

Name

Class



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# Linear graphs

(9 – 1) Topic booklet

## Higher

These questions have been collated from previous years GCSE Mathematics papers.

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
- If the question is a **1H** question you are not allowed to use a calculator.
- If the question is a **2H** or a **3H** question, you may use a calculator to help you answer.

### Information

- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

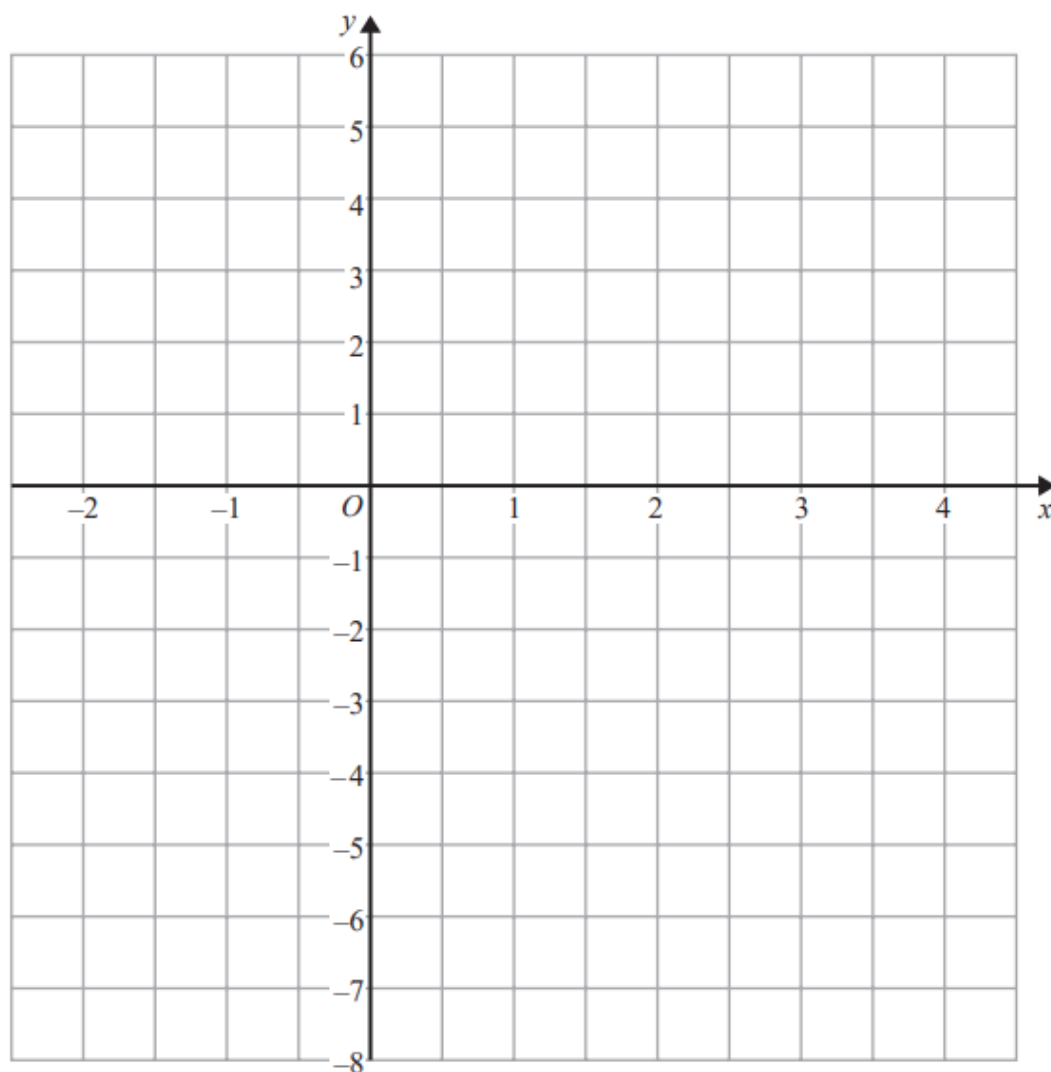
