SAINIK SCHOOL GOPALGANJ
Sub: Mathematics
Class-X

ASSIGNMENT – 3

Pair of Linear Equations in Two Variables:

Part – I

1. Rajesh can row downstream 20km in 2 hours, and the upstream 4km in 2 hours. What will be the speed of rowing in still water?
   (a) 6km/hr
   (b) 4km/hr
   (c) 3km/hr
   (d) 7km/hr

2. Five years ago, A was thrice as old as B and ten years later, A shall be twice as old as B. What is the present age of A.?
   (a) 20
   (b) 50
   (c) 60
   (d) 40

3. A fraction becomes. When subtracted from the numerator and it becomes. When 8 is added to its denominator. Find the fraction.
   (a) 4/12
   (b) 3/13
   (c) 5/12
   (d) 11/7

4. What will be the solution of these equations ax+by=a-b, bx-ay=a+b
   (a) x =1, y=2
   (b) x =2,y=-1
   (c) x=-2, y=-2
   (d) x =1, y=-1

5. If x=a, y=b is the solution of the pair of equation x-y=2 and x + y=4 then what will be value of a and b
   (a) 2,1
   (b) 3, 1
   (c) 4, 6
   (d) 1, 2

Part – II

1. What types of lines do the pair of equations x=c and y=c represent graphically? (1).
2. A boat is moving at the rate of 5km/h in still water, takes thrice as much as time in going 40 km upstream as in going 40 km downstream. Find the speed of the stream. (3).
3. Find the value of m, when (m+1) x=3ky+15=0 and 5x+k y+5=0 are coincident. (3)
4. Write the pair of linear equations which have solutions x=2, y=-2. (1)
5. Solve it on a graph 4x-3y+4=0, 4x+3y-24=0. (3)
6. If we have two variables x and y when x=a and y=b is the solution of equations x-y=2 and x +y=4, then what will be the value of a and b. (3)
7. Use cross multiplication method to solve a x+ b x=a-b, b x-ay=a +b. (3)
8. Whether this pair of linear equations is consistent. Find x-2y=6, 3x-6y=0. (1)
9. A number is a two digit number which is three times more than 4 times the sum of the digits. If 18 are added to the number, the digits get opposite. Represent geometrically. (4)
10. The addition of numerator and denominator of a fraction is three less than twice the denominator. If the numerator and denominator are decreased by 1, the numerator becomes half the denominator. Find the fraction. (3)

Linear equation in two variables

Part – III

1. For what values of a and b does the following pair of equations have an infinite numbers of solutions.
2x+3y=7, a(x + y)-b(x-y) = 3a+b-2 **(DELHI 2008 C)**
2. For what value of k will the following equations have infinitely many solutions?
2x-3y=7, (k+1) x+ (1-2k) y=5k-4 **(DELHI 2008 C)**
3. The sum of denominator and numerator of a fraction is 3 less than twice the denominator. If each of the numerator and denominator is decreased by 1, the fraction becomes 1/2. Find the fraction. **(DELHI 2010)**
4. The sum of the digits of a two digit number is 12. The number obtained by interchanging the two digits exceeds the given number by 18. Find the number. **(CBSE (CCE) 2011)**
5. The father's age is six times his son's age. Four years hence, the age of the father will be four times his son's age. Find the present ages, in years, of the son and the father.
6. 4 men and 6 boys can finish a piece of work in 5 days while 3 men and 4 boys can finish it in 7 days. Find the time taken by 1 man alone or than by 1 boy alone. **(CBSE (CCE) 2011)**
7. A man travels 600km apart by train and partly by car. It takes 8 hours and 40 minutes if he travels 320 km by train and rest by car. It would take 30 minutes more if he travels 200 km by train and the rest by the car/. Find the speed of the train and by car separately. **(CBSE (CCE) 2011)**
8. Solve the equations graphically.

2x+y=2, 2y-x=4. Also find the area of a triangle formed by the two lines and the line y=0. **(CBSE (CCE) 2011)**

9. For what value of k will pair of equations have no solution?
3x+y=1, (2k-1) x+ (k-1) y=2k+1 **CBSE (CCE) 2012)**

10. Solve the following pair of equations graphically. x+3y=6, 2x-3y=12. Also find the area of the triangle formed by the lines representing the given equations with y-axis. **(CBSE (CCE) 2012)**

11. 6 men and 10 women can finish making pots in 8 days, while the 4 men and 6 women can finish it in 12 days. Find the time taken by the one man alone from that of one woman alone to finish the work.

12. A boat covers 14 kms in upstream and 20 kms downstream in 7 hours. Also it covers 22 kms upstream and 34 kms downstream in 10 hours. Find the speed of the boat in still water and of that the stream.

13. Draw the graph of 2x+y=6 and 2x-y+2=0. Shade the region bounded by these lines and x axis. Find the area of the shaded region

14. When you add two numbers and the number obtained by reversing the order of its digits is 165. If the both numbers differ by three, find the number.

15. A number say z is exactly the four times the sum of its digits and twice the product of the digits. Find the numbers.

16. Solve graphically 4x-3y+4=0, 4x+3y-20=0

17. There are two points on a highway a, b. They are 70 km apart. An auto starts from a and another auto starts from b simultaneously. If they travel in the same direction, they meet in 7 hours, but if they travel towards each other they meet in 1 hour. Find how fast the two autos are.

18. A diver rowing at the rate of 5 km/h in still water takes double the time in going 40 km upstream as in going 40 km downstream. Find the speed of the stream.

19. The larger of two supplementary angles exceeds thrice the smaller by 20 degrees. Find them.

20. The sum of two children is ‘a’. The age of the father is twice the ‘a’. After twenty years, his age will be equal to the addition of the ages of his children. Find the age of father.

