

SURNAME .....

FIRST NAME .....

JUNIOR SCHOOL .....

SENIOR SCHOOL .....



Independent Schools  
Examinations Board

## COMMON ENTRANCE EXAMINATION AT 13+

# MATHEMATICS

## LEVEL 2: NON-CALCULATOR PAPER

Monday 26 January 2015

Please read this information before the examination starts.

- This examination is 60 minutes long.
- **All** questions should be attempted.
- A row of dots ..... denotes a space for your answer.
- You must show all your working or you may receive no marks.
- Answers given as fractions should be reduced to their lowest terms.



1. (a) Ann has £19.25 and Beth has £9.89  
How much money do Ann and Beth have in total?

Answer: £ ..... (2)

- (b) Colin has £21.32 and then he buys a bag which costs £8.73  
How much money does Colin have left?

Answer: £ ..... (2)

- (c) A box of pens costs £3.25  
How much would it cost to buy 8 of these boxes of pens?

Answer: £ ..... (2)

- (d) 8 identical boxes of pencils cost £28 altogether.  
How much does 1 box of these pencils cost?

Answer: £ ..... (2)

2. Dan is 18 years old and Emma is 24 years old.

(i) Write down the ratio of Dan's age to Emma's age in its simplest form.

Answer: .....:..... (2)

Mother shares £350 between Dan and Emma in the ratio of their ages.

(ii) How much does Dan receive?

Answer: £ ..... (2)

3. Work out the value of

(i)  $-4 + 8 \times 5$

Answer: ..... (2)

(ii)  $5 \times \sqrt{9} + 7$

Answer: ..... (2)

4. (a) Work out 55% of £96

Answer: £ ..... (2)

(b) Jessica's first throw of a javelin is 33 metres.

Her second throw is 20% longer.

How long is Jessica's second throw?

Answer: ..... m (2)

(c) (i) Write  $\frac{9}{20}$  as a percentage.

Answer: ..... % (2)

(ii) Write the following numbers in order of size, starting with the smallest.

55%       $\frac{9}{20}$       0.505

Answer: ....., ....., ..... (2)

5. (i) Write the number 32 as a product of its prime factors.

Answer: ..... (2)

(ii) Use your answer to part (i) to write 320 as a product of its prime factors.

Answer: ..... (1)

6. You are told that  $654 \times 32.5 = 21\,255$   
Use this fact to work out

(i)  $654 \times 3.25$

Answer: ..... (1)

(ii)  $655 \times 32.5$

Answer: ..... (2)

(iii)  $21\,255 \div 3.25$

Answer: ..... (1)

7. (i) Write each of the numbers in the following calculation correct to 1 significant figure.

$$\frac{305 \times 6.123}{0.499}$$

Answer:  $\frac{\dots \times \dots}{\dots}$  (2)

- (ii) Use your answer to part (i) to estimate the value of:

$$\frac{305 \times 6.123}{0.499}$$

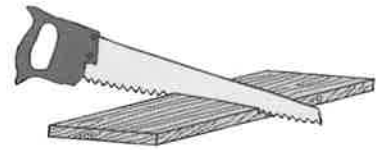
Answer: ..... (2)

8. Paul is building a bookcase.

All the shelves are  $\frac{3}{8}$  of a metre long.

Paul has a piece of wood which is  $\frac{17}{20}$  of a metre long.

He cuts 1 shelf from this piece of wood.



- (i) What fraction of a metre of wood is left over?

Answer: ..... m (2)

He then cuts another shelf from what is left over.

- (ii) What is the length, in centimetres, of the piece of wood that remains?

Answer: ..... cm (2)

Paul buys a piece of wood which is 3 metres long.

(iii) How many shelves can he cut from this piece?

Answer: ..... (2)

9. (i) At 9 am the temperature in Alaska is  $-12.7^{\circ}\text{C}$  and in Washington it is  $-2.9^{\circ}\text{C}$ .

(a) What is the difference between these two temperatures?

Answer: .....  $^{\circ}\text{C}$  (1)

By noon, the temperature in Washington has risen by  $4.5^{\circ}\text{C}$ .

(b) What is the temperature in Washington at noon?

