



# **MATHS**

**BOOKS - CBSE COMPLEMENTARY**

**MATERIAL MATHS (HINGLISH)**

**PAIR OF LINEAR EQUATIONS IN TWO  
VARIABLES**

**Very Short Answer Type Questions**

1. If the lines given by  $3x + 2ky = 2$  and  $2x + 5y = 1$  are parallel, then the value of  $k$  is



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2. If  $x = a$  and  $y = b$  is the solution of the equations  $x - y = 2$  and  $x + y = 4$ , then the values of  $a$  and  $b$  are, respectively



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3. A pair of linear equations which has a unique solution  $x = 2$  and  $y = -3$  is

A.  $x + y = 1$  and  $2x - 3y = -5$

B.  $2x + 5y = -11$  and  $2x - 3y = -22$

C.  $2x + 5y = -11$  and  $4x + 10y = 22$

D.  $x - 4y - 14 = 0$  and  $5x - y - 13 = 0$

**Answer: A::B::D**



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4. The area of the triangle formed by the line  $x = 3$ ,  $y = 4$  and  $x = y$  is (a) sq. unit (b) 1 sq. unit (c) 2 sq. unit (d) None of these



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5. Find the value of  $k$  for which the system of equations

$$3x + 5y = 0, \quad kx + 10y = 0$$

has a nonzero solution.



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6. If a pair of linear equations in two variables is consistent, then the lines represented by two equations are (a) intersecting (b) parallel (c) always coincident (d) intersecting or coincident

A. Intersecting

B. Parallel

C. always coincident

D. intersecting or coincident

**Answer: C::D**



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7. For  $2x + 3y = 4$ ,  $y$  can be written in terms of  $x$  as \_\_\_\_\_ .



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8. One of the common solution of  $ax + by = c$  and  $y$  axis is

A.  $\left(0, \frac{c}{b}\right)$

B.  $\left(0, \frac{b}{c}\right)$

C.  $\left(\frac{c}{b}, 0\right)$

D.  $\left(0, -\frac{c}{b}\right)$

**Answer: A::B::C**



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9. a irax by c and lix my n has unique solutions  
then find the relation between the coefficients

A.  $am \neq lb$

B.  $am = lb$

C.  $ab = lm$

D.  $ab \neq lm$

**Answer: A::B**



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10. In a  $\triangle ABC$ ,  $\angle C = 3\angle B = 2(\angle A + \angle B)$

find the three angles.

A.  $30^\circ, 60^\circ, 90^\circ$

B.  $20^\circ, 40^\circ, 120^\circ$

C.  $45^\circ, 45^\circ, 90^\circ$



D.  $110^\circ$ ,  $40^\circ$ ,  $50^\circ$

**Answer: A::B::D**



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**11.** If  $x = 3m - 1$  and  $y = 4$  is a solution of the equation  $x + y = 6$ , then find the value of  $m$ .



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12. What is the point of intersection of the line represented by  $3x - 2y = 6$  and the  $y$ -axis?



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13. For what value of  $p$ , system of equations  $2x + py = 8$  and  $x + y = 6$  have no solution.



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**14.** A motor cyclist is moving along the line  $x - y = 2$  and another motor cyclist is moving along the line  $x - y = 4$  find out their moving direction.



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**15.** Find the value of  $k$  for which pair of linear equations  $3x + 2y = -5$  and  $x - ky = 2$  has a unique solution.



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16. Express  $y$  in terms of  $x$  in the expression

$$3x - 7y = 10$$



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17. If  $2x + 5y = 4$ , write another linear equation, so that lines represented by the pair are coincident.



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**18.** Check whether the graph of the pair of linear equations  $x + 2y - 4 = 0$  and  $2x + 4y - 12 = 0$  is intersecting lines or parallel lines.



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**19.** If the lines given by  $3x + 2ky = 2$  and  $2x + 5y + 1 = 0$  are parallel, then the value of  $k$  is



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20. If we draw lines of  $x = 2$  and  $y = 3$  what kind of lines do we get?



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## Short Answer Type I Questions

1. The sum of the numerator and denominator of a fraction is 3 less than twice the denominator. If the numerator and denominator are decreased by 1, the numerator

becomes half the denominator. Determine the fraction.



