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IBA

Name :	Batch:

MATH LECTURE - 02

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PART I: CLASS PRACTICE

GROUP 1: ROUNDING OFF

1. The number 89.783 rounded off to the nearest tenth is equal to which of the following?
   a. 90.0 b. 89.78 c. 89.7 d. 89.8 e. 89.9

2. What is the product of 23 and 79 to one place of accuracy?
   a. 1600 b. 1817 c. 1000 d. 1800 e. 2000

3. Which of the following results if 65135 is rounded off to 2nd significant figure?
   a. 65100 b. 65000 c. 65130 d. 66000 e. None of these

GROUP 2: ALGEBRAIC EQUATIONS

4. If $(x - 1)(x - 2)(x^2 - 4) = 0$, what are the possible values of x?
   a. –2 only b. 2 only c. –1, –2, or –4 only d. 1, 2, or 4 only e. 1, 2, or –2 only

5. If $\frac{t^2 - 1}{t - 1} = 2$, what value(s) may „t" have?
   a. 1 only b. –1 only c. 1 or –1
   d. No values e. Any value

6. Find the value(s) of r from the equation $\frac{r^2 + 5r + 6}{r + 2} = r + 3$.
   a. 0 only b. – 2 and – 3 only c. Any value except 2
   d. Any value except – 2 e. Any value

GROUP 3: INEQUALITIES

7. What is the sum of all integers x, such that $-35 \le x < 37$?
   a. – 36 b. 71 c. 36 d. 1260 e. None of these

8. If $-100 < x < y < 0$, then of the following, which has the greatest value?
   a. y – x b. x + y c. x – y d. x^3 e. y^3

9. If $2 < a < 6$ and $-3 < b < 5$, what are the possible values of a + b?
   a. a + b must be between –3 and 6 b. a + b must be between 2 and 5
   c. a + b must be between –3 and 11 d. a + b must be between 2 and 11
   e. a + b must be between –1 and 11

10. If $-5 < a < 2$, and $-7 < b < 1$, then what are the possible values for their product ab?
   a. between –14 and 2 b. between –35 and 2 c. between 2 and 35
   d. between –12 and 3 e. between –14 and 35

11. If $a > b > c > 1$ *and* $a \times b \times c = 72$ where *a, b*, and *c* are integers, what is the greatest possible value of *a*?
   a. 12 b. 18 c. 24 d. 36 e. 72

GROUP 4: EXPONENT AND ROOT PROBLEMS

12. If $x \neq 0$, then $(x^3)^2 \times x^2 =$
a. 1 b. x^2 c. x^8 d. x^{11} e. x^{12}

13. $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} = ?$

a. $5 + 2\sqrt{6}$ b. $\frac{5+2\sqrt{6}}{5}$ c. $5 - 2\sqrt{6}$ d. $\frac{5-2\sqrt{6}}{5}$ e. None

14. $2^{10} + 2^{10} + 2^{10} + 2^{10} = ?$

a. 20000 b. 2^{40} c. 2^{11} d. 2^{12} e. 2^{10000}

15. If $\frac{0.063 \times 3^{w+k}}{0.007 \times 9^k}$ = 1, then w–k =?

a. 0 b. 1 c. 2 d. –1 e. –2

GROUP 5: FINDING RATIOS

16. If m + 4n = 2n + 8m, what is the ratio of n to m?
a. 1:4 b. 1: –4 c. –4:1 d. 2:7 e. 7:2

17. If p : q = 5 : 2 and q : r = 3 : 4, what is the ratio of p to r ?

a. 5:4 b. 2:3 c. 8:15 d. 15:8 e. None

18. If $A = \frac{2}{3}B$, $B = \frac{2}{3}C$, and $C = \frac{2}{3}D$, what is $\frac{A}{D}$?

a. $\frac{27}{8}$ b. $\frac{4}{9}$ c. $\frac{2}{3}$ d. $\frac{8}{27}$ e. $\frac{4}{3}$

