STUDENT COPY

IBA

Name :	Batch:

MATH LECTURE - 03

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PART I: CLASS PRACTICE

GROUP 1: FRACTION

1. A $1000 bonus must be divided among three people so that Turab receives twice as much as Saif, who receives $\frac{1}{5}$ as much as Arefin. How much money should Arefin receive?

   a. $100 b. $125 c. $250 d. $375 e. $625

2. In one classroom, exactly one-half of the seats are occupied. In another classroom with double the seating capacity of the first, exactly three-quarters of the seats are occupied. If the students from both rooms are transferred to a third, empty classroom that has a seating capacity exactly equal to the first two combined, what fraction of the seats in the third classroom is occupied?

   a. $\frac{1}{4}$ b. $\frac{1}{3}$ c. $\frac{3}{8}$ d. $\frac{2}{3}$ e. $\frac{3}{4}$

3. A book dealer has some books in store of which $\frac{1}{5}$ were hardcover books. The dealer sold $\frac{2}{3}$ of the books, including $\frac{3}{4}$ of the hardcover books. What fraction of the unsold books were hardcover books?

   a. $\frac{1}{10}$ b. $\frac{3}{20}$ c. $\frac{1}{5}$ d. $\frac{11}{20}$ e. $\frac{4}{5}$

4. After filling the car's fuel tank, a driver drove from P to Q and then to R. She used $\frac{2}{5}$ of the fuel driving from P to Q. If she used another 7 gallons to drive from Q to R and still had $\frac{1}{4}$ of a tank left, how many gallons does the tank hold?

   a. 12 b. 18 c. 20 d. 21 e. 35

5. In a certain year, the number of girls who graduated from City High School was twice the number of boys. If $\frac{3}{4}$ of the girls and $\frac{5}{6}$ of the boys went to college immediately after graduation, what fraction of the graduates that year went to college immediately after graduation?

   a. $\frac{5}{36}$ b. $\frac{12}{27}$ c. $\frac{7}{9}$ d. $\frac{29}{36}$ e. $\frac{31}{36}$

6. In IBA, $\frac{1}{5}$ of the students are studying BBA, $\frac{2}{3}$ of the students are studying MBA and rest 40 of the students are studying EMBA. How many of them are BBA Students?

   a. 66 b. 60 c. 46 d. 300 e. 30

GROUP 2: PERCENTAGE AND DEVIATION

7. What is 0.5 percent of 6.5?

   a. 0.0325 b. 0.013 c. 0.325 d. 1.30 e. 130.0

8. Afifa's salary is 125% of Mariha's salary. Cynthia's salary is 80% of Mariha's salary. The total of all three salaries is $61,000. What is Cynthia's salary?

   a. $15,000 b. $16,000 c. $17,000 d. $18,000 e. $19,000

9. If 8% tax on a sale amounts to 96 paisa, what is the final price (including tax) of the item?

   a. $1.20 b. $2.16 c. $6.36 d. $12.00 e. $12.96

10. Among the 100 students in a business school, 50% enrolled in a marketing course. Of the enrolled students, 90% took the final exam. Two-thirds of the students who took the final exam passed it. How many students failed in the final exam?

a. 5 b. 10 c. 15 d. 30 e. 45

11. The price of sugar has increased by 60%. In order to restore the original price, the new price must be reduced by:

a. 33.33% b. 35% c. 37.5% d. 60% e. 66.66%

12. Twenty Prizes were distributed to five percent of the contestants. No contestant got more than one prize. The number of contestants were-

a. 200 b. 400 c. 300 d. 160 e. None of these

13. If the sales tax on a camera priced at 400 is between 4 percent and 7 percent, then the final price including tax is-

a. 404 b. 400 c. 415 d. 422 e. 436

14. The annual revenue of the SARA agency increased by 25% last year. This year, it increased by 20%. If the increase in the exports was 1 million Taka last year, then what is the increase (in million Taka) this year?

a. 0.78 b. 0.8 c. 1 d. 1.2 e. 1.25

15. A chemist was preparing a solution that should have included 35 milligrams of a chemical. If he actually used 36.4 milligrams, what was his percentage error?