Part – III

Question 1.

Solve the following pair of linear equations:
y -4x= 1
6x- 5y= 9

Question 2.A part of monthly Hostel charge is fixed and the remaining depends on the number of days one has taken food in the mess. When Swati takes food for 20 days, she has to pay 13000 as hostel charges whereas; Mansi who takes food for 25 days pays Rs3500 as hostel charges. Find the fixed charges and the cost of food per day.

Question 3.
Solve using cross multiplication method:

x+y=1
2x – 3y = 11

Question 4.
Draw the graphs of the pair of equations x + 2y = 5 and 2x-3y = – 4. Also find the points where the lines meet the x-axis.

Question 5.
Find whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident: 2x – 3y + 6 = 0,4x – 5y + 2 = 0

Question 6.
Given a linear equation 3x-5y = 11. Form another linear equation in these variables such that the geometric representation of the pair so formed is:
(i) intersecting lines
(ii) coincident lines
(iii) parallel lines

Question 7.
Solve for x and y
x + 2y – 3= 0
3x – 2y + 7 = 0

Question 8.
4 chairs and 3 tables cost ? 2100 and 5 chairs and 2 tables cost ? 1750. Find the cost of one chair and one table separately

Question 9.
Solve for x andy:
2x= 5y + 4;
3x-2y + 16 = 0

Question 10.
Solve for x and y:

$$\frac{5}{x-1}+\frac{1}{y-2}=2 \text{ and } \frac{6}{x-1}-\frac{3}{y-2}=1 \qquad [\text{Where } x \neq 1, y \neq 2]$$

Question 11.

Solve for x and y:

6(ax + by) = 3a + 2b
6(bx – ay) = 3b -2a

Question 12.
Solve the following pair of equations by reducing them to a pair of linear equations:

$1/x - 4/y = 2$

$1/x + 3/y = 9$

Question 13.
Determine graphically whether the following pair of linear equations $2x - 3y = 5$; $3x + 4y = -1$ has
(i) a unique solution
(ii) infinitely many solutions or
(iii) no solution

Question 14.
Find those integral values of m for which the c-coordinate of the point of intersection of lines represented by $y = mx + 1$ and $3x + 4y = 9$ is an integer.

Question 15.
In a two digit number, the digit in the unit place is twice of the digit in the tenth place. If the digits are reversed, the new number is 27 more than the given number. Find the number.

Question 16.
Solve the following system of linear equations graphically.
$3x + y - 12 = 0$;
$x - 3y + 6 = 0$
Shade the region bounded by the lines . Also, find the area of shaded region.

Question 17.
The owner of a taxi company decides to run all the taxi on CNG fuels instead of petrol/ diesel. The taxi charges in city comprises of fixed charges together with the charge for the distance covered.
For a journey of 13 km, the charge paid is Rs 129 and for journey of 22 km, the charge paid is Rs 210.
(i) What will a person have to pay for travelling a distance of 32 km?
(ii) Why did he decide to use CNG for his taxi as a fuel?

Question 18.
The area of a rectangle reduces by 160 m if its length is increased by 5 m and breadth is reduced by 4 m. However, if length is decreased by 10 m and breadth is increased by 2 m, then its area is decreased by 100 m2. Find the dimensions of the rectangle.

Question 19.
At a certain time in a zoo, the number of heads and the number of legs of tiger and peacocks were counted and it was found that there were 47 heads and 152 legs. Find the number of tigers and peacocks in the zoo:
Why it is necessary to conserve these animals?

Question 20.
If the system of equations
$6x + 2y = 3$ and $kx + y = 2$ has a unique solution, find the value of k.

Question 21.
Determine the value of m and n so that the following pair of linear equations have infinite number of solutions.
$(2m - l)x + 3y = 5$;
$3x + (n- l)y = 2$

Question 22.
For what values of p and q will the following pair of linear equations has infinitely many solutions?
$4x + 5y = 2$;
$(2p + 7q)x + (p + 8q)y = 2q-p + 1$

Question 23.
Solve the following pair of equations for x and y

$$\frac{ax}{b} - \frac{by}{a} = a + b; \quad ax - by = 2ab$$

Question 24.
8 men and 12 boys can finish a piece of work in 10 days, while 6 men and 8 boys can finish it in 14 days. Find the time taken by one man alone and that by one boy alone to finish the work.

Question 25.
A two digit number is equal to 7 times the sum of its digits. The number formed by reversing its digits is less than the original number by 18. Find the original number.

Question 26.
The age of the father is twice the sum of the ages of his 2 children. After 20 years, his age will be equal to the sum of the ages of his children. Find the age of the father.

Question 27.
Places A and B are 80 km apart from each other on a highway. A car starts from A and another from B at the same time. If they move in same direction they meet in 8 hrs and if they move in opposite directions they meet in 1 hr 20 minutes. Find speeds of the cars.

Question 28.
For what value of k will the pair of equations have no solution?
$3x + y = 1$
$(2k-l)x+ (k-l)y = 2k+l$

Question 29.
Solve for x and y:

$$\frac{5}{x-1}+\frac{1}{y-2}=2;\ \frac{6}{x-1}-\frac{3}{y-2}=1$$

Question 30.

Solve the following pair of linear equations graphically, x + 3y = 6;2x-3y = 12 Also find the area of the triangle formed by the lines representing the given equations withy-axis.

Question 31.

Solve the equations graphically:
2x + y = 2;
2y-x = 4
What is the area of the triangle formed by the two lines and the line y = 0?

Question 32.

The sum of the numerator and the denominator of a fraction is 4 more than twice the numerator. If 3 is added to each of the numerator and denominator, their ratio becomes 2: 3. Find the fraction. [All India]

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