Surname

Centre Number

0

Other Names



GCSE

4370/06

# MATHEMATICS – LINEAR PAPER 2 HIGHER TIER

A.M. WEDNESDAY, 13 June 2012

2 hours

# ADDITIONAL MATERIALS

A calculator will be required for this paper.

# INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take  $\pi$  as 3.14 or use the  $\pi$  button on your calculator.

# **INFORMATION FOR CANDIDATES**

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 2(a).



For Examiner's use only				
Question	Maximum Mark	Mark Awarded		
1	7			
2	13			
3	5			
4	13			
5	9			
6	3			
7	5			
8	4			
9	3			
10	11			
11	5			
12	5			
13	4			
14	6			
15	7			
TOTAL	MARK			

### **Formula List**

а





a

B

### **The Quadratic Equation**

The solutions of  $ax^2 + bx + c = 0$ 

where  $a \neq 0$  are given by



A bag contains 10 beads, of which 2 are red, 3 are blue and 5 are yellow.

One bead is selected at random from the bag.

Find the probability that the bead is

white,

(i)

[1] (ii) either red or yellow. [1] *(b)* A fair dice is thrown. What is the probability that the top face shows a square number? [2] (c)There are marbles of 6 different colours in a bag. The table shows the probabilities of selecting the different coloured marbles from the bag. Colour Red Orange Yellow Green Blue Purple Probability 0.23 0.12 0.13 0.22 0.21Complete the entry for Green in the table. (i) [2] Which colour of marble is the mode? (ii) [1]



1.

(a)

You will be assessed on the quality of your written communication in this part of the

*question.* Valley Water Company measures the water used by a household in cubic metres. There is a quarterly standing charge of £7.45. The first 25 cubic metres of water used are charged at a rate of 93 pence per cubic metre. All further water used is charged at the rate of 132 pence per cubic metre.

Calculate the quarterly water bill for a household using 46 cubic metres of water.

[6]

(b) A different water company, Trevi Water, has a different scale of charges.

Trevi Water:

- Quarterly standing charge £4
- First 10 cubic metres per quarter at £1.50 per cubic metre
- All further water charged at £2 per cubic metre

Write down, in its simplest form, an expression for the quarterly bill in pounds for a Trevi Water customer who uses x cubic metres of water, where x > 10.

[4]



2.

(a)

(c) Mr and Mrs Alston recycle the water from their bath and washing machine to use in their garden. Their meter reading, in cubic metres, on 1<sup>st</sup> April was 1678 and on 30<sup>th</sup> June it was 1702. They recycled 8 cubic metres of the water used between 1<sup>st</sup> April and 30<sup>th</sup> June. Find the percentage of the water that they recycled in the quarter.
[3]
(a) Solve 5(2x - 7)= 75.

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[3]

[2]

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# (*b*) Simplify 7x - 3(4x - 1).

3.

.....



-40 70 50 70 32 Age, in years 26 46 80 66 64 Price, in £ 100 60 80 70 50 40 20 50 50 30 ┥ Draw a scatter diagram to display these ages and prices. (i) [2] Price, in £ 100 -80 ┥ ┥ ┥ 60 ┥ 40 --20 ┥ 0 0 20 40 60 80 100 Age, in years (ii) Write down the age and price of the oldest chair. Age ..... years -Price £ [2] \_ Does the scatter diagram indicate that there is a correlation between the age and (iii) price of the chairs? You must give a reason for your answer. --[1]





		Price, $\pounds x$	Number of tables	
		$50 \leqslant x < 100$	6	
		$100 \leqslant x < 150$	10	
		$150 \leqslant x < 200$	4	
	Calcula	ate an estimate for the mean pr	ice of a table.	
				[4]
( <i>c</i> )	A leath Each ye At the e	er sofa costs £2400. ear, the value of furniture depr end of two years, by how much	eciates by 18% of its value at th has the value of the leather sof	e start of the year. a depreciated?
••••••				
•••••				
•••••				
•••••				[4]

*(b)* The same antique shop has a number of tables for sale.



5. (a) Kerbstones are made in the shape of a cuboid.



8

The dimensions of the kerbstones are 50 cm by 20 cm by 10 cm. **All measurements are given correct to the nearest centimetre.** Calculate the greatest possible length of 200 of these kerbstones laid along a straight road. Give your answer in metres. Explain any assumption you have made in working out your answer.

[5]



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(b) Concrete blocks in the shape of cuboids are made using cement, sharp sand, gravel and water. A builder's yard offers customers use of their Concrete Quantity Calculator.

Customers enter the length, width and depth of the block of concrete they want to make. The calculator then works out the quantities of cement, sharp sand, gravel and water needed.

One customer enters her measurements, length 0.5 m, width 0.2 m and depth 0.3 m for the concrete she wants to make. This is what the Concrete Quantity Calculator shows:

	Concrete Quar	ntity Calculator	
Block dimensions	Length $0.5$ metres	Width $0.2$ metres	Depth 0.3 metres
	Cement	<b>10</b> kg	
	Sharp sand	<b>18</b> kg	
	Gravel	<b>36</b> kg	
	Water	<b>5</b> litres	

Complete the Concrete Quantity Calculator for another customer who wants to make a block of the same type of concrete, measuring 0.6 m by 0.4 m by 0.2 m.

Concrete Quantity Calculator			
Block dimensions	Length $0.6$ metres	Width $0.4$ metres	Depth $0.2$ metres
	Cement	<b>16</b> kg	
	Sharp sand	kg	
	Gravel	kg	
	Water	litres	
	Water	litres	

[4]









### On the graph paper provided, draw the region which satisfies **all** of the following inequalities. 9.





		3(g-2f) = ag + 5h	
••••			
•••			
•••			
(	(b)	Factorise $4x^2 - 169$ .	
•••			
/	(c)	Solve $3 - 2n > 4n - 9$	
(	()	501ve 5 2n 7 m 2.	
•••			
(	(d)	Solve $3x^2 + 4x - 18 = 0$ giving your answers correct to two decimal places	
(	u)	Solve $5x + 4x = 10 = 0$ , giving your answers contect to two decimal places.	
•••			



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Examiner
only

- **12.** Given that *y* is inversely proportional to  $x^2$ , and that y = 8 when x = 0.5,
  - (a) find an expression for y in terms of x,

[3]

# (b) use the expression you found in (a) to complete the following table.

X		0.2	0.5
У	800		8

[2]



13. A company manufactures two different sized boxes. Both boxes are cuboids and are similar in shape. The total surface area of the smaller box is 132 cm<sup>2</sup> and the length of its longest edge is 12 cm. The total surface area of the larger box is 297 cm<sup>2</sup>. Calculate the length of the longest edge of the larger box.





	Fva
The diagram below shows a sketch of a company logo.	(
<i>B</i>	
8.8 cm 84°	
4 7.2 cm	
47° C	
18·6 cm	
Diagram not arawn to scale	
Calculate the area of the triangle ACD.	
	·····
	·····
	·····
	·····



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- 19
- (c) Denia says that "the graph of  $\sin x$  is the same as the graph of  $\cos(x 90^\circ)$ ". Explain the transformation from  $y = \cos x$  to  $y = \cos(x - 90^\circ)$  and hence decide if Denia is correct.





Question number	Additional page, if required. Write the question numbers in the left-hand margin	Exami only
		1

