



## MATHS

### BOOKS - KALYANI MATHS (ASSAMESE ENGLISH)

## EQUATIONS REDUCIBLE TO LINEAR FORM

### Example

1. Solve the following pair of the equations:

$$\frac{1}{3x} + \frac{1}{5y} = 1, \quad \frac{1}{5x} + \frac{1}{3y} = \frac{17}{15}$$



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2. Solve the following pair of the equations:

$$\frac{10}{3x + 2y} - \frac{4}{2x + y} = 1, \quad \frac{2}{3x + 2y} + \frac{3}{2x + y} = \frac{23}{20}$$



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3. Two women and five men together can finish a work in 4 days. But three women and six men can finish the same work in three days. Determine the time taken to complete the work by a woman and by a man when each of them works alone.



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## Exercise

1. Solve the following pair of equations:

$$3x + 2y = 2xy, 6x + 2y = 3xy$$



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2. Solve the following pair of equations:

$$3(2x + y) = 7xy, 3(x + 3y) = 11xy$$



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3. Solve by any method:

$$\frac{xy}{x+y} = \frac{6}{5}, \frac{xy}{y-x} = 6$$



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4. Solve the following pair of equations:

$$\frac{4}{x-3} + \frac{6}{y-4} = 5, \frac{5}{x-3} - \frac{3}{y-4} = 1$$



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5. Solve the following pair of equations:

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



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6. Solve the following pair of the equations:

$$\frac{1}{3x} + \frac{1}{5y} = 1, \quad \frac{1}{5x} + \frac{1}{3y} = \frac{17}{15}$$



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7. Two women and five men together can finish a work in 4 days. But three women and six men can finish the same work in three days. Determine the time taken to complete the work by a woman and by a man when each of them works alone.



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### 8. Work Problem on Time and Work

Nine boys and four girls complete a piece of work in four days. Two boys and four girls complete that work in ten days. How much time does a boy or a girl alone need to complete the work.



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### 9. Work Problem on Time and Work

Four boys and four girls can do a piece of work in three days. While two boys and seven girls can do

it four days. How long would it take to one boy or one girl to do the work.



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### 10. Work Problem on Time and Work

A and B can do a piece of work in sixteen days.

After working four days together A being retire from the work and B finished the work alone in thirty-six days. Find how many days required by each to complete the work.



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## 11. Work Problem on Time and Work

A and B working together can complete a work in eight days. After working for five days together, A has left away and B completed the work in nine days working alone. Find the number of day required by each of them to complete the work alone.



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## 12. Work Problem related to speed, distance and time

The ratio of the speed A to B is 2:3. If A takes 3



hours more than B to cover  $30\text{km}$ . Find the speed of A and B.



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**13.** Work Problem related to speed, distance and time

The ratio of the speed A to B is  $2:3$ . If A takes 3 hours more than B to cover  $30\text{km}$ . Find the speed of A and B.



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**14.** Work Problem related to speed, distance and time

Two places A and B are at distance  $160\text{km}$ . Two cars starting from the same place and moving in the same direction meet after eight hours. Again moving in the opposite directions from A to B. The cars meet each other after one hour. Find the speed of the cars.



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**15.** Work Problem related to speed, distance and time

Places A and B are  $70\text{km}$  apart on a highway. A car starts from A and another car start from B at the same time. If they travel in the same direction they meet in seven hours but if they travel towards each other meet in one hour. What are their speed.



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**16. Work Problem related to speed, distance and time**

A man walks a certain distance at a certain rate.

Had he walked  $\frac{1}{2}$  km per hour faster, he would

taken one hour less. But if he had gone one

km/hour slower, he would have taken three hours

longer. Find the distance covered by the man and

his original rate of walking.



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**17.** Work Problem related to the form

$$\frac{A}{ax + by} + \frac{B}{cx + dy} = k$$

A boat goes 30 km upstream and 44 km downstream in 10 hours. It can go 40km upstream and 55 km downstream in 13 hours. Find the speed of the boat in still water and speed of the stream.



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**18.** Work Problem related to the form

$$\frac{A}{ax + by} + \frac{B}{cx + dy} = k$$

A motorboat takes 6 hours to cover 100 km downstream and 30 km back. If the motorboat goes 75 km downstream and returns back to its starting point in 8 hours, find the speed of the motorboat in still water and speed of the stream.



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19. Write the solution of the equation

$$\frac{x}{y} = 1, x + y = 1$$



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20. Write the solution of the equation

$$5x - 10y + 5 = 0 \text{ and } x - 2y + 1 = 0.$$



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21. A two digit number, the digit in the units place

is  $x$  and ten's place is  $y$ . What is the number.



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22.  $a_1x + b_1y + c_1 = 0, a_2x + b_2y + c_2 = 0$

Under what condition the above equations

represent a unique solution.



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**23.**  $a_1x + b_1y + c_1 = 0, a_2x + b_2y + c_2 = 0$

Under what condition the above equations represent infinitely many solution.



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**24.** For  $p = \underline{\hspace{2cm}}$  system  $x + py = 2$  and  $4x + 12y = 8$  has infinitely many solution.



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25. The roots of the equation  $x + y = 6$  and  $x - y = 0$  is \_\_\_\_\_.



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26.  $a_1x + b_1y + c_1 = 0$  and  $a_2x + b_2y + c_2 = 0$  has no solution if \_\_\_\_\_.



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27. The solution of  $\frac{x}{2} + \frac{y}{3} = 1$  and  $x - y = 0$  is

\_\_\_\_\_.



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28. If  $2x + y = 45$  and  $x + 2y = 15$  then  $x + y$  is

\_\_\_\_\_.



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29. The roots of the equation  $x + 2y = 4$  and

$2y - x = 0$  are

A. (2, 0)

B. (1, 2)

C. (2, 1)

D. (4, 1)

**Answer:**



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30. If  $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$  then the system of equation

$a_1x + b_1y + c_1 = 0, a_2x + b_2y + c_2 = 0$  has

A. Unique solution

B. No solution

C. Infinitely many solution

D. None of these

**Answer:**



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**31.** The value of  $a$  for which the system of equation

$6x - y = 2, ax - 2y = 3$  has a unique solution

A.  $a \neq 3$

B.  $a \neq 12$

C.  $a \neq -3$

D.  $a \neq -12$

**Answer:**



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**32.** If  $x + y = 3$  and  $xy = 2$ , then the value of  $x - y$  is

A.  $\pm 1$

B. 2

C. 3

D.  $\pm 4$

**Answer:**



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**33.** The roots of the equation  $x + 2y = 4$  and  $2x - y = 0$  are

A. (2, 0)

B. (1, 2)

C. (2, 1)

D. (4, 1)

**Answer:**



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