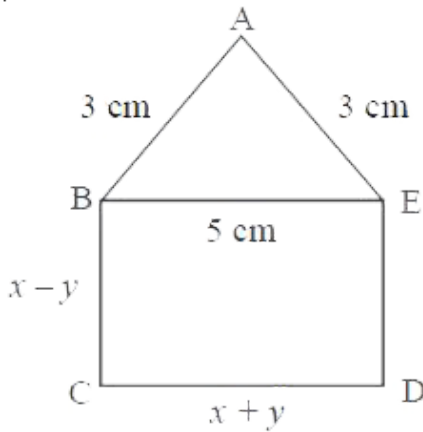
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2. For what value of  $p$  the pair of linear equations  $(p + 2)x - (2p + 1)y = 3(2p - 1)$  and  $2x - 3y = 7$  has a unique solution.



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3. ABCDE is a pentagon with  $BE \parallel CD$  and  $BC \parallel DE$ , BC is perpendicular to CD. If the perimeter of ABCDE is 21 cm, find  $x$  and  $y$ .



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4. Solve for  $x$  and  $y$

$$x - \frac{y}{2} = 3 \text{ and } \frac{x}{2} - \frac{2y}{3} = \frac{2}{3}$$



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5. Solve for  $x$  and  $y$

$$3x + 2y = 11 \text{ and } 2x + 3y = 4$$

Also find  $p$  if  $p = 8x + 5y$



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6. Solve the pair of linear equations by substitution method  $x - 7y + 42 = 0$  and  $x - 3y - 6 = 0$



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7. Ram is walking along the line joining (1, 4) and (0, 6)

Rahim is walking along the line joining (3, 4) and (1, 0)

Represent on graph and find the point where both of them cross each other



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8. Given the linear equation  $2x + 3y - 12 = 0$ , write another linear equation in these variables, such that. geometrical representation of the pair so formed is

(i) Parallel Lines (ii) Coincident Lines



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9. The difference of two numbers is 66. If one number is four times the other, find the

numbers.



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10. For which value (s) of  $k$  will the pair of equations

$$kx + 3y = k - 3,$$

$$12x + ky = k$$

has no solution ?



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1. Solve graphically the pair of linear equations

$$5x - y = 5 \text{ and } 3x - 2y = -4$$

Also find the co-ordinates of the points where these lines intersect y-axis



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2. Solve for  $x$  and  $y$

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

$$\frac{15}{x + y} - \frac{5}{x - y} = -2$$



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3. Solve the following system of equations by method of cross-multiplication:

$$\frac{x}{a} + \frac{y}{b} = a + b, \quad \frac{x}{a^2} + \frac{y}{b^2} = 2$$



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4. For what values of  $a$  and  $b$  the following pair of linear equations have infinite number of solutions?

$$2x + 3y = 7$$

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



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5. Solve the following system of equations:

$$152x - 378y = -74, \quad -378x + 152y = -604$$



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6. Yash scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then

Yash would have scored 50 marks. How many questions were there in the test?



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7. A two digit number is obtained by either multiplying sum of digits by 8 and adding 1 or by multiplying the difference of the digits by 13 and adding 2. Find the number.



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**8.** Father's age is three times the sum of ages of his two children. After 5 years his age will be twice the sum of ages of two children. Find the age of father.



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**9.** On selling a T.V. at 5% gain and a fridge at 10% gain, a shopkeeper gains Rs. 2000. But if he sells the T.V. at 10% gain and the fridge at 5% loss, he gains Rs. 1500 on the transaction. Find the actual prices of T.V. and fridge.



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**10.** Sunita has some Rs. 50 and Rs. 100 notes amounting to a total of Rs. 15,500. If the total number of notes is 200, then find how many notes of Rs. 50 and Rs. 100 each, she has.



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**Long Answer Type Questions**

1. Solve graphically the pair of linear equations  $3x - 4y + 3 = 0$  and  $3x + 4y - 21 = 0$ . Find the co-ordinates of vertices of triangular region formed by these lines and x-axis. Also calculate the area of this triangle.



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2. Solve: 
$$\frac{1}{2(2x + 3y)} + \frac{12}{7(3x - 2y)} = \frac{1}{2}$$

$$\frac{7}{2x + 3y} + \frac{4}{3x - 2y} = 2$$
 where

$2x + 3y \neq 0$  and  $3x - 2y \neq 0$ .