Answer: .....  $^{\circ}\text{C}$  (1)

(ii) There are two different temperature scales: Celsius ( $^{\circ}\text{C}$ ) and Fahrenheit ( $^{\circ}\text{F}$ ).

To convert Celsius to Fahrenheit *multiply by  $\frac{9}{5}$  then add 32*

(a) If the temperature is  $35^{\circ}\text{C}$ , what is the temperature in Fahrenheit?

Answer: .....  $^{\circ}\text{F}$  (2)

(b) If the temperature is  $50^{\circ}\text{F}$ , what is the temperature in Celsius?

Answer: .....  $^{\circ}\text{C}$  (2)

10. If  $x = 2$   $y = -2$  and  $z = 6$  find the value of

(i)  $7x + 4y$

Answer: ..... (2)

(ii)  $xyz$

Answer: ..... (2)

(iii)  $z - y^3$

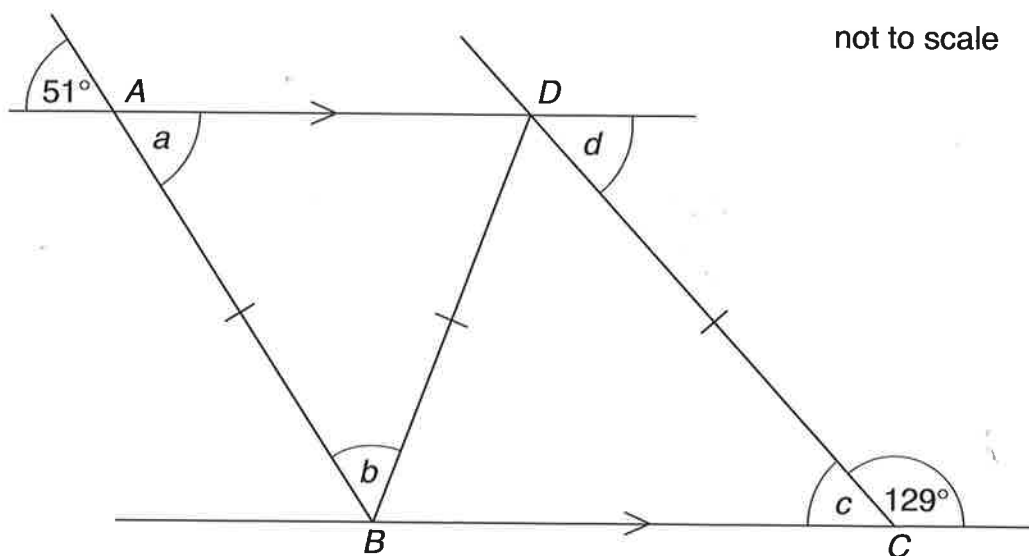
Answer: ..... (2)

(iv)  $2z^2$

Answer: ..... (2)



11. (i) Work out the size of each of the angles marked  $a$ ,  $b$ ,  $c$  and  $d$  in the diagram below.



- Answer:  $a = \dots\dots\dots$  (1)
- $b = \dots\dots\dots$  (2)
- $c = \dots\dots\dots$  (1)
- $d = \dots\dots\dots$  (1)

(ii) Is shape  $ABCD$  a parallelogram?  
Give a reason for your answer.

Answer: Yes/No    reason: .....