**Answer ALL questions**

**Write your answers in the space provided.**

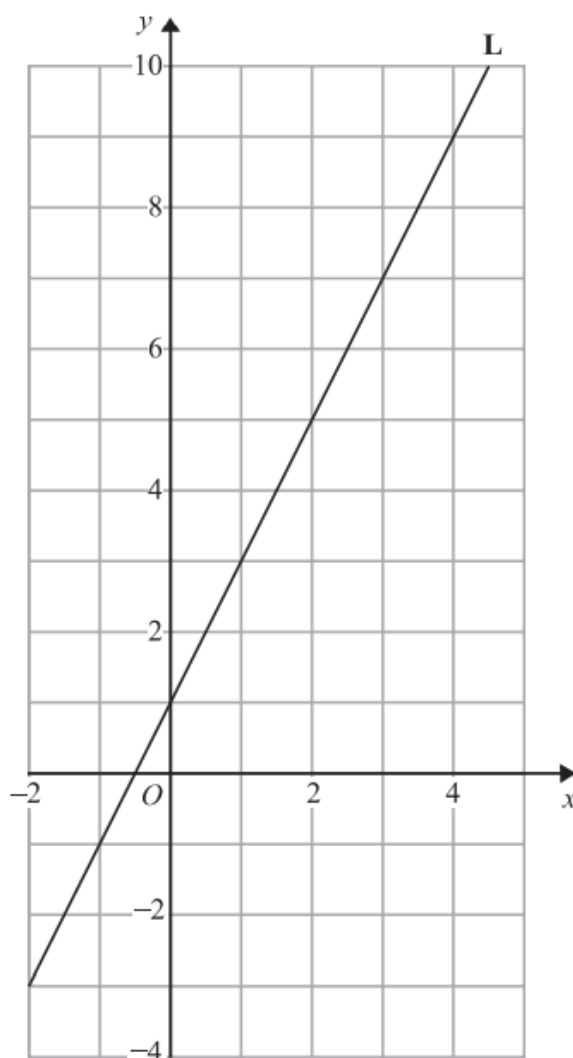
**You must write down all the stages in your working.**



- 2** On the grid below, draw the graph of  $y = 2x - 3$  for values of  $x$  from  $-2$  to  $4$

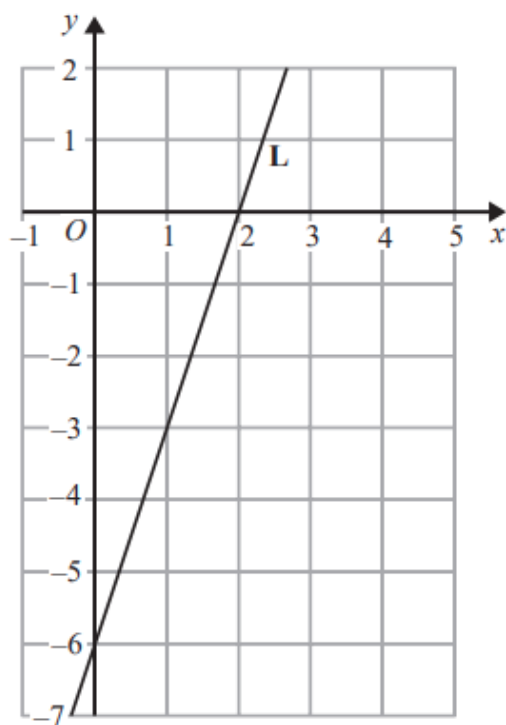


3 Line L is drawn on the grid below.



Find the equation for the straight line L.  
Give your answer in the form  $y = mx + c$

3 The line **L** is shown on the grid.



Find an equation for **L**.

- 5 The points  $L$ ,  $M$  and  $N$  are such that  $LMN$  is a straight line.



