



FOUNDED 1900

THE ENGLISH SCHOOL  
A SECOND CENTURY OF EXCELLENCE

## **YEAR 2 MID-PROGRAMME ENTRY EXAMINATIONS 2021**

**MATHEMATICS**

**SATURDAY 5<sup>th</sup> JUNE 2021**

**Time allowed: 2 hours**

### **Instructions to candidates**

Answer all the questions in the spaces provided.

Without sufficient working, correct answers may be awarded no marks.

### **Information to candidates**

This paper has 27 questions.

There are 15 pages in this question paper.

Full marks may be obtained for answers to all questions.

The total marks for this paper is 120.

The marks for each question is shown in round brackets, e.g. (2)

### **Advice for candidates**

Write your answers neatly and in good English.

Work steadily through the paper.

Do not spend too long on one question.

Show all stages in any calculations.

### **Materials required for the paper**

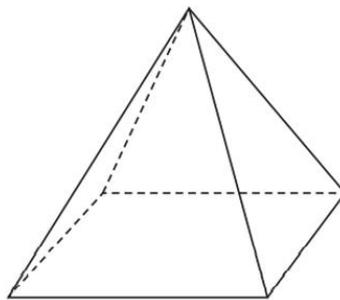
Ruler graduated in centimetres and millimetres, pen, HB pencil, eraser. Tracing paper may be used.

**Calculators are NOT allowed**

1. Sean pays £10 for 24 chocolate bars.  
He sells all 24 chocolate bars for 50p each.  
Work out Sean's percentage profit.

..... %  
(3)

2. Here is a 3-D shape.



- (a) Write down the mathematical name of this 3-D shape.

.....  
(1)

- (b) How many edges does this shape have?

.....  
(1)

3. Write these numbers in order of size. Start with the smallest number.

$$\frac{11}{50} \quad \sqrt{9} \quad 0.4^2 \quad \frac{27}{125}$$

.....  
(4)

4. (a) Simplify  $3 \times 10d$

.....  
(1)

(b) Simplify  $8e + e - 5e$

.....  
(1)

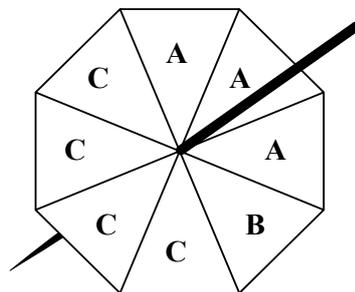
(c) Solve  $42g = 6$

$g =$  .....  
(2)

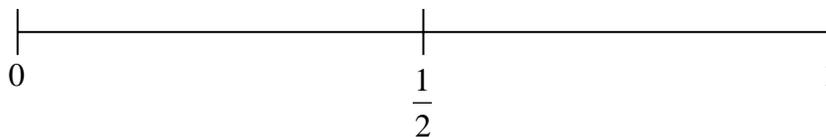
(d) Solve  $24 = 10 - h$

$h =$  .....  
(2)

5. Gita spins a fair 8-sided spinner.

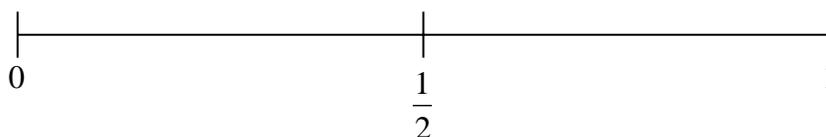


(a) On the probability scale, mark with a cross (X) the probability that the spinner will land on **C**.



(1)

(b) On the probability scale, mark with a cross (X) the probability that the spinner will land on **B**.



(1)

6. In a shop, a TV has a normal price of £500  
The shop has a sale.

On Monday, the normal price of the TV is reduced by  $\frac{1}{10}$  to give the sale price.

On Tuesday, the sale price of the TV is reduced by 20%

Chris wants to buy the TV.

He has £400 to spend on the TV.

Does Chris have enough money to buy the TV on Tuesday?

You must show how you get your answer.

.....  
(3)

7. Work out  $4\frac{1}{4} - 2\frac{7}{12}$ , giving your answer as simply as possible.

You must show all steps in your workings.

.....  
(2)

8. (a) Expand  $x(x - 4)$

.....  
(1)

(b) Write  $15y - 10$  in the form  $5(\dots\dots\dots)$

.....  
(2)

(c) Solve  $7(f - 5) = 28$

$f =$  .....  
(2)

9. The first five terms of an arithmetic sequence are

13      10      7      4      1

(a) Write the next two terms of the sequence.