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3. Solve the pair of equations by reducing them to a pair of linear equations

$$\frac{3x + 2y}{xy} = 1 \text{ and } \frac{4x - 2y}{xy} = 13$$

hence find a for which  $y = ax - 4$



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4. Formulate the following problem as a pair of equations and then find their solutions.

Rahim travels 600 km to his home partly by

train and partly by car. He takes 8 hours If he travels 120 km by train and rest by car. He takes 20 minutes more if he travels 200 km by train and rest by car. Find the speed of the train and the car.



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5. A and B are two points 150 km apart on a highway. Two cars start with different speeds from A and B at same time. If they move in same direction, they meet in 15 hours. If they move in

opposite direction, they meet in one hour. Find their speeds



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6. A boat covers 32km upstream and 36 km downstream in 7 hours. Also, it covers 40 km upstream and 48km downstream in 9 hours. Find the speed of the boat in still water and that of the stream.



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7. The sum of the numerator and denominator of a fraction is 4 more than twice the numerator. If the numerator and denominator are increased by 3, they are in the ratio 2 : 3. Determine the fraction.



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8. 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.



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**9.** The ratio of incomes of two persons A and B is  $3:4$  and the ratio of their expenditures is  $5:7$ . If their savings are Rs.15,000 annually find their annual incomes.



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**10.** Vijay had some bananas and he divided them into two lots A and B. He sold the first lot at the rate of RS. 2 for 3 bananas and the second lot at the rate of Rs 1 per banana and got a total of Rs. 400. If he had sold the first lot at the rate of Rs. 1 per banana and the second lot at the rate of Rs. for 5 bananas , his total collection would have been Rs 460. Find the total number of bananas he had.



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**11.** A railway half ticket cost half the full fare but the reservation charges are the same on a half ticket as on a full ticket. One reserved first class ticket from the stations A to B costs Rs. 2530. Also, one reserved first class ticket and one reserved first class half ticket from stations A to B costs Rs. 3810. Find the full first class fare from stations A to B and also the reservation charges for a ticket.



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12. Solve the equations:  $\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2$  and

$$\frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$$



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13. Determine graphically, the vertices of the triangle formed by the lines  
 $y=x$ ,  $3y=x$  and  $x+y=8$



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**14.** Draw the graphs of the equations  $x=3$ ,  $x=5$  and  $2x-y-4=0$ . Also find the area of the quadrilateral formed by the lines and the X-axis.



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**15.** The area of a rectangle gets reduced by a 9 square units, if its length is reduced by 5 units and the breadth is increased by 3 units. The area is increased by 67 square units if length is increased by 3 units and breadth is increased by 2 units. Find the perimeter of the rectangle.



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## Practice Test Section A

1. For what value of  $k$  does the system of equations

$$x + 2y = 3, 5x + ky + 7 = 0$$

have (i) a unique solution, (ii) no solution ?

Also, show that there is no value of  $k$  for which the given system equations has infinitely many solutions.



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2. Does the point  $(2, 3)$  lie on line of graph of  $3x - 2y = 5$ .



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3. The pair of equations  $x = a$  and  $y = b$  graphically represents lines which are

A. Parallel

B. Intersecting at  $(b, a)$

C. Coincident

D. Intersecting at (a, b)

**Answer:**



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4. For what value of  $k$ , do the equations

$$3x - y + 8 = 0 \quad \text{and} \quad 6x - ky = -16$$

represent coincident lines ?

A.  $\frac{1}{2}$

B.  $-\frac{1}{2}$

C. 2

D.  $-2$

**Answer:**



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## Practice Test Section B

1. For what values of  $a$  and  $b$  does the pair of linear equations have infinite number of



solutions

$$2x - 3y = 7$$

$$ax + 3y = b$$



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$$2.04x + 0.3y = 1.7,$$

$$0.7x - 0.2y = 0.8$$



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



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## Practice Test Section C

1. Solve for  $x$  and  $y$  by cross multiplication method

$$x + y = a + b$$

$$ax - by = a^2 - b^2$$



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2. Sum of the ages of a father and the son is 40 years. If father's age is three times that of his son, then find their ages.



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**Practice Test Section D**

1. Solve the following pair of equations graphically.

$$3x + 5y = 12 \text{ and } 3x - 5y = -18.$$

Also shade the region enclosed by these two lines and x-axis.



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