The coordinates of  $L$  are  $(-3, 1)$

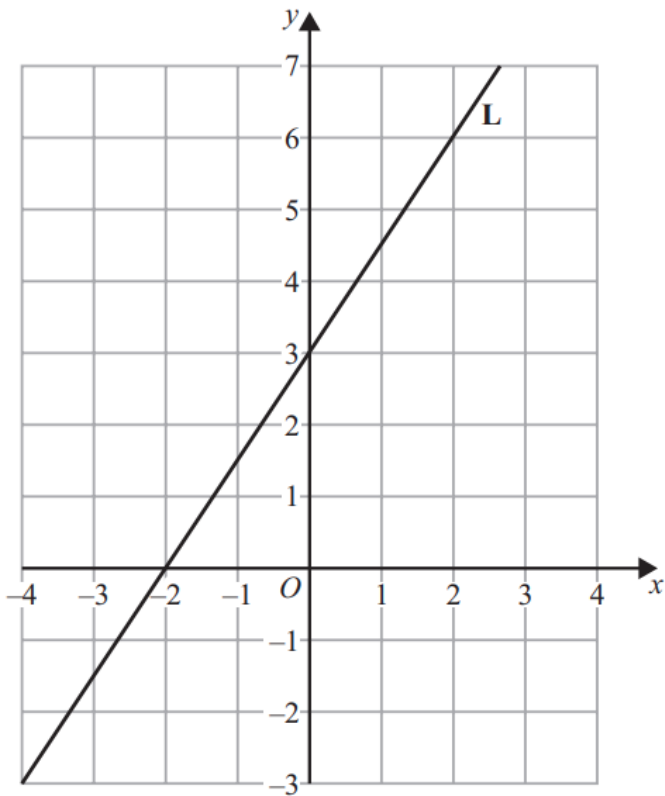
The coordinates of  $M$  are  $(4, 9)$

Given that  $LM : MN = 2 : 3$ ,

find the coordinates of  $N$ .

(....., .....)

6 Here is a straight line **L** drawn on a grid.



(a) Find an equation for **L**.

(3)

**M** is a different straight line with equation  $y = 5x$

(b) Write down the equation of a straight line parallel to **M**.

(1)

- 6**  $A$  is the point with coordinates  $(5, 9)$   
 $B$  is the point with coordinates  $(d, 15)$

The gradient of the line  $AB$  is 3

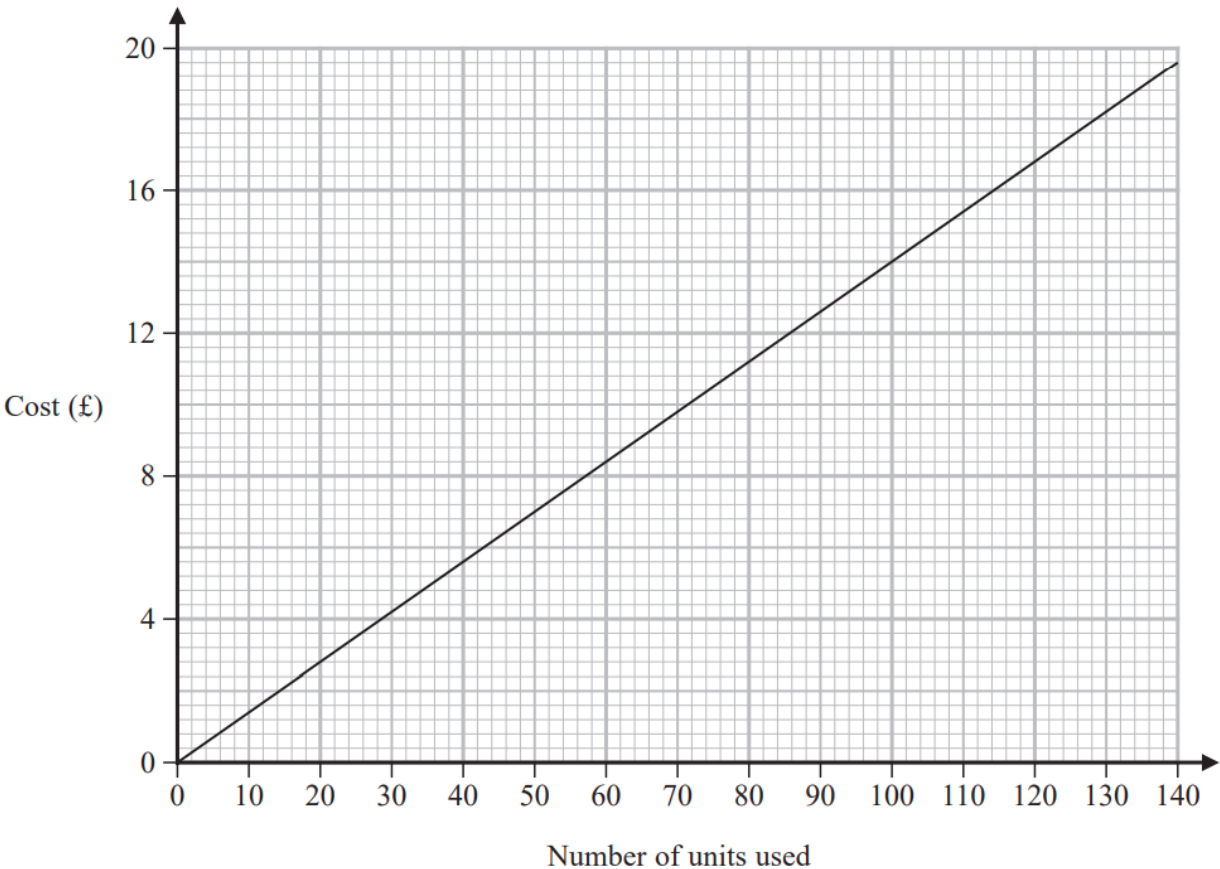
Work out the value of  $d$ .