.....  
(2)

(b) Write which term has a value of  $-20$ .

.....  
(2)

(c) Write down an expression, in terms of  $n$ , for the  $n$ th term of this sequence.

.....  
(2)

10. (a) Write 29 381 correct to the nearest 1000

..... (1)

(b) Write 0.00974 correct to one significant figure.

..... (1)

11.  $T = 3x + 4y$

(a) Work out the value of  $T$  when  $x = 5$  and  $y = -7$

..... (2)

(b) Work out the value of  $y$  when  $T = 38$  and  $x = 6$

..... (2)

12. In the diagram below,  $ABCE$  is a square and  $CDE$  is a right-angled triangle. The length of  $DE$  is 4 cm and the area of triangle  $CDE$  is  $14\text{cm}^2$ . Calculate the area of the whole shape  $ABCDE$ . You must show all your working.

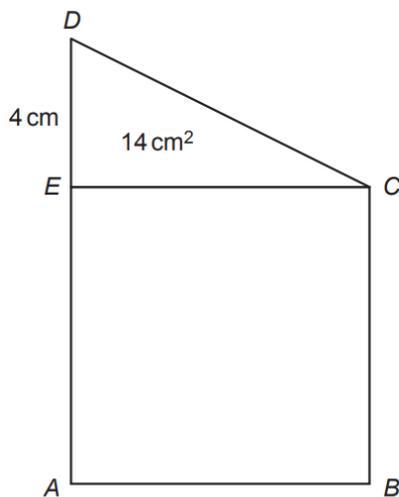
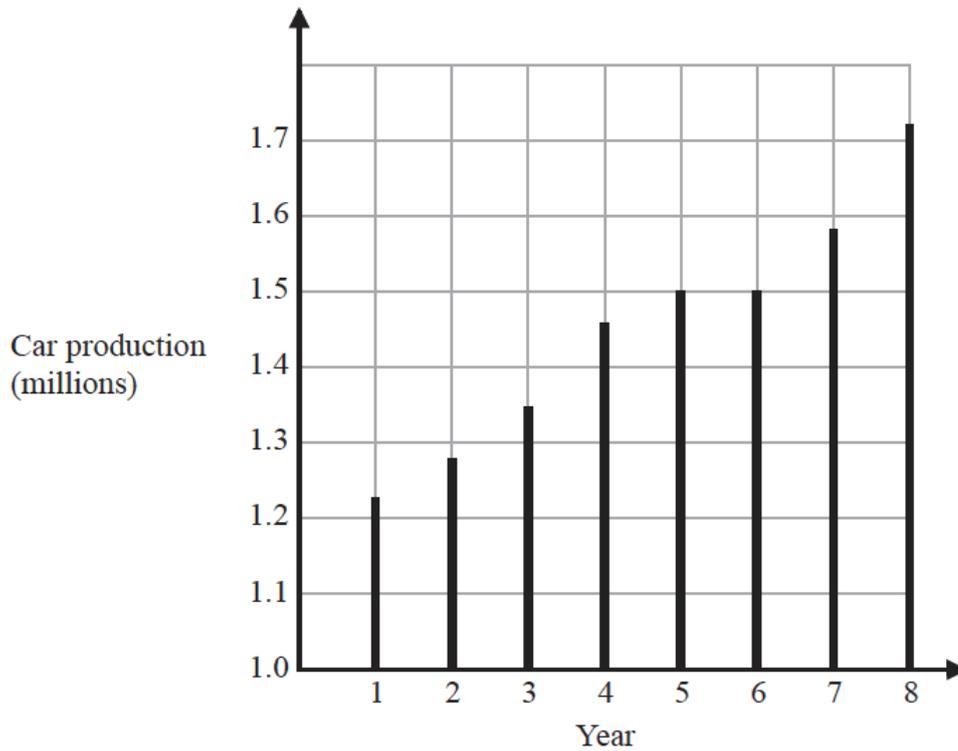


Diagram not drawn to scale

.....  $\text{cm}^2$  (4)

13. The graph shows some information about car production in the UK over eight years.



(a) For how many of these years was car production more than 1.4 million?

..... (1)

(b) In which two years was car production the same?