a. 0.04% b. 0.05% c. 1.40% d. 3.85% e. 4.00%

16. The average score on a certain examination was 80. Oeshi, on the same examination, scored 84. What was her percent deviation from the average score?

a. 6.7% b. 5.5% c. 5.0% d. 4.3% e. 4.0%

GROUP 3: PROFIT - LOSS, MARK UP, MARK DOWN

17. A businessman buys 1,440 dozen pens at $2.50 a dozen and then sells them at a price of 25 cent a piece. What is his total profit on the lot of pens?

a. $60.00 b. $72.00 c. $720.00 d. $874.00 e. $8,740.00

18. A seller makes a profit of 20% by selling a product at 60 Tk. What is his cost price?

a. 48 b. 40 c. 50 d. 72 e. None of these

19. A retailer buys a radio from the wholesaler for $75.00. He then marks up the price by $\frac{1}{3}$ and sells it at a discount of 20%. What was his profit on the radio?

a. $5.00 b. $6.67 c. $7.50 d. $10.00 e. $13.33

20. A store usually sells a certain item at 40% profit. One week, the store has a sale, during which the item is sold for 10% less than the usual price. During the sale, what is the percent profit the store makes on each of these items?

a. 14% b. 24% c. 26% d. 30% e. 36%

21. Saif usually makes a 45% profit on every Amul Cool Milk he sells. During a sale, he reduces his margin of profit to 40% while his sales increase by 10%. What is the ratio of his new total profit to the original profit?

a. 1:1 b. 45:44 c. 8:9 d. 11:10 e. 44:45

22. A merchant marks a certain lamp up 20% above cost. Then he gives a customer a 10% discount. If the final selling price of the lamp was $81, what was the original cost price?

a. $72.0 b. $74.25 c. $75.0 d. $75.75 e. $78.0

23. A product marked Tk. 80 is offered at a discount of 25% during a sale. At this reduced price, the seller gains a profit of 20%. The cost of the seller is-

a. 48 b. 80 c. 50 d. 60 e. None of these

24. After a 20 percent decrease in price, the cost of an item becomes D dollars. What was the price of the item before the decrease?

a. 0.75D b. 0.80D c. 1.20D d. 1.25D e. 1.5D

25. Tarique has x eggs. He sells 12 of them at a profit of 10 percent and the rest of the eggs at a loss of 10 percent. He made neither a profit nor a loss overall. Which one of the following equals x?

a. 10 b. 13 c. 12 d. 24 e. 14

PART II: TAKE-HOME ASSIGNMENT

1. Which of the following fraction is the smallest?

a. $\frac{3}{4}$ b. $\frac{4}{5}$ c. $\frac{2}{3}$ d. $\frac{5}{6}$ e. $\frac{2}{5}$

2. How much less is 1/16 than 0.0665?

a. 2/250 b. 2/25 c. 1/250 d. 1/35 e. 1/25

3. What is the percentage increase of an account that began with a balance of $250000 and increased to $250005?

a. 0.0145% b. 0.00145% c. 0.00002% d. 0.002% e. 1.011%

4. 50 students took an exam. There were 4 A's, 9 B's, 15 C's, 8 D's, and the rest of the students failed. What percent of the students failed?

a. 72% b. 42% c. 28% d. 14% e. 36%

5. A candy bar weighing 4 ounces costs 'c' cents. If the size of the candy bar is reduced to 3.6 ounces while the price remains the same, the old price per ounce is what fraction of the new price per ounce?

a. $\frac{3}{4}$ b. $\frac{9c}{10}$ c. $\frac{10}{9}$ d. $\frac{9}{10c}$ e. $\frac{9}{10}$

6. Only sophomores, juniors and seniors attended a school meeting. $\frac{5}{12}$ of those who attended were juniors, and $\frac{1}{3}$ were seniors. If 36 sophomores attended the meeting, what was the total number of students who attended the meeting?

a. 108 b. 144 c. 252 d. 288 e. 300

7. Three friends ate dinner at a restaurant. When they settled the check, Jawad paid $\frac{4}{5}$ as much as Safa paid, and Safa paid $\frac{1}{3}$ as much as Mezbah paid. What fraction of the check did Safa pay?