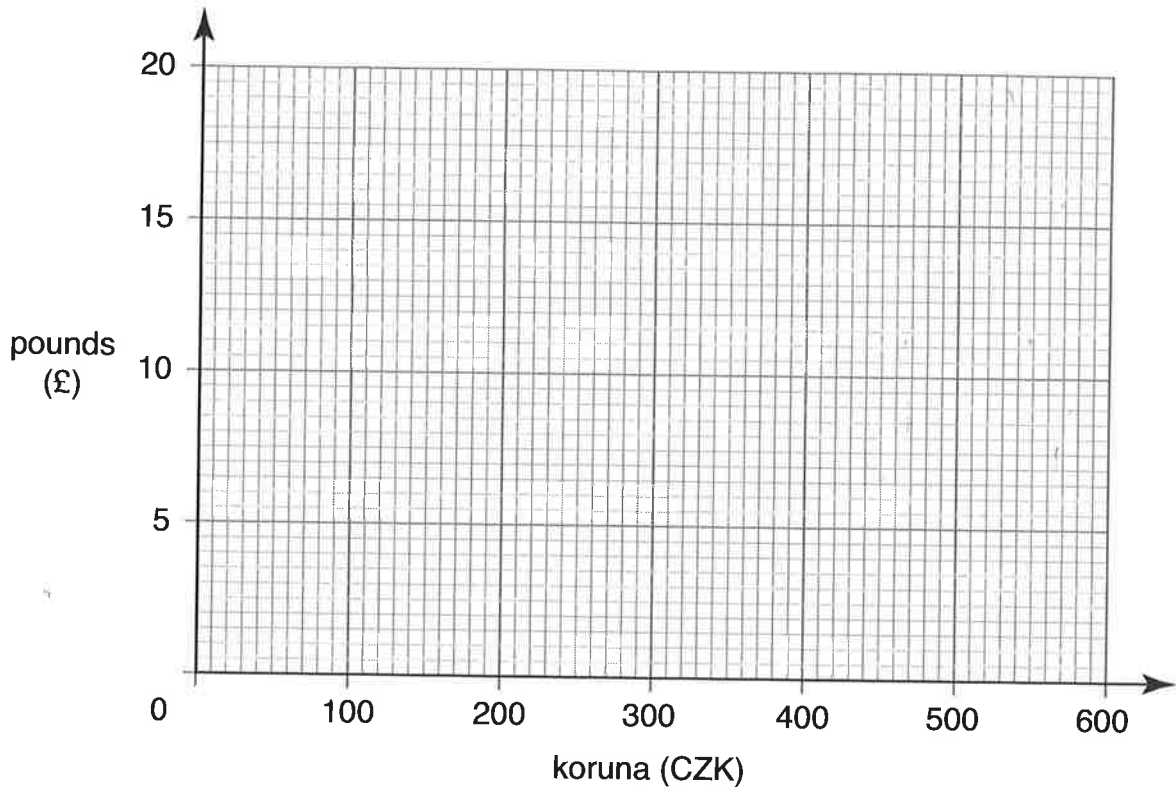
..... (2)

12. The currency in the Czech Republic is the koruna (CZK).  
 £1 is worth 28 CZK.

(i) What is £20 worth in CZK?

Answer: ..... CZK (1)

(ii) Draw a straight line on the grid below to convert CZK to £.



(2)

(iii) **Showing clearly where you take your readings**, use your graph to help you answer the following questions:

(a) How many CZK are worth £17.50?

Answer: ..... CZK (2)

(b) How many pounds are worth 420 CZK?

Answer: £ ..... (2)

(c) Tomas has 350 CZK.

James has £14

Who has more money and by how many pounds?

Answer: ..... by £ ..... (2)

13. (i) Using ruler and compasses, construct an equilateral triangle with sides of length 8 cm.  
(One side has been drawn for you already.)



(2)

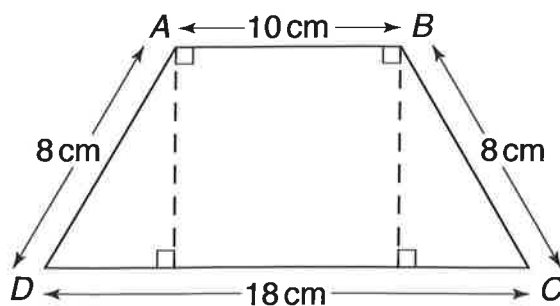
- (ii) Draw a line of symmetry of the triangle as accurately as you can. (1)

- (iii) By taking suitable measurements, calculate the area of the triangle.

Answer: ..... cm<sup>2</sup> (2)

Look at the shape *ABCD*.

- (iv) What is the area of *ABCD*?



not to scale

Answer: ..... cm<sup>2</sup> (2)

14. A straight line has the equation  $y = 3 - 2x$

(i) (a) Complete the table of values below for the line  $y = 3 - 2x$

$x$	-1	1	3
$y$	5		

(2)

(b) Draw and label the line  $y = 3 - 2x$  on the grid opposite.

