ELEMENTARY MATHEMATICS

Module I

1. Number Line
2. BODMAS
3. Highest Common Factor
4. Lowest Common Multiple
5. Fractions
6. Decimals

Module 1

Number Line, BODMAS, HCF and LCM, Fractions and Decimals

NUMBER LINE:

Solve the following using Number Line:

1. +3 and -3
2. +5 and -6
3. -7 and -8
4. +6 and -9
5. +3 and -5
6. +7 and -11
7. -13 and +5
8. +4 and -10
9. -6 and +12
10. -13 and +5

BODMAS:

Solve the following using BODMAS rule:

1. 5 + 7 -2 +4
2. (2 + 3) – (1 + 2)
3. (4/5) * (5/2)
4. 0 – (7 +3 – 9)
5. 4 (4 + 3) -2
6. 8 –{3 + (3 -1)}
7. 4 – (3 / {4 –(7 -6)}
8. 5 * {3 –(5 +3 -2)} -2
9. 35 – [20 + {9 – (5-3 +2)}]
10. 7 [6 {5 (4-2+2)}]

HCF :

Common Factor Method:

1. Calculate the HCF of
   I. 12 and 20
   II. 40 and 60
   III. 200 and 250

2. Calculate the HCF of
   I. 12 , 18 and 30
   II. 10, 25 and 35
   III. 120, 144 and 180

Prime Factor Method:

1. Find the HCF of:
   I. 15 and 20
   II. 13 and 78
   III. 30 and 45
   IV. 108 and 144
   V. 21, 28 and 35
   VI. 16, 40 and 56
   VII. 120, 144 and 180

Division Method:

1. Find the HCF of:
   I. 42 and 70
   II. 6 and 16
   III. 72 and 88
   IV. 16 and 63

2. Find the HCF of:
   I. 6, 8 and 12
   II. 6, 18 and 24
   III. 63, 56 and 14

3. Find the HCF of 96, 120 and 144

Decimal and Fraction Method

1. 16.5, 0.45 and 15.

2. 54/9 , 60/17 and 36/51

LCM:

Prime factor method:

1. Find the LCM of
   I. 12 and 18.
   II. 16 and 24.
   III. 28 and 42.

2. Find the LCM of
   I. 4, 6 and 18.
   II. 16, 24 and 40.
   III. 24, 54, 60 and 12

3. Find the LCM of 18, 24, 60 and 150.

4. Find the LCM of
   I. 28, 36 and 48.
   II. 20, 28 and 42.

Common Division Method:

1. Find the LCM of
   i. 8 and 10.
   ii. 12 and 16.
   iii. 18 and 20.
   iv. 138 and 207.
   v. 252 and 378

2. Find the LCM of
   I. 11, 22 and 88.
   II. 27, 36 and 45.
   III. 34, 51 and 17.
   IV. 25. 30 and 46.
   V. 40, 60 and 70

3. Calculate the LCM of
   I. 9, 4, 18 and 6.
   II. 5, 8 , 20 and 15.

FRACTIONS:

Addition:

1) $\frac{3}{5} + \frac{1}{5}$

2) $\frac{1}{4} + \frac{2}{5}$

3) $\frac{5}{6} + \frac{3}{4}$

Subtraction:

1. $\frac{10}{13} - \frac{3}{13}$

2. $\frac{2}{3} - \frac{1}{4}$

3. $\frac{5}{10} - \frac{6}{4}$

Multiplication:

1) $5 \times \frac{3}{8}$

2) $\frac{3}{8} \times \frac{4}{9}$

3) $\frac{2}{3} \times \frac{3}{5} \times \frac{1}{4}$

Division:

1) $\frac{5}{8} / \frac{2}{8}$

2) $\frac{4}{15} / \frac{9}{10}$

3) $3 / \frac{2}{5}$

DECIMALS:

Decimals

Addition:

1) 102.8 + 15.21

2) 0.04 + 1.521

3) 5.6 + 3.21

Subtraction:

1) 18.62 – 1.7

2) 15.2 – 3.46

3) 8.46 – 3.42

Multiplication:

1) 1.7
x 1.9

2) 7.25
x 1.52

3) 3.46
x 8.46

Division:

1) 5.88 / 7

2) 45.28 / 0.8

3) 99.76 / 4

CONVERSION:

1. Convert each of the following fractions in terms of a decimal:
   a) 39/8. b) 59/25. c) 79/11. d) 89/55
2. Express each of the following decimal numbers in the form of ***p/q*:**
   a) 0.24 b) 0.325 c) 38.25 d) -64.125
3. Solve: a) 0.7^2 , b) 0.34 - 0.125, c) 2.5 - 0.82 + 0.17, d) [(0.56x1/4)+(7/2)]+1.4- (0.11x0.5)

Module 2

Equations

SIMPLE EQUATIONS:

Find the value of x:

1. x+6=8
2. x-4=3
3. x+3= -4
4. 4 – x =7
5. x+3= -2
6. x+8=3
7. 6+x= -2
8. x-7= -6

LINEAR EQUATIONS:

1. Solve: 21 – 3(a-7) = (a+20)

2. Solve : [(Y+2)/4] – [(Y-3)/3] = ½

3. 5/X = 7/(X-4)

4. (a-2)(a+1) = (a-3)(a+4)

5. 5(8x +3) = 9(4x +7)

6. Four times a number increased by 7 is 31 . Find the number.

7. Seven times a number diminished by 14 is equal to the sum of three times the number and 6.

8. If the fourth part of a number exceeds its sixth part by 5 . Find the number.

9. When 142 is added to a number, the result is 64 more than three times the number. Find the number.

10. A person is paid Rs 150 each day he worked and is fined Rs 30 each day he remains absent. If in 40 days he earned Rs 3300, find out for how many days he worked.

11. $(x+2)/(x-1) = 5/2$

12. $3x-[3+ \{x-(3+x)\}] = 5+2x$

13. $(2x-7)/(2x-1) = (x-3)/(x+3)$

14. $7x+5/5-(x-11)/14=3(x-25)/7+35$

15. $7(x-3)-3(x+4)=7+2(3x-8)$

QUADRATIC EQUATIONS:

Solve using formula method and factorization method:

1. $x^2 - x - 12 = 0$
2. $x^2 + 7x + 12 = 0$
3. $x^2 + 8x = -15$
4. $x^2 - 10x = -21$
5. $3x^2 - x - 2 = 0$
6. $4x^2 - 8x = 5$
7. $x^2 - 25 = 0$
8. $x^2 = 100$
9. $x^2 + 6x + 9 = 0$
10. $x^2 + -14x + 45 = 0$
11. $0.25x^2 + -0.25x + -10.5 = 0$
12. $0.3y^2 + 0.15y + -11.7 = 0$
13. $10k^2 + 200k + 937.5 = 0$
14. x^2 - 11x + 30.25
15. $4x^2 + 8x + -77 = 0$
16. $n^2 + 7n + n^2 + -10 = 5$

SIMULTANEOUS EQUATIONS:

Solve the following:

1. 8x+5y= 9
   3x+2y= 4

2. $\frac{5}{x}$ +6y= 13

   $\frac{3}{x}$+4y= 7

3. $\frac{x+y-8}{2}$ -$\frac{x+2y-14}{3}$ =$\frac{3x+y-12}{11}$

4. 2x+y= 8
   - 4x+3y= 4

5. $\frac{x}{2}$+ $\frac{y}{9}$= 11

6. 2x+3y= 29
   - x+y= 3

7. $\frac{4}{x}$ + 5y =7

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

x

8. 3x+7y= 75
   5x-5y= 25

9. 3x-5y= 5
   2x-5y= 0

10. 3x+1y= 900
    5x+3y= 2100

WORD PROBLEMS:

1. Find two numbers whose sum is 21 and difference is 9.

2. If the numerator of a function is increased by 2 and the denominator by one, it becomes 5/8
   If the numerators and the denominator of the same function are each increased by 1, the function becomes 1/2. Find the fraction.