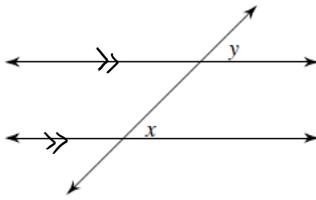
....., ..... (2)

14. 30% of £250 is shared in the ratio 2 : 1  
Calculate the value of the larger share.

£ ..... (4)

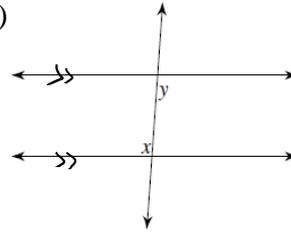
15. Identify each pair of angles as corresponding, alternate or interior angles.

(a)



\_\_\_\_\_

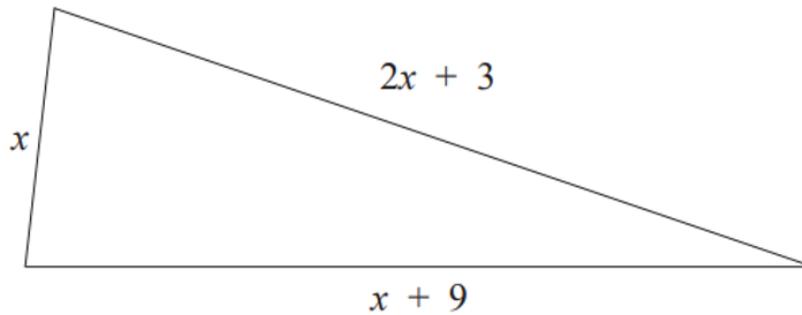
(b)



\_\_\_\_\_

(2)

16. (a) Write an expression, in terms of  $x$ , for the perimeter of the triangle shown.  
Give your answer in its simplest form.



..... (2)

(b) The perimeter of this triangle is 32.

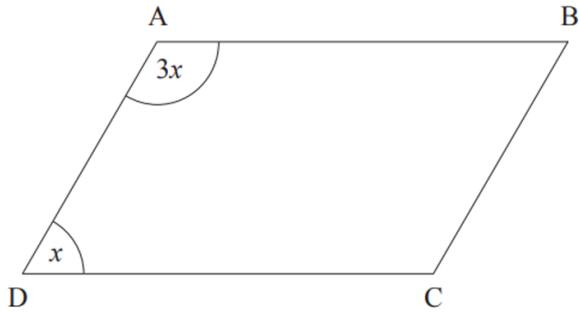
(i) Write down an equation in terms of  $x$ .

..... (1)

(ii) Solve your equation and find the length of the longest side of the triangle.

..... (3)

17. ABCD is a parallelogram.  
Work out the size of angle  $x$ .



$x = \dots\dots\dots^\circ$   
(2)

18. Calculate the following, showing all your working out:

(a)  $21 \div (-7) - 10$

$\dots\dots\dots$   
(2)

(b)  $(3^3 - 7) \times (9 - 4)$

$\dots\dots\dots$   
(3)

(c)  $(-11 + 4)^2 - (-3 + 5)^2$

$\dots\dots\dots$   
(3)

(d)  $8 \div \frac{2}{3} + 3\left(\frac{1}{3} + \frac{1}{5}\right)$

$\dots\dots\dots$   
(4)

19. Solve

(a)  $8t - 3 = 18 - t$

.....  
(3)

(b)  $4x^2 = 36$

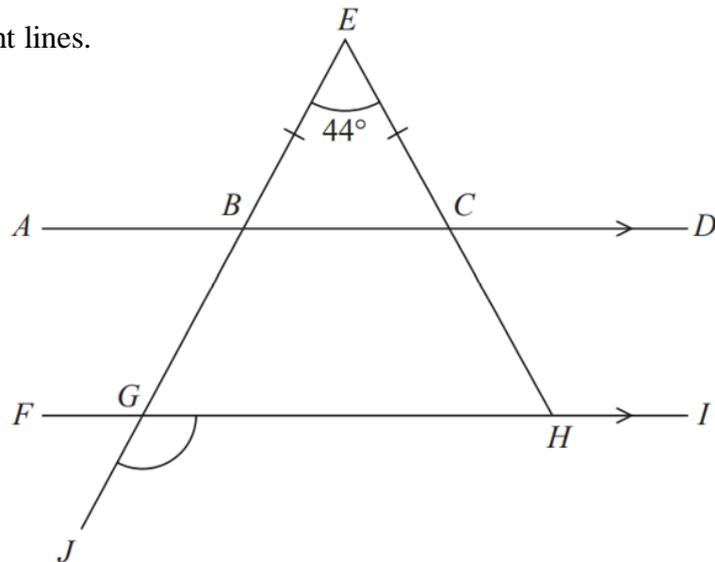
.....  
(3)

20.  $ABCD$  and  $FGHI$  are parallel straight lines.