GROUP 6: LCM & HCF

19. What is the smallest possible number that leaves a remainder of 1 when divided by 3, 4, 5, and 7?
a. 141 b. 106 c. 421 d. 420 e. 85

20. What is the least number which when divided by 3, 4 and 5 leaves remainders of 1, 2 and 3 respectively?
a. 59 b. 58 c. 116 d. 118 e. 67

21. If x, y, z are positive integers and 4x = 3y = 5z, then what is the smallest value of x + y + z?
a. 12 b. 47 c. 60 d. 94 e. Cannot be determined

22. Mursalin has 18 apples, 27 mangoes and 54 bananas. He wants to divide each kind of fruit equally among the same number of children so that no fruit remains left. What is the maximum number of children who might get the fruit?
a. 3 b. 6 c. 9 d. 18 e. None of these

GROUP 7: FACE VALUE OF CURRENCIES

23. Zafar spent exactly Tk. 2.50 on 3 paisa, 6 paisa, and 10 paisa stamps. If he bought ten 3 paisa stamps and twice as many 6 paisa stamps as 10 paisa, how many 10 paisa stamps did he buy?

a. 5 b. 10 c. 12 d. 15 e. 20

24. Neelim exchanged a dollar bill for change and received 7 coins, none of which were half-dollars. How many of these coins were dimes?

a. 0 b. 1 c. 4 d.5 e. Cannot be determined from the information given

25. Raiad has 112 taka. He has twice as many 5 taka notes as he has 10 taka notes. Other than these, he has only 2 taka notes. Find the minimum number of 2 taka notes he must have.

a. 1 b. 6 c. 7 d. 16 e. None of these

PART II: TAKE-HOME ASSIGNMENT

1. Which off the following is the round off value of π to the nearest tenth?
   a. 3.0 b. 3.14 c. 3.1416 d. 3.1 e. 3.2

2. The number 98.4321 rounded off to the nearest hundredths is equal to which of the following?
   a. 98.4320 b. 98.40 c. 98.43 d. 98.0 e. 99.0

3. What is the result if 7735 is rounded off to 1st significant figure?
   a. 7730 b. 7700 c. 7000 d. 8000 e. None of these

4. In the formula $V = \pi r^2 h$, what is the value of r, in terms of V and h?
   a. $V/\pi h$ b. $\pi(\sqrt{V}/\sqrt{h})$ c. $\sqrt{\pi V h}$ d. $\pi h/\sqrt{V}$ e. $\sqrt{V}/\sqrt{(\pi h)}$

5. Find the value of y that satisfies the equation $8.8y - 4 = 7.7y + 7$.
   a. 1.1 b. 7.7 c. 8.0 d. 10.0 e. 11.0

6. For what value(s) of k is the following equation satisfied?
   $2k - 9 - k = 4k + 6 - 3k$
   a. –5 only b. 0 only c. $\frac{5}{2}$ only d. No value e. Any value

7. What is the largest possible value of the following expression?
   $(x + 2)(3 - x)(2 + x)^2(x - 3)(2x + 4)$
   a. –576 b. –24 c. 0 d. 8 e. Cannot be determined

8. What values may z have if $2z + 4$ is greater than $z - 6$?
   a. Any value greater than –10 b. Any value greater than –2 c. Any value less than 2
   d. Any value less than 10 e. None of these

9. What are the values of $(x - y)$ if $5 < x < 9$ and $-4 < y < -1$?
   a. $-4 < x-y < 9$ b. $9 < x-y < 10$ c. $-1 < x-y < 5$ d. $6 < x-y < 13$ e. None of these

10. If $-8 < a < 20$, and $-4 < b < -2$, what are the possible values of a / b?
    a. a / b must be between 2 and –10 b. a / b must be between –2 and 20
    c. a / b must be between –5 and 4 d. a / b must be between –80 and 32
    e. a / b must be between –10 and 4