3. Seven nuts and eight bolts weigh 326gms. Eleven nuts and ten bolts weigh 448gms. Find the weight of :
   i. One nut and one bolt
   ii. Twelve nuts and twelve bolts.

4. Two small pitchers and one large pitcher can hold 8 cups of water and one large pitcher minus one small pitcher constitutes 2 cups of water. How many cups of water can each pitcher hold?

5. There are two numbers such that the sum of the first and three times the second is 53, while the difference between 4 times the first and twice the second is 2.Find the numbers.

6. 6) The equations $5x + 2y = 48$ and $3x + 2y = 32$ represent the money collected from school concert tickets sales during two class periods. If x represents the cost for each

adult ticket and *y* represents the cost for each student ticket, what is the cost for each adult ticket?

7. There are two numbers such that if to 3times the first, twice the other is added the sum is 72.Also, if from 5 times the first number, 3 times the other is subtracted , the result is 44.What are the numbers?

8. As the number of units manufactured increases from 4000 to 6000 the total cost of production increases from 22000 to 30000.assuming a linear relationship between the cost y and the number of units produced x.Find the values of x and y.

9. Two pens and one eraser cost Rs. 35 and 3 pencil and four erasers cost Rs. 65. Find the cost of pencils and eraser separately.

10. If twice the age of son is added to age of father, the sum is 56. But if twice the age of the father is added to the age of son, the sum is 82. Find the ages of father and son.

Module 3

Percentages, Discount and Profit / Loss

PERCENTAGES:

1. Evaluate the following
   i) 45% of 280 + 28% of 450
   ii) 37% of 150 - 0.05% of 1000
   iii) (9% of 386) * (6.5% of 144)
2. Calculate 'x' in the following
   i) (0.9% of 450) / (0.02% of 250) = x
   ii) 40% of x = 240
   iii) 12% of 980 – x% of 450 = 30% of 227
   iv) 60 = x% of 400
3. What % of 2/7 is 1/35?
4. A number exceeds 20% of itself by 40. Find the number.
5. 65% of a number is 21 less than $4/5^{th}$ of that number. Find the number.
6. A number decreased by 27 ½% gives 87. Find the number.
7. In an examination, 65% of the total examinees passed. If the number of failures is 420, find the total number of examinees.
8. The population of a town is 176400. It increases annually at the rate of 5% p.a. what will be the population after 2 years? What was it 2 years ago?

DISCOUNTS:

1. Determine the trade discount amount and the net price for the following

a)

Product	List price	Trade discount rate
Computer	$1,200	30%
Copy machine	$700	25%

2. Find the net price using complement of trade discount rate

b)

Product	List price	Trade discount rate

Computer	$1,500	25%
Copy machine	$800	20%

3. Jane's Variety Store places a $75.00 order for candy. If the store receives a 35% discount from the candy wholesaler, what is the net price that the variety store will pay to the wholesaler?
   The net price for a sweatshirt is $20.63. If the store receives a trade discount of 25% what would the list price of the sweatshirt be?
4. Mr. Antony, an appliance dealer, can buy a big-screen TV at a list price of $6,400 with a 25/10/10 series discount. Find the net price by calculating the price after each discount**.** Also find the equivalent single discount rate and the net price using the equivalent single discount rate.
5. For the last 15 years, Tina has been receiving a 20/15/5 series discount. Find the equivalent single discount rate.
6. The marked price of an article is Rs 650, and the trader gives a discount of 16% on it. Find the **amount of discount** and the **selling price.**
7. A manufacturer can cover its cost and make a reasonable profit if it sells an article for $63.70. At what price should the article be listed so that a discount of 30% can be allowed?
8. You buy goods with a list price of $800. You return goods that are defective, having a list price of $50. You are entitled to a trade discount of 20%. The seller paid $20 in freight on your behalf and added the amount to the invoice. You are offered a 4% cash discount if you pay the invoice within 15 days. What is the net amount you should pay the supplier if you make payment within the discount period?
9. A customer gets a discount of Rs 120 on an article if a discount of 15% is allowed. Find the marked price and the selling price of the article.
10. A trader marks his goods 30% above the cost price and gives 10% discount to his customers. Find his gain percent. What will be the profit of an article whose list price is Rs 780?
11. A shopkeeper sells an article at a discount of 25%.If the selling price is Rs 720 find the list price of the article. If he makes a profit of 20%, what will be the cost price of it?