$EBGJ$  and  $ECH$  are straight lines.

$BE = CE$

Angle  $BEC = 44^\circ$



(a) Work out the size of angle  $EBC$ .  
Give a reason for your answer.

.....  
(2)

Reason:

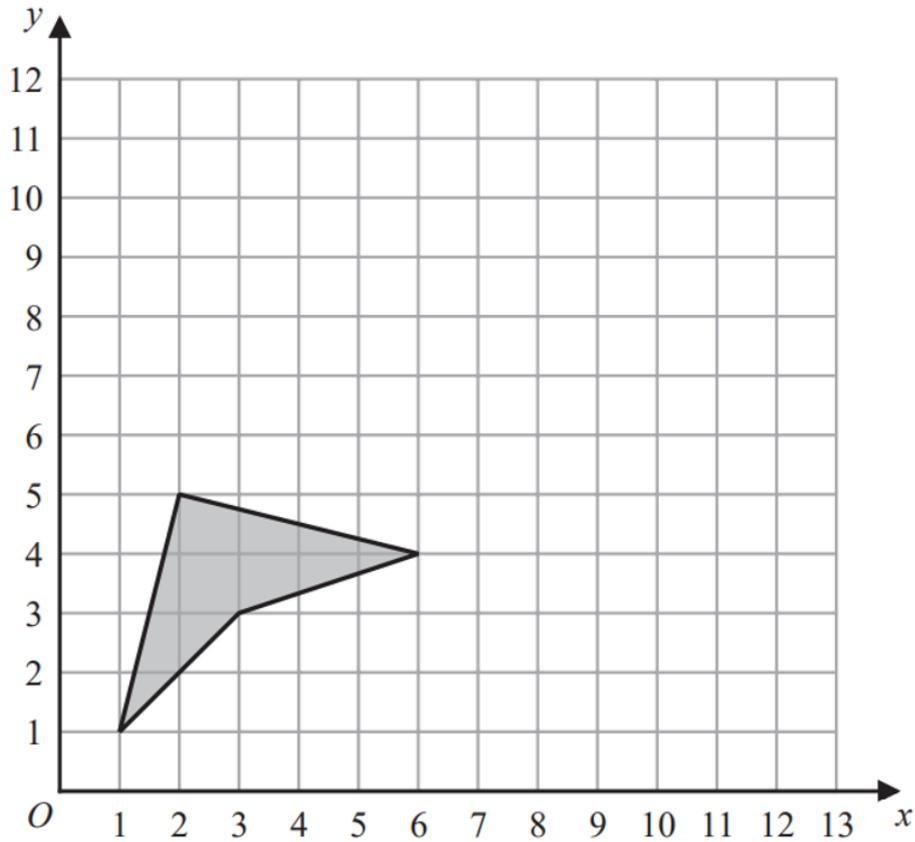
.....  
.....

(1)

(b) Work out the size of angle  $JGH$ .

.....  
(2)

21. The diagram shows a shaded shape on a grid.



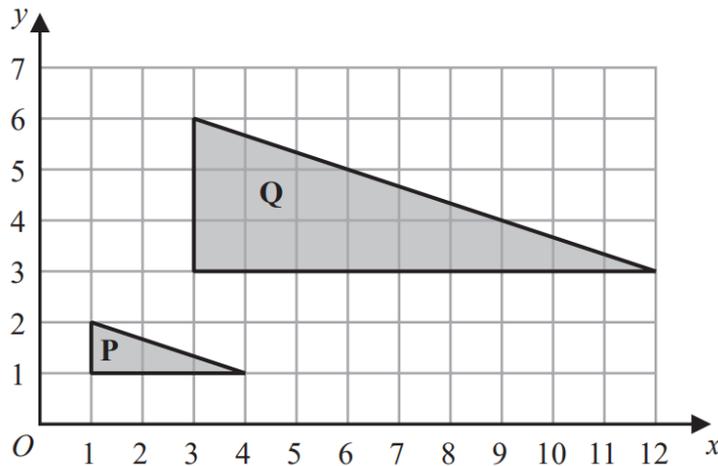
(a) Reflect the shaded shape in the line with equation  $x = 6$ . Label the new shape **A**.