11. If $y = 1 + \frac{1}{x}$ where x > 1, then y could equal to which of the following?
    a. $\frac{1}{5}$ b. $\frac{5}{8}$ c. $\frac{9}{7}$ d. $\frac{15}{11}$ e. $\frac{8}{7}$

12. If $2p + 7$ is greater than $3p - 5$, which of the following best describes the possible values of p?
    a. p must be greater than 2 b. p must be greater than 12
    c. p must be less than 2 d. p must be less than 12
    e. p must be greater than 2 but less than 12

13. Which of the following represents the expression: $\sqrt{3.6 \times 10^8}$?
    a. 3.6×10^3 b. 1.8×10^3 c. 6×10^3 d. 6×10^4 e. None of these

14. If $\sqrt[4]{y} = 3$, then $\sqrt{y^4}$ =?
    a. $\sqrt{4}$ b. $\sqrt{12}$ c. 3^4 d. 3^8 e. 3^{16}

15. If $x \neq 0$, then $(x^5)^2 \div x^4 =$
a. x^{21} b. x^{14} c. x^8 d. x^7 e. x^6

16. $2^{12} + 4^6 + 8^4 + 16^3 =?$

a. 2^{12} b. 2^{14} c. 2^{18} d. 2^{24} e. None

17. If $c + 4d = 3c - 2d$, what is the ratio of c to d?
a. 1:3 b. 1: –3 c. 3:1 d. 2:3 e. 2: –3

18. If $P + Q = R$, and $P + R = 2Q$, what is the ratio of P to R?
a. 1:1 b. 1:2 c. 2:1 d. 1:3 e. 3:1

19. What is the least number when divided by 3, 4 and 5 leaves a remainder of 2 in each case but when divided by 7 leaves nothing?
a. 60 b. 62 c. 122 d. 182 e. None

20. If p, q, r are positive integers and $2p = 6q = 7r$, then what is the smallest value of $p - q - r$?
a. 6 b. 7 c. 8 d. 9 e. 13

21. What is the smallest number which when divided by 7 & 9 leaves a remainder of 2 & 4 respectively?
a. 44 b. 56 c. 58 d. 63 e. 65

22. The H.C.F. and L.C.M. of two numbers are 6 and 36 respectively. If one of the numbers is 12, find the other number.
a. 9 b. 18 c. 27 d. 36 e. None

23. A man has twice as many 25-paisa coins as he has 10-paisa coins now. If he had taka 1.50 more in hand and replaced it with all 10-paisa coins, he would have twice as many 10-paisa coins as he has 25-paisa coins. How many 25-paisa coins does he have now?
a.5 b. 10 c. 15 d. 20 e. 25

24. You have only dimes and quarters. How many dimes you can take at most to make it a dollar if you have to take a quarter at least?
a. 0 b. 3 c. 5 d. 7 e. 10

25. You have only 5-taka, 10-taka, 50-taka, and 100-taka notes in your wallet and altogether you have 20 notes there. Suddenly you found 4 notes are missing. What is the minimum amount of money you could lose?
a. tk. 400 b. tk. 165 c. tk. 100 d. tk. 20 e. Cannot be determined

PART III: REVIEW LESSON FOR THE NEXT LECTURE

Fractions:

$$\frac{\text{Numerator}}{\text{Denominator}}$$

The numerator of a fraction is the upper number and the denominator is the lower number.

Example: In the fraction $\frac{8}{13}$, the numerator is 8 and the denominator is 13.

Comparison of Fractions:

If fractions A and B have the same denominator, and A has a larger numerator, then fraction A is larger. (We are assuming here, and for the rest of this Refresher Session, that numerators and denominators are positive.)
Example: 56/271 is greater than 53/271 because the numerator of the first fraction is greater than the numerator of the second.

If fractions A and B have the same numerator, and A has a larger denominator, then fraction A is smaller.
Example: 37/256 is smaller than 37/254.