(1)

Another straight line has the equation  $y = 3x - 2$

(ii) (a) Complete the table of values below for the line  $y = 3x - 2$

$x$	-1	1	3
$y$			7

(2)

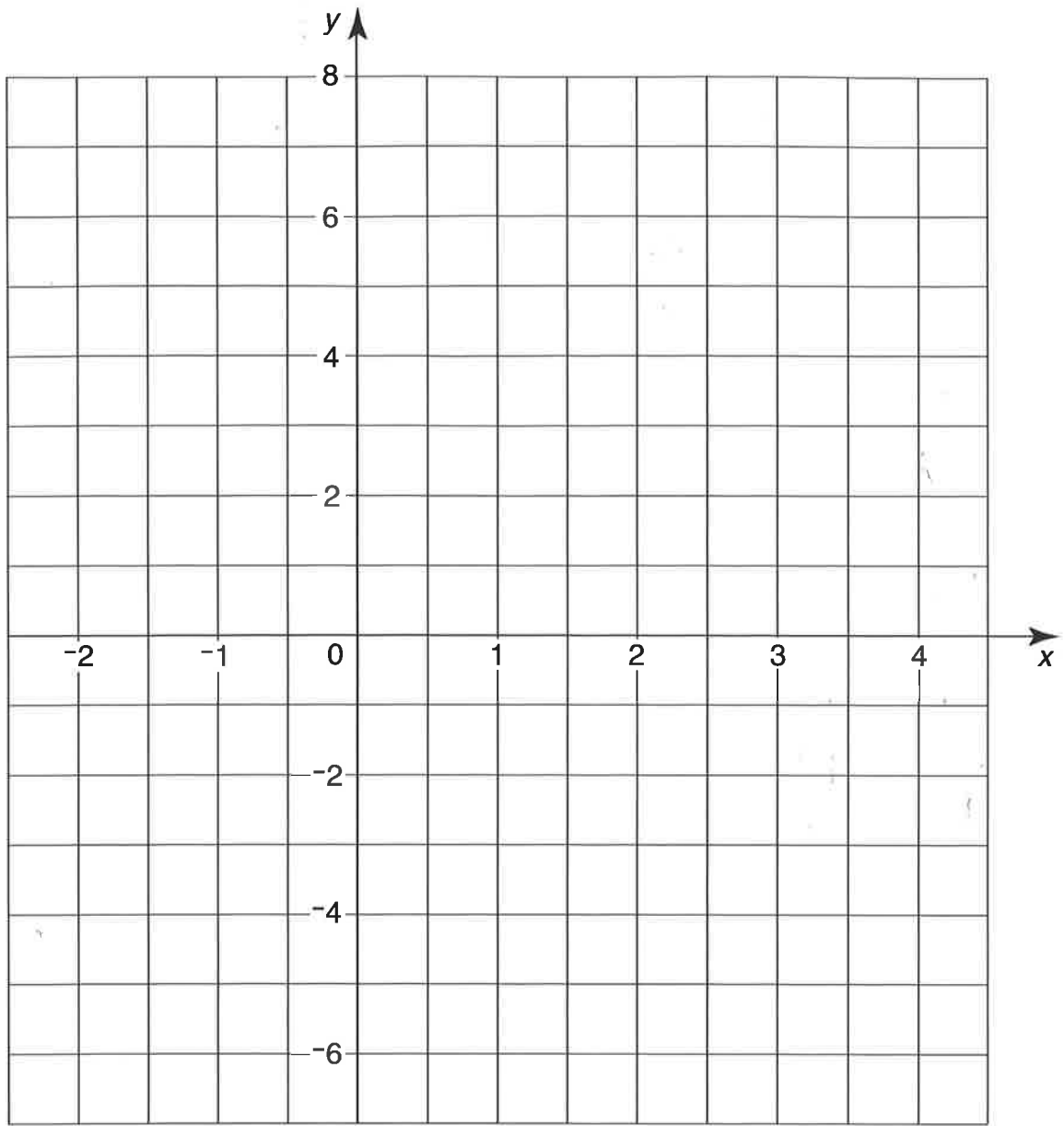
(b) Draw and label the line  $y = 3x - 2$  on the grid opposite.

(1)

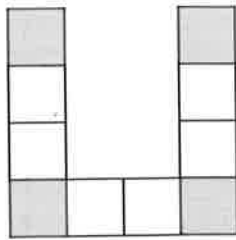
Look at the triangle formed by  $y = 3 - 2x$ ,  $y = 3x - 2$  and the  $y$  axis.