(3)

(b) Translate the shaded shape one unit right and four units up. Label the new shape **B**.

(2)

22. The diagram shows triangle **P** and triangle **Q** on the grid.



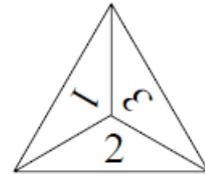
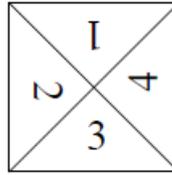
Describe the single transformation that maps triangle **P** onto triangle **Q**.

.....

.....

(3)

23. A game is played using a four sided spinner and a three sided spinner. The two spinners are spun together and their scores are multiplied.



(a) Complete the possible scores in the diagram.

(2)

	1	2	3	4
1				
2				
3				

(b) Calculate the probability of obtaining

(i) a prime number

..... (1)

(ii) an odd number

..... (1)

(iii) at least 6

..... (1)

24. (a) (i) Express 54 as a product of its prime factors, leaving your answer in index form.

..... (2)

(ii) Two numbers have a LCM of 54 and a HCF of 3.

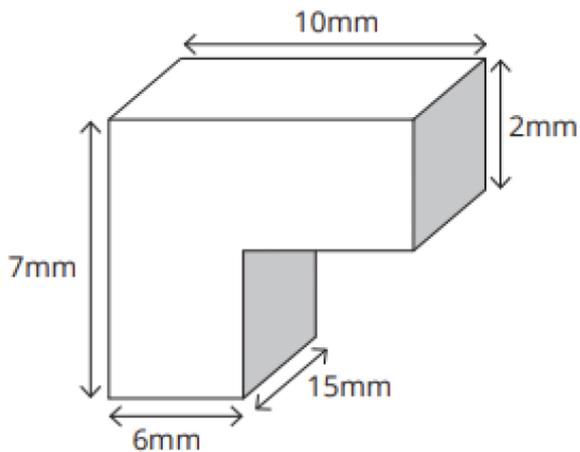
Given that the smallest number is not equal to 3, write down the two numbers.

..... (3)

- (b) Busses leave the bus station to go to the hospital every 16 minutes.  
 Busses leave the same station to go to the college every 20 minutes.  
 At 9 am a bus leaves the station to go to the hospital and at the same time another bus leaves the station to go to the college.  
 Work out the next time that a bus leaves the station to go to the hospital and at the same time another bus leaves the station to go to the college.

.....  
 (3)

25. (a) Calculate the volume of the prism.



..... mm<sup>3</sup>  
 (3)

(b) Give your answer to part (a) in cm<sup>3</sup>.

..... cm<sup>3</sup>  
 (1)

26. The shape below has three straight lines and a semicircle.

$AB = 9 \text{ cm}$ ,  $AD = 6 \text{ cm}$ ,  $DC = 9 \text{ cm}$ .

Use  $\pi \approx 3$

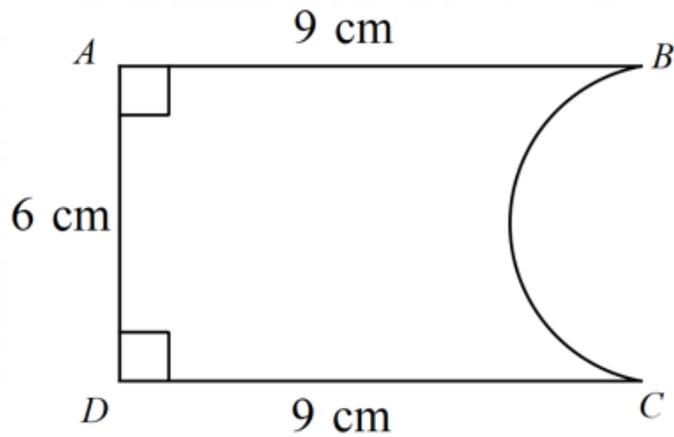


Diagram not drawn to scale

(a) Find the perimeter of this shape.

..... cm  
(3)

(b) Find the area of this shape.