a. $\frac{15}{24}$ b. $\frac{12}{31}$ c. $\frac{5}{24}$ d. $\frac{1}{6}$ e. $\frac{1}{24}$

8. Cereal costs 1/3 as much as mushroom. Mushroom costs 5/4 as much as eggs. Eggs cost what fraction of the cost of cereal?

a. $\frac{5}{12}$ b. $\frac{4}{5}$ c. $\frac{5}{4}$ d. $\frac{5}{3}$ e. $\frac{12}{5}$

9. Tk. 336 is divided between A & B so that A gets 5/16th of what B gets. What amount does A get?

a. Tk. 105 b. Tk. 80 c. Tk. 75 d. Tk. 125 e. Tk. 100

10. By how much is $\frac{3}{7}$ larger than 20% of 2?

a. $\frac{1}{20}$ b. $\frac{1}{25}$ c. $\frac{1}{30}$ d. $\frac{1}{35}$ e. $\frac{1}{40}$

11. Successive discounts of 20% and 12% are equivalent to a single discount of:

a. 16.0% b. 29.6% c. 32.4% d. 32.0% e. 33.7%

12. In June, a basketball team that played 60 games had won 30% of its games played. After a phenomenal winning streak this team raised its average to 50%. How many games must the team have won in a row to attain this average?

a. 20 b. 22 c. 24 d. 26 e. 28

13. In reading a thermometer, Irfan mistakenly observed a temperature of 72° instead of 77°. What was her percentage of error (to the nearest hundredth of a percent)?

a. 5.0% b. 6.50% c. 6.74% d. 6.82% e. 6.95%

14. A bus uses one gallon of gasoline to travel 20 miles. After a tune-up, the bus travels 5% farther on one gallon. How many gallons of gasoline will it take for the bus to travel 210 miles after a tune-up?

a. 10 b. 10.5 c. 11 d. 20 e. 21

15. A group of people contributed to a charity fund. 30% of them contributed $40 each, 45% contributed $20 each, and the rest contributed $12 each. What percentage of the total contribution came from people who gave $40?

a. 25% b. 30% c. 40% d. 45% e. 50%

16. A house cost Mr. Sadikullah C dollars in 1986. Three years later, he sold the house for 25% more than what he paid for it. He has to pay a tax of 50% of the gain. How much tax must Mr. Sadikullah pay?

a. C b. $\frac{C}{2}$ c. $\frac{C}{4}$ d. $\frac{C}{6}$ e. $\frac{C}{8}$

17. A Denim Jacket marked $96 is offered for $72. What is the rate of discount on the marked price?

a. 25% b. 27% c. 30% d. 33% e. 36%

18. A coat was sold for $75. The coat was sold for 150% of its cost price. How much did the coat cost?

a. $25 b. $50 c. $75 d. $100 e. $112.50

19. A dealer sold 20 pens for Tk. 60 and gained 20%. How many pens did he buy for Tk. 60?

a. 30 b. 26 c. 24 d. 25 e. 22

20. A merchant buys an old carpet for $25.00. He spends $15.00 to have it restored to good condition and then sells the carpet for $50.00. What is the percent profit on his total investment?

a. 20% b. 25% c. 40% d. $66\frac{2}{3}\%$ e. 100%

21. A lamp is manufactured to sell for $35.00, which yields a profit of 25% of the cost. If the profit is to be reduced to 15% of the cost, how much will the new retail price be?

a. $30.40 b. $31.60 c. $32.20 d. $33.00 e. $34.20

22. A merchant increased the original price of an item by 10 percent. If she then reduces the new price by 10 percent, the final result in terms of the original price is:

a. a decrease of 11 percent b. a decrease of 1 percent c. no net change
d. an increase of 1 percent e. an increase of 11 percent

23. Naabil, Manish, and Rokon were each given a candy bar. Naabil ate 7/12 of his and Rokon ate 20% of his. If Manish ate more than Rokon and less than Naabil, what amount could Manish have eaten?