8 An electricity company charges the same fixed amount for each unit of electricity used.



David uses this graph to work out the total cost of the electricity he has used.



(a) Work out the gradient of the straight line.

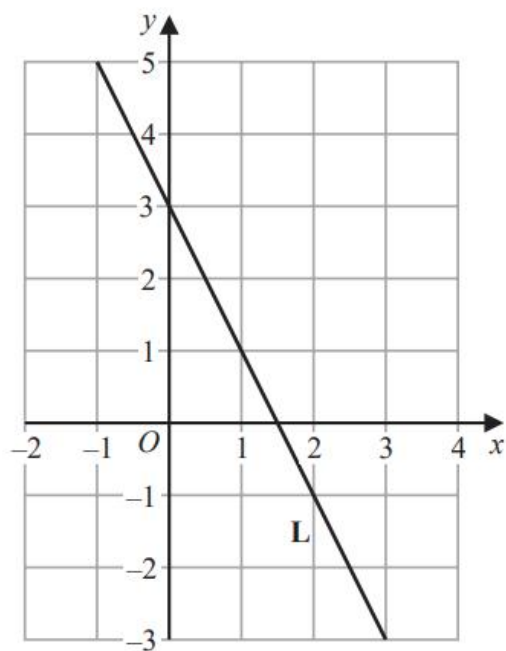
(2)

(b) What does the gradient of this line represent?

(1)