If fraction A has a larger numerator and a smaller denominator than fraction B, then fraction A is larger than B.
Example: 6/11 is larger than 4/13. (If this does not seem obvious, compare both fractions with 6/13

Percentages:

To change a fraction to a percent, find its decimal form, multiply by 100 and add a percent sign.

Example: Express $\frac{3}{8}$ as a percent.

Solution: To convert $\frac{3}{8}$ to a decimal, divide 3 by 8; this gives us 0.375. Multiplying 0.375 by 100 gives us 37.5%.

To change a percent to a fraction, drop the percent sign and divide the number by 100.
Example: Express 17% as a fraction.

Solution: Dropping the % sign gives us 17, and dividing by 100 gives us $\frac{17}{100} = 0.17$

- **Finding the percent of a given quantity:**

1. Replace the word "of" with a multiplication sign.
2. Convert the percent to a decimal: Drop the percent sign and divide the number by 100. This is done by moving the decimal point two places to the left, adding zeros where necessary. **Examples:** 30% = 0.30, 2.1% = 0.021, 78% = 0.78, 243% = 2.43.
3. Multiply the given quantity by the decimal.

Example: Find 30% of 200. 30% of 200 = 30% × 200 = 0.30 × 200 = 60.00

Speed Calculation Tool: Fraction– Percent Matrix

	1	2	3	4	5
1	$\frac{1}{1}=100\%$				
2	$\frac{1}{2}=50\%$		$\frac{3}{2}=150\%$		$\frac{5}{2}=250\%$
3	$\frac{1}{3}=33\frac{1}{3}\%$	$\frac{2}{3}=66\frac{2}{3}\%$		$\frac{4}{3}=133\frac{1}{3}\%$	$\frac{5}{3}=166\frac{2}{3}\%$
4	$\frac{1}{4}=25\%$	$\frac{2}{4}=50\%$	$\frac{3}{4}=75\%$		$\frac{5}{4}=125\%$
5	$\frac{1}{5}=20\%$	$\frac{2}{5}=40\%$	$\frac{3}{5}=60\%$	$\frac{4}{5}=80\%$	
6	$\frac{1}{6}=16\frac{2}{3}\%$	$\frac{2}{6}=33\frac{1}{3}\%$	$\frac{3}{6}=50\%$	$\frac{4}{6}=66\frac{2}{3}\%$	$\frac{5}{6}=83\frac{1}{3}\%$
7	$\frac{1}{7}=14\frac{2}{7}\%$	$\frac{2}{7}=28\frac{4}{7}\%$	$\frac{3}{7}=42\frac{6}{7}\%$	$\frac{4}{7}=57\frac{1}{7}\%$	$\frac{5}{7}=71\frac{3}{7}\%$
8	$\frac{1}{8}=12\frac{1}{2}\%$	$\frac{2}{8}=25\%$	$\frac{3}{8}=37\frac{1}{2}\%$	$\frac{4}{8}=50\%$	$\frac{5}{8}=62\frac{1}{2}\%$
9	$\frac{1}{9}=11\frac{1}{9}\%$	$\frac{2}{9}=22\frac{2}{9}\%$	$\frac{3}{9}=33\frac{1}{3}\%$	$\frac{4}{9}=44\frac{4}{9}\%$	$\frac{5}{9}=55\frac{5}{9}\%$
10	$\frac{1}{10}=10\%$	$\frac{2}{10}=20\%$	$\frac{3}{10}=30\%$	$\frac{4}{10}=40\%$	$\frac{5}{10}=50\%$

