



# MATHS

## BOOKS - ICSE

### GRAPHICAL SOLUTION(SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS, GRAPHICALLY)

**Exercise 27 A**

1. Draw the graph for each equation given below:

$$x=5$$



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2. Draw the graph for each equation given below:

$$x + 5 = 0$$



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3. Draw the graph for each equation given below:

$$y = 7$$



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4. Draw the graph for each equation given below:

$$y + 7 = 0$$



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5. Draw the graph for each equation given below:

$$2x + 3y = 0$$



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6. Draw the graph for each equation given below:

$$3x + 2y = 6$$



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7. Draw the graph for each equation given below:

$$x - 5y + 4 = 0$$



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8. Draw the graph for each equation given below:

$$5x + y + 5 = 0$$



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**9.** Draw the graph for each equation given below, hence find the co-ordinate of the points when the graph drawn meets the co-ordinate axes:

$$\frac{1}{3}x + \frac{1}{5}y = 1$$



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**10.** Draw the graph for each equation given below, hence find the co-ordinate of the points when the graph drawn meets the co-ordinate

axes:

$$\frac{2x + 15}{3} = y - 1$$



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**11.** Draw the graph of the straight line given by the equation  $4x - 3y + 36 = 0$

Calculate the area of the triangle formed by the line drawn and the co-ordinate axes.



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**12.** Draw the graph of the equation

$$2x - 3y - 5 = 0$$

Find the graph find

(i)  $x_1$  the value of  $x$ , when  $y=7$

(ii)  $x_2$ , the value of  $x$ , when  $y=-5$



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**13.** Draw the graph of the equation

$$4x + 3y + 6 = 0$$

From the graph find



(i)  $y_1$  the value of  $y$ , when  $x=12$

(ii)  $y_2$  the value of  $y$ , when  $x=-6$



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14. Use the table given below to draw the graph.

$x$	-5	-1	3	$b$	13
$y$	-2	$a$	2	5	7

From your graph, find the values of  $a$  and  $b$

State a linear relation between the variables  $x$  and  $y$ .



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15. Draw the graph obtained from the table below:

$x$	$a$	3	-5	5	$c$	-1
$y$	-1	2	$b$	3	4	0

Use the graph to find the values of  $a$ ,  $b$  and  $c$ .  
State a linear relation between the variables  $x$  and  $y$ .



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**16.** A straight line passes through the points (2,4) and (5,-2). Taking 1 cm=1 unit, mark these points on a graph paper and draw the straight line through these points. If points (m,-4) and (3,n) lie on the line drawn, find the values of m and n.



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**17.** Draw the graph (straight line) given by equation  $x - 3y = 18$ . If the straight line

drawn passes through the points  $(m,-5)$  and  $(6,n)$ , find the values of  $m$  and  $n$ .



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**18.** Use the graphical method to find the value of  $k$  if

(i)  $(k,-3)$  lies on the straight line

$$2x + 3y = 1$$

(ii)  $(5,k-2)$  lies on the straight line

$$x - 2y + 1 = 0$$



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## Exercise 27 B

1. Solve graphically the following pairs of equations :

$$x - 5 = 0$$

$$y + 4 = 0$$



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2. Solve graphically the following pairs of equations :

$$2x + y = 23$$

$$4x - y = 19$$



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**3.** Solve graphically the following pairs of equations :

$$3x + 7y = 27$$

$$8 - y = \frac{5}{2}x$$



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4. Solve graphically the following pairs of equations :

$$\frac{x + 1}{4} = \frac{2}{3}(1 - 2y)$$

$$\frac{2 + 5y}{3} = \frac{x}{7} - 2$$



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5. Solve graphically the simultaneous equations given below. Take the scale as 2 cm-1 unit on both the axes.

$$x - 2y - 4 = 0$$

$$2x + y = 3$$



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6. Use graph paper for this question. Draw the graph of  $2x - y - 1 = 0$  and  $2x + y = 9$  on the same axes. Use 2 cm=1 unit on both axes and plot and 3 points per line.

Write down the co-ordinates of the point of intersection of the two lines.



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7. Use graph paper for this question. Take 2 cm = 2 units on x-axis and 2 cm = 1 unit on y-axis.

solve graphically the following equations:

$$3x + 5y = 12, 3x - 5y + 18 = 0$$

(Plot only three points per line)



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8. Use graph paper for this question. Take 2 cm = 1 unit on both the axes.