9 The line **L** is shown on the grid.

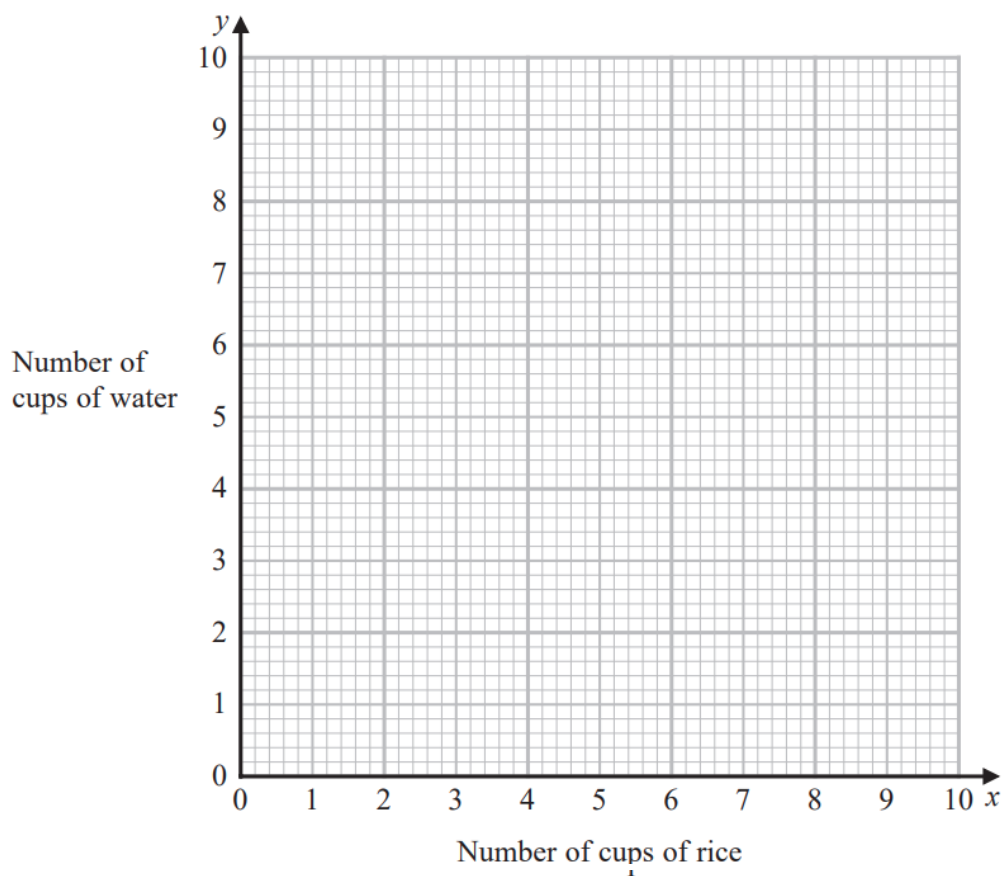


Find an equation for **L**.

9 To cook rice

the number of cups of rice ( $x$ ): the number of cups of water ( $y$ ) = 4 : 5

- (a) Use this information to draw a graph to show the relationship between the number of cups of rice and the number of cups of water needed to cook rice.



(2)

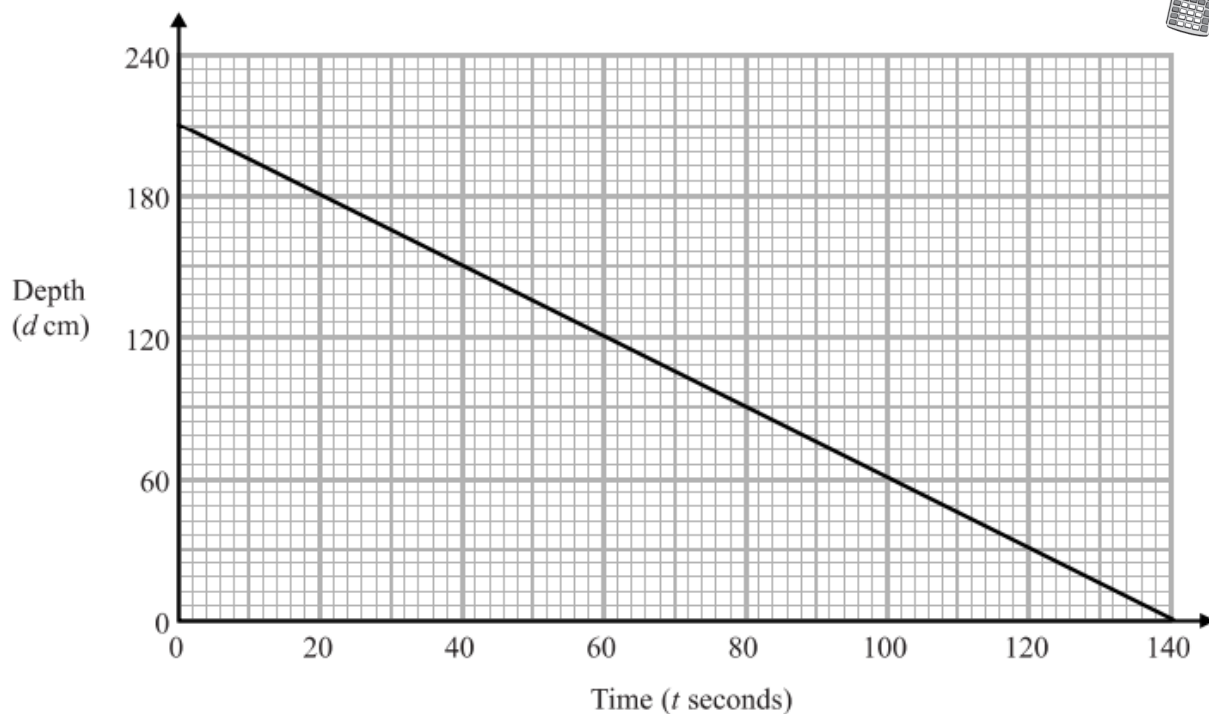
- (b) (i) Find the gradient of the line drawn in part (a).

(1)

- (ii) Explain what this gradient represents.