a. 9/15 b. 2/7 c. 3/5 d. 8/9 e. 1/10

24. Jawad buys 5 dozen eggs at 10 paisa per egg. He then sells each dozen for 2 Tk. What is his profit margin?

a. 9/15 b. 2/7 c. 3/5 d. 8/9 e. 1/10

25. A chair company produces 5,000 luxury chairs per year. Each chair requires Tk 200 in wood and other materials to build. It also requires 3 hours of work by a craftsman, who earns Tk 30 per hour. If the company wants to earn Tk 3 million dollars in profit this year, how much should each chair cost?
a. Tk 890 b. Tk 800 c. Tk 750 d. Tk 900 e. Tk 850

PART III: REVIEW LESSON FOR THE NEXT LECTURE

Ratio and Proportion:

In solving ratios or proportions that have units of measurement (feet, seconds, miles, etc.), each ratio must have the same unit. For example, if we have the ratio 5 inches: 3 feet, we must convert the 3 feet to 36 inches and then set up the ratio 5 inches: 36 inches or 5:36.

An alternative solution to this is: $5\times(5\times\frac{1}{12})$ feet: 3 feet = 5 feet: 36 feet, or again, 5:36.

Example: On a blueprint, a rectangle measures 6 inches in width and 9 inches in length. If the actual width of the rectangle is 16 inches, how many feet are there in the length?

Solution: We set up the proportions, 6 inches: 9 inches = 16 inches: x feet. Since x feet is equal to 12x inches, we substitute this value in the proportion, Thus, 6 inches: 9 inches = 16 inches: 12x inches. Since all of the units are now the same, we may work with the numbers alone. In fractional terms we have 6/9 = 16/12x. Cross multiplication gives us 72x = 144 and solving for x gives us x = 2. The rectangle is 2 feet long.

Mixture:

Concentration of the Mixture × The Amount of the Mixture = The Amount of Substance

Example: A chemist has two quarts of 25% acid solution, and one quart of 40% acid solution. If he mixes these, what will be the concentration of the resultant mixture?

Solution: Let x = concentration of the mixture. So we can arrange the table as follows

Concentration × Amount of Solution = Amount of Acid

	qt(acid)/qt(sol)	qt(sol)	qt(acid)
25% solution	0.25	2	0.50
40% solution	0.40	1	0.40
Mixture	X	3	3x

We now have one additional bit of information. The amount of acid in the mixture must be equal to the total amount of acid in each of the two parts. So, 3x = 0.50 + 0.40. Therefore x is equal to 0.30, which is the same as a 30% concentration of the acid in the mixture.

Mixture problems can also be solved with the help of the following formula:

$$C=\frac{C_1Q_1+C_2Q_2}{Q_1+Q_2}$$

Where, C = Concentration of any element in the resultant mixture
C_1 = Concentration of some element in the first mixture
C_2 = Concentration of the same element in the second mixture
Q_1 = Amount of the first mixture
Q_2 = Amount of the second mixture

Unitary Method

This is a technique for solving particular types of problems. It is a method of carrying out a calculation to find the value of a number of items by first finding the value of 1 unit of them. Hence, it involves scaling down one of the variables to a single unit, i.e. 1, and then performing the operation necessary to alter it to the desired value.

Example: If 6 men can do a particular work in 3 days, how many days will it take for 9 men to finish the work?

Solution: Consider the work of 1 man first
1 man can do it in 6 x 3 = 18 days.
So 9 men will do it in 18/9 = 2 days.

Simple Interest:

If person borrows some money from someone for a certain period then the borrower has to pay some extra money, called interest (I) on the money borrowed for that period. The money borrowed is called principle (P) and the total sum comprising of principle and the interest is called the amount (A). If the interest on a certain sum borrowed for a certain period is reckoned uniformly, then it is called simple interest.
If Amount = A, Principle = P, Interest = I, Time = T (in year), Rate of interest per annum = R

i. $I = \frac{PRT}{100}$

ii. $A = \frac{P(100+RT)}{100}$

Compound Interest:

Money is to be lent at compound interest when at the end of a year or other fixed period the interest that has become due is not paid, but is added to the sum lent, and the amount thus obtained becomes the principle for the next period. The process is repeated until the amount for the last period has been found. The difference between the original principle and the final amount is the required compound interest.

i. Amount after compound interest is applied = $P(1+\frac{r}{100})^t$

ii. Compound interest = $P(1+\frac{r}{100})^t - P$

Average / Mean, Median

Average / Arithmetic mean = $\frac{\text{Sum of the numbers}}{\text{No. of the numbers}}$

Example: The average of 10, 15, 45 and 50 is (10+15+45+50) / 4 = 30.
In problems requiring you to supply a missing value in order to obtain a specific average, first determine the required sum and then compare it with the given sum. Consider this problem: What number must be added to 5, 6, 9, and 11 to have an average of 7? You will have five numbers. The required sum is 7×5 or 35. The sum of 5, 6, 9, and 11 is 31. Therefore, the number to be added is 4.

