did each student receive?

(A) 4   (B) 5   (C) 8   (D) 10   **Ans: B**

18. Sixty-five percent of a number is 21 less than four-fifth of that number. What is the number?

(A) 140   (B) 142   (C) 144   (D) 145   **Ans: A**

19. If x is 30% greater than y, then approximately what percent of y is x?

A. 70   B. 77   C. 120   D. 130   **Ans: B**

20. What is the equivalent discount of a consecutive discount of 25% and 20%?

A. 30%   B. 29%   C. 28%   D. 40%   **Ans: D**

21. Add 1.5% of 800 to 20% of 200 and deduct there from 80% of 80. What is the result?

A. 404   B. 408   C. 412   D. None of these   **Ans: D**

22. If 32 students in a class are female and in the class the ratio of female students to the male students is 16:9, what percentage of the students in the class is female?

A. 32%   B. 48%   C. 56.25%   D. 64%   **Ans: D**

23. A certain product has been marked down twice. The first was 20% and the second 25%. If the original price was Tk. 150, what is the final price after the two marked downs?

A. Tk. 60   B. Tk. 80   C. Tk. 85   D. 90   **Ans: D**

24. Rajeev buys goods worth Tk. 6650. He gets a rebate of 6% on it. After getting the rebate, he pays sales tax @10%. Find the amount he will have to pay for the goods:

A. 6876.10   B. 6999.20   C. 6654   D. 7000   **Ans: A**

25. Aaron had Tk. 2100 left after spending 30% of the money he took for shopping. How much money did he take along with him?

A. 1000   B. 2000   C. 3000   D. 4000   **Ans: C**

26. Two tailors X and Y are paid a total of Tk. 550 per week by their employer. If X is paid 120 percent of the sum paid of Y, how much is Y paid per week?

A. Tk. 200   B. Tk. 250   C. Tk. 300   D. Tk. 400   **Ans: B**

27. A class of 50 girls and 60 boys sponsored a football game. If 52% of the girls and 30% of the boys attended the game, what percentage of the class went to the game?

A. 44%   B. 55%   C. 40%   D. 35%   **Ans: C**

28. Hemel has a goal to bench press 220 pounds. When he started working out, Himel was able to lift 150 pounds. He has currently increased that amont by 20%. What percent of his current lifting amount must Himel increase to reach his goal of 220 pounds?

A. 22.50%   B. 22%   C. 22.22%   D. 20.22%   **Ans: C**

29. What is 35% of a number if 12 is 15% of a number?

A. 5   B. 12   C. 28   D. 33   **Ans: C**

30. On the first day of two-day fishing trip. Reza caught 90 fishes; 33.33% of them are red. By the end of the second day Reza caught 60 more fishes; none was red. What percent of all the fisher caught is red?

     A. 20%   B. 25%   C. 30%   D. 33.33%   **Ans: A**

31. Due to booming business, a company increased its staff salary by 25%. By what percent must it now decrease the salary to return to the original amount?

     A. 15%   B. 18%   C. 20%   D. 22.5%   **Ans: C**

32. The salary of an employee is first decreased by 10% and then is increased by 25%. Find percent increase in his salary from the original salary?

     A. 11%   B. 10.5%   C. 15%   D. 12.5%   **Ans: D**

33. If an inspector rejects 0.08% reject of a product as defective. How many products will he examine in order to reject 2?

     A. 1500   B. 500   C. 2000   D. 2500   **Ans: D**

34. After having to pay increased income taxes this year, Edmond has to sell his BMW. Edmond bought the car for \$49.000, but he sold it for a 20% loss. What did Edmond sell the car for?

     A. \$24200   B. \$39200   C. \$28900   D. \$37300   **Ans: B**

35. The state sales tax 7.35%, what is the total cost for a purchase that costs 30 pre-tax?

     A. 3.33   B. 2.21   C. 32.21   D. 27.79   **Ans: C**

36. If the price of an item is increased by 10% and then decreased by 10%, the net effect on the price of the item is-

     A. increase 99%   B. decrease 17%   C. increase 1%   D. decrease 1%   **Ans: D**

37. If 40% of the workers are graduate, and of them 15% are male, what percent of the workers are male and graduate?

     A. 4%   B. 6%   C. 8%   D. 10%   **Ans: B**

38. The total expense of 15 employees in 27000 including 15% gratuity of service. What is per person expense excluding the gratuity? [BUP (FBS): 2021-22]

     A. 4050   B. 1570   C. 1550   D. 1530   **Ans: D**

39. If the price of a product was reduced 10% then 20% then 40%, what was the total discount price? [BUP (FBS): 2021-22]

     A. 43.2   B. 56.8   C. 28.8   D. 55   **Ans: B**

40. If 18 is 15 percent of 30 percent of a certain number, what is the number? [BUP (FBS): 2019-20]

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

41. After 30% discount the price of a product is 84. What's the original price of the Product. [BUP (FBS): 2020-21]

     A. 120   B. 125   C. 130   D. 135   **Ans: A**

42. If 40% of all women are voters and 52% of population are women, what % of the population are women voters? [BUP (FBS): 2020-21]

     A. 19.2   B. 20.8   C. 26.4   D. 40   **Ans: B**

43. The rainfall in January and February was 2.5 inches and 4.0 inches respectively. What was the % increase in rainfall in February? [BUP (FBS): 2020-21]

     A. 35   B. 45   C. 55   D. 60   **Ans: D**

44. An amount is first discounted by 20% and then discounted again by 12.5%. What is the single discount in %? [BUP (FBS): 2020-21]

     A. 20   B. 30   C. 28   D. 25   **Ans: B**