(1)

10 The graph shows the depth,  $d$  cm, of water in a tank after  $t$  seconds.



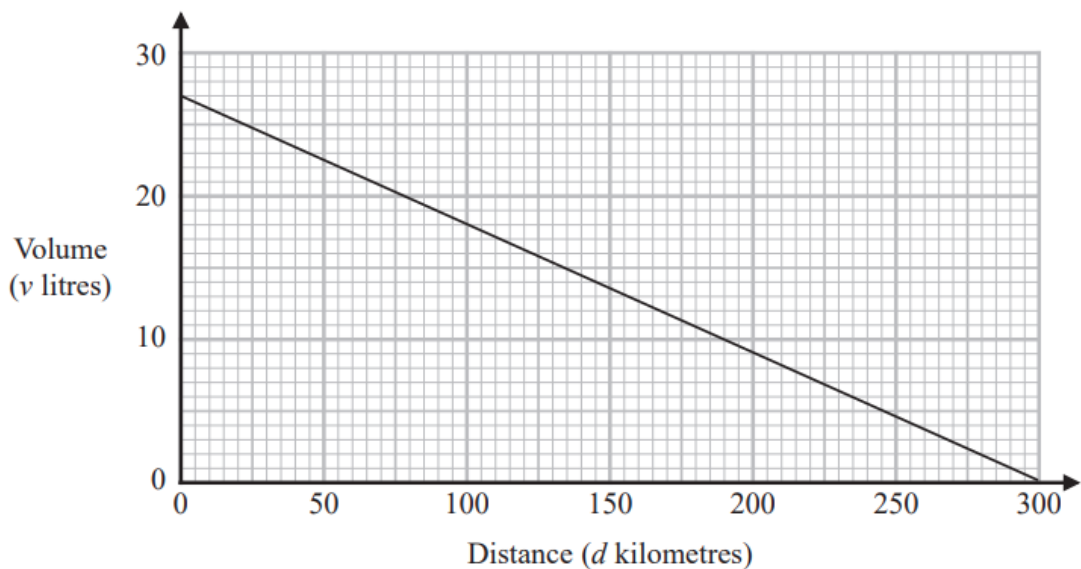
(a) Find the gradient of this graph.

.....  
(2)

(b) Explain what this gradient represents.

.....  
.....  
(1)

12 The graph gives information about the volume,  $v$  litres, of petrol in the tank of Jim's car after it has travelled a distance of  $d$  kilometres.



(a) Find the gradient of the graph.

(2)

(b) Interpret what the gradient of the graph represents.

(1)

- 18** The straight line  $L_1$  passes through the points with coordinates  $(4, 6)$  and  $(12, 2)$   
The straight line  $L_2$  passes through the origin and has gradient  $-3$

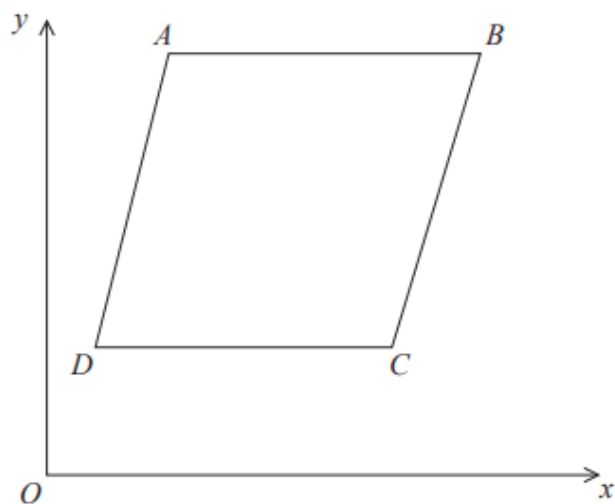


The lines  $L_1$  and  $L_2$  intersect at point  $P$ .

Find the coordinates of  $P$ .

(..... , .....)

18



$ABCD$  is a rhombus.

The coordinates of  $A$  are  $(5, 11)$

The equation of the diagonal  $DB$  is  $y = \frac{1}{2}x + 6$

Find an equation of the diagonal  $AC$ .

- 25**  $A(-2, 1)$ ,  $B(6, 5)$  and  $C(4, k)$  are the vertices of a right-angled triangle  $ABC$ .  
Angle  $ABC$  is the right angle.

Find an equation of the line that passes through  $A$  and  $C$ .

Give your answer in the form  $ay + bx = c$  where  $a$ ,  $b$  and  $c$  are integers.