	6	7	8	9	10
1					
2		$\frac{7}{2}=350\%$		$\frac{9}{2}=450\%$	
3		$\frac{7}{3}=233\frac{1}{3}\%$	$\frac{8}{3}=266\frac{2}{3}\%$		$\frac{10}{3}=333\frac{1}{3}\%$
4	$\frac{6}{4}=150\%$	$\frac{7}{4}=175\%$		$\frac{9}{4}=225\%$	$\frac{10}{4}=250\%$
5	$\frac{6}{5}=120\%$	$\frac{7}{5}=140\%$	$\frac{8}{5}=160\%$	$\frac{9}{5}=180\%$	
6		$\frac{7}{6}=116\frac{2}{3}\%$	$\frac{8}{6}=133\frac{1}{3}\%$	$\frac{9}{6}=150\%$	$\frac{10}{6}=166\frac{2}{3}\%$
7	$\frac{6}{7}=85\frac{5}{7}\%$		$\frac{8}{7}=114\frac{2}{7}\%$	$\frac{9}{7}=128\frac{4}{7}\%$	$\frac{10}{7}=142\frac{6}{7}\%$
8	$\frac{6}{8}=75\%$	$\frac{7}{8}=87\frac{1}{2}\%$		$\frac{9}{8}=112\frac{1}{2}\%$	$\frac{10}{8}=125\%$
9	$\frac{6}{9}=66\frac{2}{3}\%$	$\frac{7}{9}=77\frac{7}{9}\%$	$\frac{8}{9}=88\frac{8}{9}\%$		$\frac{10}{9}=111\frac{1}{9}\%$
10	$\frac{6}{10}=60\%$	$\frac{7}{10}=70\%$	$\frac{8}{10}=80\%$	$\frac{9}{10}=90\%$	

Fill the Matrix as much as you think you need. You can't memorize all these, neither is expected from you. But a careful exercise will speed up your calculation and will serve as an error guard and auto correction.

Squared Values

x^2	1	4	9	16	25	36	49	64	81	100	121	144
x	1	2	3	4	5	6	7	8	9	10	11	12
√x	1	1.41	1.73	2	2.24	2.45	2.65	2.83	3	3.16	3.32	3.46

x^2	169	196	225	256	289	324	361	400	441	484	529	576
x	13	14	15	16	17	18	19	20	21	22	23	24
√x	3.61	3.74	3.87	4	4.12	4.24	4.36	4.47	4.58	4.69	4.8	4.9

X^2	625	676	729	784	841	900	961	1024	1089	1156	1225	1296
x	25	26	27	28	29	30	31	32	33	34	35	36
√x	5	5.1	5.2	5.29	5.39	5.48	5.57	5.66	5.74	5.83	5.92	6

Deviations:

Absolute error, or absolute deviation, is the difference between the estimated value and the real value (or between the approximate value and the exact value).

Example: If the actual value of a measurement is 60.2 and we estimate it as 60, then the absolute deviation (absolute error) is 60. 2 – 60 = 0.2.

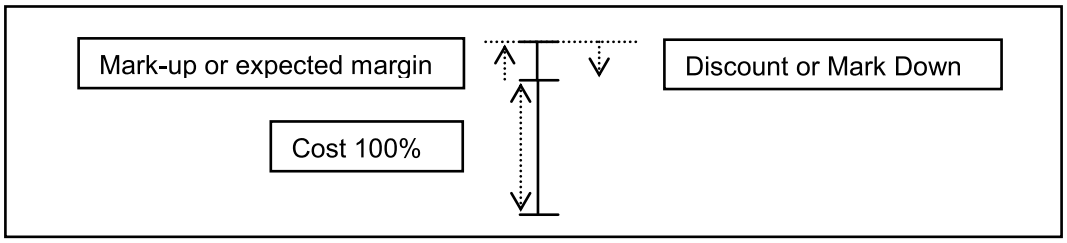
Fractional error, or fractional deviation, is the ratio of the absolute error to the exact value of the quantity being measured.

Example: If the exact value is 60.2 and the estimated value is 60, then the fractional error is $\frac{60.2-60}{60.2} = \frac{0.2}{60.2} = 0.0033$

Example: Suppose that a $100 item is reduced by 10 % and then by 20 %. The first reduction puts the price at $90 (10% of $100 = $10, $100 – $10 = $90). Then reducing the $90 (the new original value) by 20% gives us $72 (20% of $90 = $18; $90 – $18 = $72). Therefore, it is NOT correct to simply add 10% and 20% and then take 30% of $100.