.....  $\text{cm}^2$   
(4)

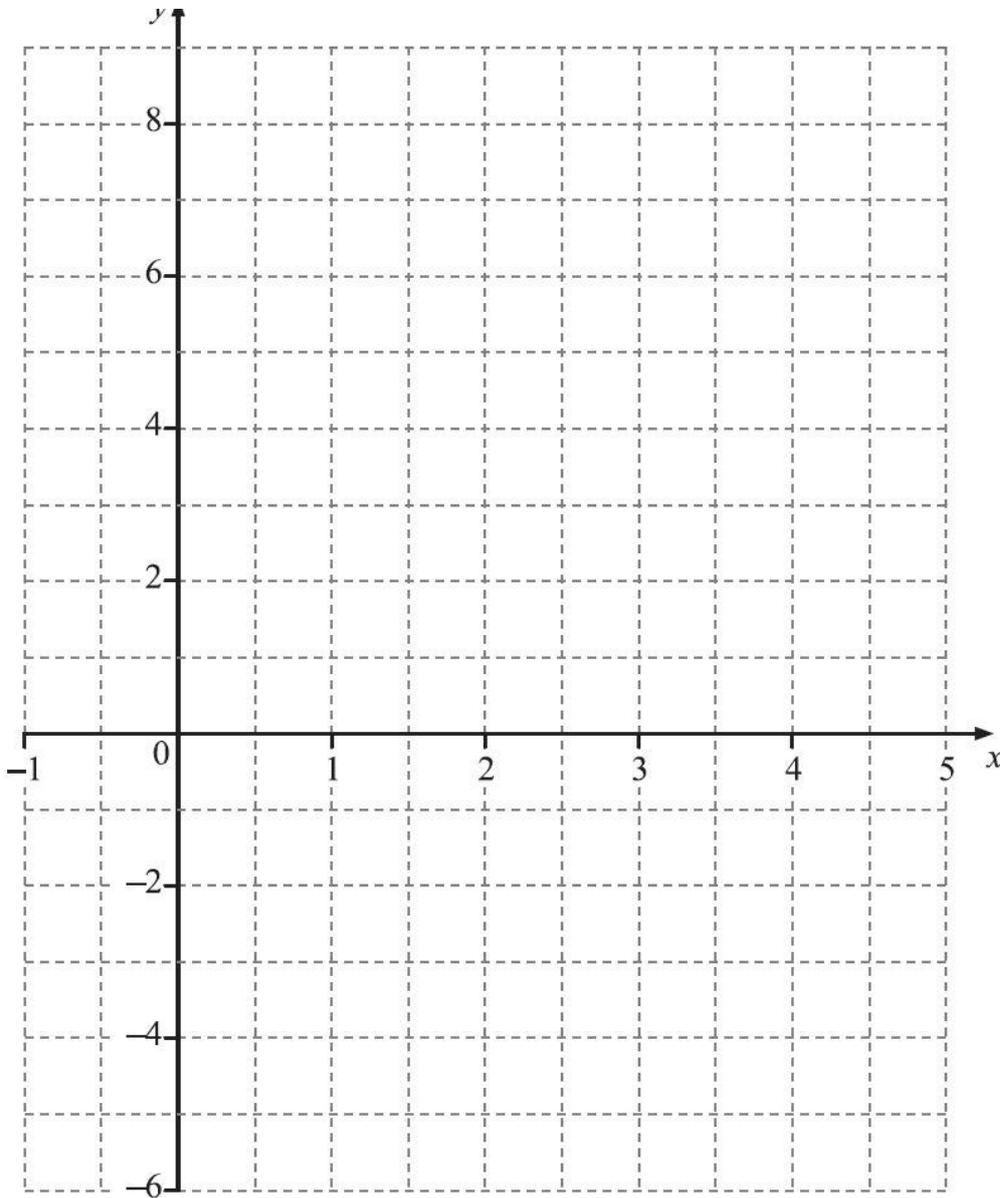
27. (a) Complete the table of values for  $y = 8 - 3x$

$x$	0	1	3
$y$			

(2)

(b) Draw the line  $y = 8 - 3x$

(1)



(c) The line  $y = 5$  crosses the line  $y = 8 - 3x$  at point **L**.  
Write down the coordinates of **L**.

**L** ( ..... , ..... )  
(2)

**TOTAL FOR PAPER IS 120 MARKS**

**END OF PAPER**