PROFIT AND LOSS:

1. A table is bought for Rs.950 and sold at Rs.1140. find the gain percent.
2. A machine is bought for Rs.75000 and sold at a gain of 8%. Find its selling price.
3. By selling a watch for Rs.1440, a man loses 10%. At what price should he sell it to gain 5%?

4. A man sells an article at a profit of 20%. If he had bought it at 20% less and sold for Rs.5 less , he would have gained 25%. Find the cost price of the article?

MODULE 4

Ratio and Proportions

RATIO AND PROPORTIONS:

1. Find the ratio of
a. 25 to 75
b. 30 cm to 2m
c. Rs.7 to 75 paise
d. 1 hour to 22 minutes

2. Find the duplicate and triplicate of the ratio 2:5

3. Find the duplicate of the ratio 9:625 and sub triplicate of the ratio 27:125

4. Share Rs.125 in the ratio 3:2 for A and B

5. The ratio of daily income of X and Y is 3:4 and the ratio of their daily expense 9:11. Ratio of their saving 9:11. Ratio of their savings is 2:3. If their total saving per day is Rs.75 find their daily income.

6. Find the fourth proportional to 2,5,6
7. Find the third proportional to 10 and 20
8. Find the mean proportional between 4 and 16
9. If (x + 4) : (9 – 2x) = 6 : 5 find the value of x.
10. If a : b = c : d = 4 : 9, find the value of ab : bc and a+b : c+d
11. If a+b : a-b = 11:6 , find the ratio b : a
12. If a : b = 2 : 5 ; b: c = 4 : 7 ; c: d = 3 : 5 find a : d
13. Find the fourth proportional to
    i) 2,4,7 ii) 1,3,5 iii) 6,3,1 iv) 5,10,15

14. Find the third proportional to
    i) 5 and 10 ii) 16 and 18 iii) 6 and 12 iv) 3 and 9

15. Find the mean proportional between

    i) 3 and 27 ii) 5 and 125 iii) 8 and 2 iv) 3 and 9

16. If a + b : a - b = 7 : 5 find the ratio b : a

17. If a : b = 5 : 6 and b : c = 3 : 7 find the ratio a : b : c

18. If a : b = 2 : 5 , b: c = 1 : 3 and c : d = 2 : 7 find the ratio a : b : c : d

19. if a : b = 1 : 4 , b : c = 2 : 5 , c : d = 3 : 7, find a : d

PARTNERSHIP:

1. A invested Rs. 10000 and B invested Rs. 15000 in a business. The profits received from the business were Rs. 6000. How much each should get?
2. A, B and C are equal partners in a business. They earn Rs. 13000 from a business. Divide the profits in their ratios.
3. X, Y and Z have invested capital in the ratio of 2:3:5. The profits earned for the year are Rs. 50000. Evaluate each one's share.
4. Calculate the share of profit of Rs. 56000 for the three partners X , Y , Z .If Z received $2/5^{th}$ of what Y received and Y received $3/7^{th}$ of what X received.
5. An amount of Rs. 6600 is divide among three partners X , Y and Z, so that X receives $3/7^{th}$ of what Y and Z received together and Y receives $13/20^{th}$ of what X and Z received together . Find share of each partner.