(i) Draw the graphs of  $x + y + 3 = 0$  and

$3x - 2y + 4 = 0$ . Plot only three points per line.

(ii) Write down the co-ordinates of the point of intersection of the lines

(iii) Measure and record the distance of the point of intersection of the lines from the origin in cm.



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**9.** The sides of a triangle are given by the equations  $y - 2 = 0$ ,  $y + 1 = 3(x - 2)$  and

$$x + 2y = 0$$

Find graphically

(i) the area of triangle

(ii) the co ordinates of the vertices of the triangle.



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**10.** By drawing a graph for each of the equations  $3x + y + 5 = 0$ ,  $3y - x = 5$  and  $2x + 5y = 1$  on the same graph paper, show that the lines given by these equations are

concurrent (i.e. they pass through the same point)

Take 2 cm=1 unit on both the axes.



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**11.** Using the scale of 1 cm to 1 unit for both the axes, draw the graphs of the following equations:  $6y = 5x + 10$ ,  $y = 5x - 15$ .

From the graph find

(i) the co-ordinates of the point where the two lines intersect,

(ii) the area of the triangle between the lines and the x-axis.



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**12.** The cost of manufacturing  $x$  articles is Rs.  $(50+3x)$ . The selling price of  $x$  articles is Rs.  $4x$ .

On a graph sheet, with the same axes, and taking suitable scale draw two graphs, first for the cost of manufacturing against no. of articles and the second for the selling price against number of articles.

Use your graph to determine

(i) No. of articles to be manufactured and sold to break even (no profit and no loss),

(ii) The profit or loss made when a. 30 b. 60 articles are manufactured and sold.



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**13.** Find the graphically, the vertices of the triangle whose sides have the equations

$$2y - x = 8, 5y - x = 14 \quad \text{and} \quad y - 2x = 1$$

respectively.

Take 1 cm=1 unit on both the axes.



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**14.** Using the same axes of co-ordinates and the same unit, solve graphically,

$$x + y = 0 \text{ and } 3x - 2y = 10$$

(Take at least 3 points for each line drawn).



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**15.** Solve graphically the following equations,

$$x + 2y = 4, 3x - 2y = 4$$

Take 2 cm=1 unit on each axis.

Also find the area of the triangle formed by the lines and the x-axis.



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**16.** Use the graphical method to find the value

of  $x$  for which the expressions  $\frac{3x + 2}{2}$  and

$\frac{3}{4}x - 2$  are equal.







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17. The course of an enemy submarine, as plotted on rectangular co-ordinate axes, gives the equation  $2x + 3y = 4$ . On the same axes, a destroyer's course is indicated by the graph  $x - y = 7$ . Use the graphical method to find the point at which the paths of the submarine and the destroyer intersect?



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## Examples

1. Draw the graph of  $y = 3x - 4$



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2. Use the table given alongside to draw the graph. Use the graph drawn to find the values of  $a$  and  $b$

State the linear relation between the variables

x and y.

x	-2	0	2	1	b
y	-3	1	a	3	-7



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3. On a graph paper, draw a straight line represented by the equation  $2x - 3y + 12 = 0$ .

Use the graph drawn to find the values of m and n so that the points (m,-2) and (3,n) lies on the given straight line.



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4. Solve the given equations graphically.

$$3x - 2y = 4 \text{ and } 5x - 2y = 0$$



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5. Use graph paper for this question:

(i) Draw the graphs of  $3x - y - 2 = 0$  and

$2x + y - 8 = 0$ . Take 1 cm=1 unit on both the

axes and plot only three points per line.

(ii) Write down the co-ordinates of the point

of intersection and the area of the triangle formed by the lines and the x-axis.



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6. In a factory the cost of manufacturing  $x$  articles is Rs.  $(20+2x)$  and the selling price of  $x$  articles is Rs.  $(2.5x)$ . On the same graph paper, with the same axes draw two graphs, first for the cost of manufacturing against no. of articles and the second for the selling price against no. of articles.

Take 2 cm=10 articles on one axis and 2cm =Rs. 20 on the other axis. Provide for x upto 80. Use your graph to determine:

(i) No.of articles to be manufactured and sold to reach breakeven point (no profit and no loss situation).

(ii) The profit made when 60 articles are manufactured and sold.



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