The Core Concepts and Major Areas of the Unit / Topic:

- Graphical Method of solution of a Pair of Linear Equations
- Algebraic Methods of Solving a Pair of Linear Equations
  i) Substitution Method   ii)Elimination Method

Learning Outcome of the Unit:

Students use graphical and algebraic methods in order to find solutions of pairs of linear equations in two variables.

ASSERTION REASON:

Q1. Assertion(A): The value of **m** for which the system of linear equations $mx + 3y + (3 - m) = 0$ and $12x + my - m = 0$ has infinite number of solutions is 6.
Reason(R): The graph of linear equations $a_1x + b_1y + c_1 = 0$ and
$a_2x + b_2y + c_2 = 0$ gives a pair of coinciding lines if $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true

Q2. Assertion (A): The number of common solutions for the system of linear equations $2x + 3y - 8 = 0$ and $4x + 6y + 4 = 0$ is zero.
Reason(R): The graph of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ gives a pair of intersecting lines if $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true

Q3. Assertion (A): The value of k for which the system of linear equations $kx - 3y + 6 = 0$ and $2x + 3y - 18 = 0$ has a unique solution is (-2).
Reason (R): The system of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ has a unique solution if $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true

Q4. Assertion (A): A system of linear equations is said to be consistent if it has at least one solution.
Reason (R): The pair of linear equations having infinitely many solutions is called the independent system.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true

Q5. Assertion (A): Graphically the pair of linear equations 2x -y -5 =0 and x – y – 3 = 0 representing intersecting lines.
Reason (R): The linear equations 2x – y – 5 = 0 and x- y- 3 = 0 meet the Y – axis at (0 ,3) and (0, - 5).
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true

Q6. . Assertion: The linear equations $x - 2y - 3 = 0$ and $3x + 4y - 20 = 0$ have exactly one solution.
Reason: The linear equations $2x + 3y - 9 = 0$ and $4x + 6y - 18 = 0$ have a unique solution.

a) Both Assertion and Reason are correct and Reason is the correct explanation for Assertion.
b) Both Assertion and Reason are correct and Reason is not the correct explanation for Assertion.
c) Assertion is true but the reason is false.
d) Assertion is false and reason is true.

MULTIPLE CHOICE QUESTIONS

Q7. The pair of linear equations y=0 and y=5 has

a) One solution   b) No solution   c) Infinitely many solutions   d)Two solutions

Q.8 The pair of linear equations: $2x - 3y + 13 = 0, 6x - 9y = -26$ has

a) No solution   b) Infinitely many solutions   c) Exactly one solution   d) Two solutions

Q9. Students of a class are made to stand in a row. If three students are extra in each row, there will be two rows less. If two students are less in each row, then there would be two rows more. The total number of students in the class is

   a) 720   b) 450   c) 240   d) 120

Q10. A person walks from his house at a speed of 4km/h. and reaches school 5 minute late. If his speed was 5 km/h. he would have reached 10 minute earlier. The distance of school from the house is

   a) 5 km   b) 6 km   c) 7 km   d) 8 km

Q11. If the length of the sides of an equilateral triangle are (3x + 2y) units,

$(4x + \frac{4}{3}y)$ units and $\left[3(x + 1) + \frac{3}{2}(y - 1)\right]$ units, then the length of its side is
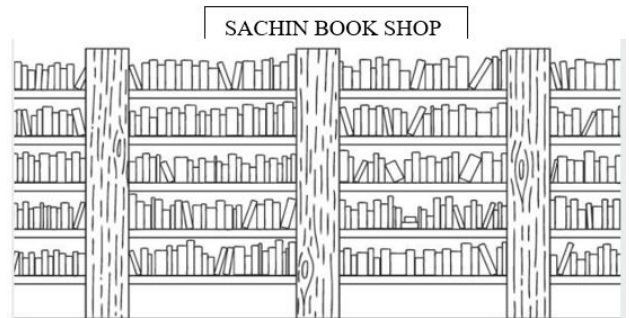
   a) 8 units   b) 10 units   c) 12 units   d) 16 units

Q12. The pair of equations x = a and y = b graphically represents lines which are –
 (a) Parallel   (c) Intersecting at (b, a)
 (b) Coincident   (d) Intersecting at (a, b)

CASE STUDY

Q13. A hostel warden had ordered books for class 10A and 10B from a book shop. Class10A got 2 books of Computer and 3 books of Mathematics for ₹ 2000 whereas Class 10B got 3 books of Computer and 2 books of Mathematics for ₹ 2500.
   i.   Form the pair of linear equations to express the situations in terms of x and y. Find the cost of 1 Computer book and 1 Mathematics book.
   ii.   What would be the cost of 1 Computer book and 5 Mathematics books together?