Profit and Loss:

Gross profit is equal to revenues minus expenses or selling price minus cost. When expenses or costs are higher the outcome is loss.



Drill-1: You buy a shirt from Westecs, which costs you 80 Taka. It was on EID sale at 25% discount. What was the tag price?

Drill-2: A peddler bought a Panjabi for 200 taka. He planned to make a profit of 25%. But the market was dull and he had to offer a 20% discount. What was his selling price and profit margin?

Drill-3: You bought the ticket of the mega-hit movie "TITANIC" for much above the market price. But you lost appetite for the movie and sold it to one of your friends for 160 Taka which counted for a 20% loss on your purchasing price. What was your purchasing price?

Discount and successive discount:

If the price is discounted by a percent, then the price becomes (100 – a) percent of the original price.

When b is the rate of successive discount and a, b are two consecutive discount rates, then

Equivalent single discount = $-a-b+\frac{ab}{100}$

Note: For individual price increase use positive sign (+) before a & b and for discount use negative sign (-) before a & b in the above formula of successive change. Here, the signs before both a & b are negative because both of them are discount rates.

Name……

Review Test on Lecture 1

10 questions, 10 minutes

Batch……

1. Of three numbers whose average is 60, the first is $\frac{1}{4}$ of the sum of the others. What is the first number?
   a. 30 b. 35 c. 39 d. 36 e. None of these
2. The sum of two numbers is twice their difference. If one of the numbers is 10, what is the other?
   a. $3\frac{1}{3}$ b. 30 c. 30 or $-3\frac{1}{3}$ d. –30 or 3 e. 30 or $3\frac{1}{3}$
3. The average of two numbers is k. If one number is equal to M, the other number is equal to:
   a. 2M – k b. $\frac{-2M-k}{2}$ c. $\frac{2M-k}{2}$ d. $\frac{M+k}{2}$ e. 2k – M
4. For the integer n, if n^3 is odd, which of the following is (are) true?
   I. n is odd II. n^2 is odd III. n^2 is even
   a. I only b. II only c. III only d. I and II only e. I and III only
5. Which of the following is the best approximation of the product $20.005 \times 0.001 \times 1000.003$?
   a. 0.2 b. 10 c. 20 d. 200 e. None
6. The sum of the digits of a three-digit number is 16. If the tenth digit of the number is 3 times the unit digit, and the unit digit is $\frac{1}{4}$ of the hundreds digit, then what is the number?
   a. 446 b. 561 c. 682 d. 862 e. 914
7. What is the next term in the following series: 8, 3, 10, 9, 12, 27, __?
   a. 8 b. 14 c. 18 d. 36 e. 81
8. Which of the following numbers is divisible by 11?
   a. 32,934 b. 15,746 c. 15,933 d. 26,012 e. None of these
9. If a is less than b, which of the following numbers is greater than a and less than b?
   a. $\frac{a+b}{2}$ b. $\frac{ab}{2}$ c. $b^2 - a^2$ d. ab e. b – a
10. A decrease of 1 from which one of the following numbers will result in the greatest change in the product of (-1) x (10) x (100) x (1000) x (0)
    a. 10 b. 100 c. -1 d. 0 e. 1000

Answer Sheet

1. ☐ ☐ ☐ ☐ ☐

2. ☐ ☐ ☐ ☐ ☐

3. ☐ ☐ ☐ ☐ ☐

4. ☐ ☐ ☐ ☐ ☐

5. ☐ ☐ ☐ ☐ ☐

6. ☐ ☐ ☐ ☐ ☐

7. ☐ ☐ ☐ ☐ ☐

8. ☐ ☐ ☐ ☐ ☐

9. ☐ ☐ ☐ ☐ ☐

10. ☐ ☐ ☐ ☐ ☐

SCORE……

REMARKS