## CLASS-X

## MATHEMATICS WORKSHEET

## CHAPTER-3: LINEAR EQUATIONS IN TWO VARIABLES

## SHORT ANSWER TYPE QUESTIONS

Q1. Solve the following pair of linear equations:
a) $\quad a x+b y=a-b$, $b x-a y=a+b$
b) $\quad(a+2 b) x+(2 a-b) y=2$

$$
(a-2 b) x+(2 a+b) y=3
$$

c) $(a-b) x+(a+b) y=a^{2}-2 a b-b^{2}$

$$
(a+b)(x+y)=a^{2}+b^{2}
$$

d) $a x / b-b y / a=a+b$
$\mathrm{ax}-\mathrm{by}=2 \mathrm{ab}$
e) $5 /(x+1)-2 /(y-1)=1 / 2$

$$
10 /(x+1)+2 /(y-1)=5 / 2
$$

f) $\quad a^{2} / x-b^{2} / y=0$
$a^{2} b / x+b^{2} a / y=a+b \quad, x, y \neq 0$
g) $m x-n y=m^{2}+n^{2}$
$x-y=2 n$
h) $\quad x y /(x+y)=6 / 5$
$x y /(y-x)=6 \quad\{(x+y) \neq 0,(y-x) \neq 0\}$
i) $\quad x / a-y / b=(a-b)$
$x / a^{2}-y / b^{2}=0$
j) $\quad b^{2} x / a-a^{2} y / b=a b(a+b)$
$b^{2} x-a^{2} y=2 a^{2} b^{2}$
Q2. Given below are three linear equations. Two of them have infinitely many solutions and two have a unique solution. State the pairs:
$4 x-5 y=3, \quad 8 x-10 y=6, \quad 5 x-4 y=5$
Q3. Determine the value of k so that the following pairs of equations are inconsistent
$(3 k+1) x+3 y-2=0$
$\left(k^{2}+1\right) x+(k-2) y-5=0$
Q4. By comparing the ratios $a_{1} / a_{2}, b_{1} / b_{2}$ and $c_{1} / c_{2}$, find out for what value (s) of $\alpha$, the lines representing the following equations have a unique solution, no solution or infinitely many solution:
$\alpha x+3 y=\alpha-3$
$12 x+\alpha y=\alpha$
Q5. If 1 is added to each of the given two numbers, then their ratio is $1: 2$. If 5 is subtracted from each of the numbers, then their ratio is $5: 11$. Find the numbers.
Q6. The ratio of the incomes of two persons is $9: 7$ and the ratio of their expenditures is $4: 3$. If each of them S aves Rs. 200 per month, find their monthly incomes.
Q7. A person starts his job with a certain monthly salary and earns a fixed increment every year . If his salary was Rs. 4500 after 4 years of service and Rs. 5700 after 12 years of service, find his initial salary and the annual increment .
Q8. Seven times a 2-digit number is equal to four times the number obtained by reversing the order of the digits. If the sum of both the digits is 9 , find the number.
Q9. A piece of work is done by 6 men and 5 women in 6 days or 3 men and 4 women in 10 days. How many days will it take for 9 men and 15 women to finish that work?
Q10. A father's age is three times the sum of the ages of his two children. After 5 years, his age will be two times the sum of their ages. Find the present age of the father. (CBSE 2019)
Q11. The students of a class are made to stand in rows. If 3 students are extra in a row, there would be 1 row less. If 3 students are less in a row, there would be 2 rows more. Find the number of students in the class.
Q12. Find $c$ if the system of equations $c x+3 y+(3-c)=0$ and $12 x+c y-c=0$ has infinitely many solutions. (CBSE 2019)

## LONG ANSWER TYPE QUESTIONS

Q13. Solve the following system of linear equations graphically
a) $2 x+3 y=12$
$2 y-1=x$
b) $2 x+4 y-10=0$
$3 x+6 y-12=0$

Q14. Draw the graph of the system of equations $x+y=5$ and $2 x-y+2=0$. Shade the region
bounded by these lines and the x - axis. Find the area of the shaded region.
Q15. It takes only half the pool is filled. How long would it take 12 hours to fill a swimming pool using two pipes. If the larger pipe is used for 4 hours and the smaller pipe for 9 hours, for each pipe alone to fill the pool?
Q16. Ankita travels 14 km to her home partly by rickshaw and partly by bus. She takes half an hour if she travels 2 km by rickshaw and the remaining distance by bus. On the other hand, if she travels 4 km by rickshaw and the remaining distance by bus, she takes 9 minutes longer. Find the speed of the rickshaw and of the bus.

## ANSWERS

1. a) $\mathrm{x}=1, \mathrm{y}=-1$
b) $x=(5 b-2 a) / 10 a b, y=(a+10 b) / 10 a b$
c) $x=a+b, y=-2 a b /(a+b)$
d) $x=b, y=-a$
e) $x=4, y=5$
f) $x=a^{2}, y=b^{2}$
g) $\mathrm{x}=\mathrm{m}+\mathrm{n}, \mathrm{y}=\mathrm{m}-\mathrm{n}$
h) $x=2, y=3$
i) $x=a^{2}, y=b^{2}$
j) $x=a^{2}, y=-b^{2}$
2. $\mathrm{k}=-1, \mathrm{k} \neq 19 / 2$
3. Unique sol: $\alpha \neq 6$ or -6 , No solution: $\alpha=-6$, Infinitely: $\alpha=6$
4. 35,71
5. Rs. 1800 , Rs. 1400
6. Rs. 3900, Rs. 150
7. 36
8. 3 days
9. 45
10. 36
11. 
12. 20,30
13. $10 \mathrm{~km} / \mathrm{hr}, 40 \mathrm{~km} / \mathrm{hr}$