Q14. A teacher placed a question to solve for the students who came to the mathematics club on a weekend. She told to think of a two-digit number, further she said that the digit in the unit place is twice of the digit in the tens place. Also, she said that we get a new number which is 27 more than the original number, if the digits are reversed.
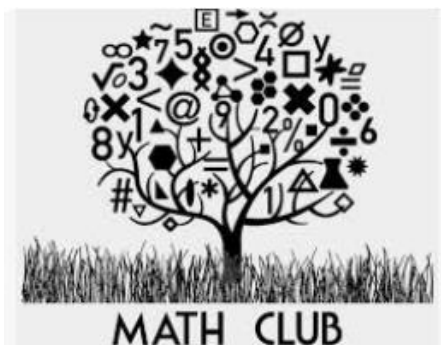
Based on the above information, answer the following questions:

(i) Form the pair of linear equations in two variables from this situation.
(ii) Find the original number.
(iii) Find the sum of the two numbers.

Q15. Amit is planning to buy a house and the layout is given below. The design and the measurement have been made such that areas of two bedrooms and kitchen together are 95 sq.m.
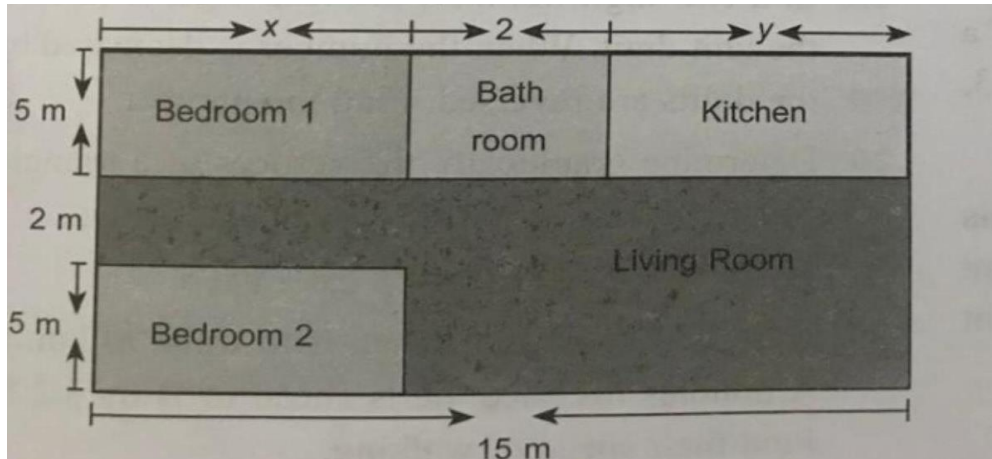
Based on the above information answer the following questions.

    i)   Form the pair of linear equations in two variables from this situation.
    ii)   Find the length of the outer boundary of the layout.
    iii)   Find the area of each bedroom and kitchen in the layout.

OR   Find the cost of laying tiles in kitchen at the rate of Rs 50 per sq.m.

Q16. In the 1961-1962 NBA basketball seasons, Wilt

Chamberlain of the Philadelphia Warriors made 30 ba

 Some of the baskets were free throws (worth 1 point

some were field goals (worth 2 points each). The num

of field goals was 10 more than the number of free thr

On the basis of above information answer the following questions:

 (a) How many field goals did he make?   **(2 Marks)**

(b) How many free throws did he make?   **(1 Mark)**

(c) What is the total number of points scored?   **(1 Mark)**

ANSWER KEY

Q1. Option (a)
Q2. Option (b)
Q3. Option (d)
Q4. Option (c)
Q5. Option (c)
Q6. Option (c)
Q7. B
Q8. A
Q9. D
Q10. A
Q11. C
Q12. D
Q13. i) 2x+3y=2000
       3x+2y=2500
        Computer Book cost=Rs.700
        Math Book Cost=200
      ii) Rs.1700
Q14. i) 2x-y=0 and-x+y=3

ii) Original number=36
iii) Original +new=36+63=99
Q15. i) Area of two bedrooms =10x m2
       Area of kitchen = 5y m2
        10x + 5y = 95
         2x + y = 19
       Also x + 2 + y = 15
       x + y = 13
  ii) Length of outer boundary = 12 + 15 + 12 + 15 = 54m
  iii) 2x + y = 19 and x + y = 13
       so x = 6m, y = 7m
      Area of one bedroom =5 X 6 = 30m2, Area of kitchen = 5 X 7 = 35m2
Or Total cost of laying tiles in the kitchen = Rs 50 x 35 = Rs 1750

Q16. a) Let x be the free throw and y be the fixed goal.
   As per question

x + y = 30

y = x + 10   **(1 Mark)**

Solving x = 10, y = 20 , Thus, he made 20 fixed goal.   **(1 Mark)**

b) Free throw x = 10

c) Point scored = 10 + 2 x 20 = 50