Median: Median is the exact middle one of some given numbers when they are arranged in ascending or descending order.
For example: What is the median of 23, 12, 17, 11 and 35?
Step 1: Arrange the given numbers in ascending or descending order. We get 11, 12, 17, 23, 35 in ascending order or 35, 23, 17, 12, 11 in descending order.
Step 2: Find the exact middle one, which is 17 in both the case.
So the median is 17.
Even Cases: However, in the cases which contain an even sequence of numbers (Total 2/4/6… numbers), arranging the series leaves no number in the middle. In that case, take **both** of the numbers in the middle (after arranging) and then calculate their average for the median.
For example: What is the median of the sequence 4, 11, 12, 7, 9, 3?

Step 1: Arrange the numbers: 3, 4, 7, 9, 11, 12 (Ascending order)
or 12, 11, 9, 7, 4, 3 (Descending order)
Step 2: Take two of the numbers in the middle (7 and 9 in both cases) and find their average:

$$\frac{7+9}{2} = 8$$

So, the median is 8.

Name……

Review Test on Lecture 2
10 Questions 10 minutes

Batch……

1. If $x = 2k - 2$ and $y = 4k^2$, what is y in terms of x?
   a. $x + 2$ b. $(x + 2)^2$ c. $\frac{(x+2)^2}{2}$ d. $\frac{(x+2)^2}{4}$ e. $x^2 + 4$

2. If x = 0, and y = 2, and $x^2yz + 3xz^2 + y^2z + 3y + 4x = 0$, what is the value of z?
   a. $-\frac{4}{3}$ b. $-\frac{3}{2}$ c. $\frac{3}{4}$ d. $\frac{4}{3}$ e. Cannot be determined

3. For all numbers x and y, x # y = xy + x. If 2 # 3 = k # 7, then k =
   a. 0 b. 1 c. 4 d. 5 e. 7

4. If p and r are integers such that, $p \neq 0$, and p = –r, which of the following must be true?
   a. $p < r$ b. $p > r$ c. $p + r < 0$ d. $p - r < 0$ e. $pr < 0$

5. What is the smallest possible integer which, when divided by 4, 5 and 6 yield a remainder of 3?
   a. 123 b. 63 c. 333 d. 33 e. 3

6. If $x + y > 8$ and $x - y > 2$, which of the following describes all possible values of x?
   a. $x > 2$ b. $x > 3$ c. $x > 5$
   d. $x > 8$ e. $x < 5$

7. If $x \neq 0$, then $(x^5)^2 \times x^3 =$
   a. 1 b. x^2 c. x^{10} d. x^{13} e. x^{28}

8. If m and n are two different prime numbers, then the least common multiple of the two numbers must equal which one of the following?
   a. m-n b. m+n c. m+mn d. mn e. mn+n

9. A man exchanged a dollar bill for change and received exactly 9 coins, which includes quarters, dimes, and nickels. How many of these coins were nickels?
   a. 1 b. 2 c. 3 d. 4 e. Cannot be determined

10. If $-1 < x < 0$, which of the following statements must be true?
    a. $x < x^2 < x^3$ b. $x < x^3 < x^2$ c. $x^2 < x < x^3$ d. $x^2 < x^3 < x$ e. $x^2 < x < x^3$

Answer Sheet

1. ☐ ☐ ☐ ☐ ☐
2. ☐ ☐ ☐ ☐ ☐
3. ☐ ☐ ☐ ☐ ☐
4. ☐ ☐ ☐ ☐ ☐
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10. ☐ ☐ ☐ ☐ ☐

SCORE……

REMARKS