(iii) How many points with integer co-ordinates lie on the perimeter of the triangle?

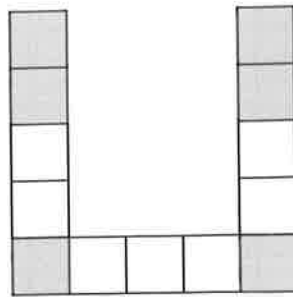
Answer: ..... (1)



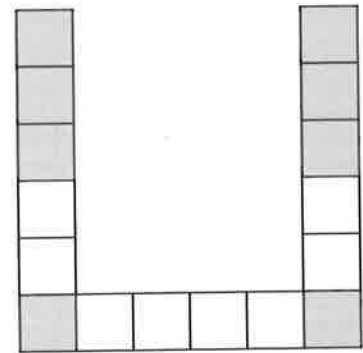
15. The patterns below are made up of grey and white squares.



pattern 1

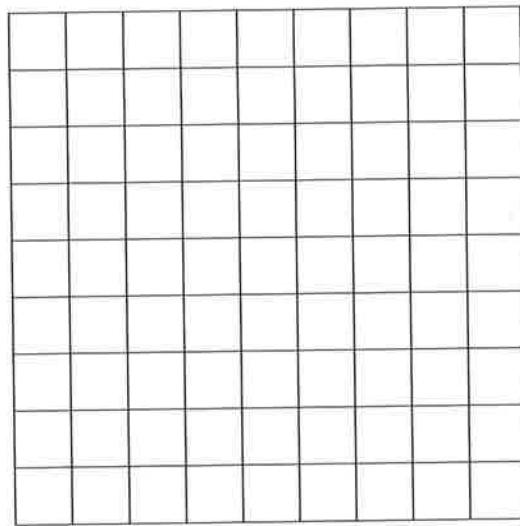


pattern 2



pattern 3

(i) (a) Draw pattern 4 in the grid below.



(1)

(b) Complete the table below to show the number of grey and white squares in each pattern.

pattern	1	2	3	4
grey squares	4			
white squares	6			

(2)

(c) How many grey squares are there in pattern 8?

Answer: ..... (1)

(d) In which pattern are there 16 white squares?

Answer: ..... (1)

(ii) The sequence of numbers below shows the total number of squares in each pattern.

10 13 16 19 ..... .....

(a) What is the 8th term in this sequence?

Answer: ..... (1)

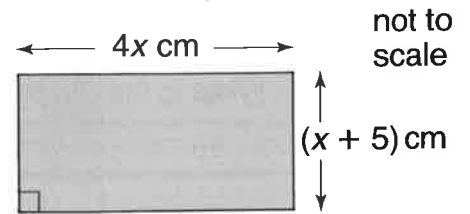
(b) Explain why the number 64 is in the sequence.

Answer: .....  
..... (1)

**TURN OVER FOR QUESTION 16**

16. (a) Chris is building a patio using the rectangular paving blocks shown below.

- (i) In terms of  $x$ , what is the perimeter of the block?  
Simplify your answer.



Answer: ..... cm (2)

- (ii) The perimeter of the block is 90 cm.

- (a) Using this information, write down an equation in terms of  $x$

Answer: ..... (1)

- (b) Solve your equation to find the value of  $x$

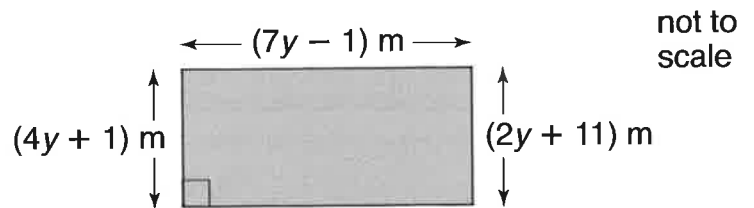
Answer:  $x =$  ..... (1)

- (iii) Calculate the area of the block.

Answer: .....  $\text{cm}^2$  (2)

- (b) Matt is building a rectangular swimming pool and has drawn the plan of it below.

Form an equation from this information and solve it to find the value of  $y$



Answer:  $y =$  ..... (2)

(Total marks: 100)