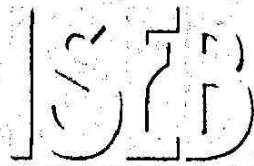


SURNAME FIRST NAME
JUNIOR SCHOOL SENIOR SCHOOL



Independent Schools
Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

MATHEMATICS

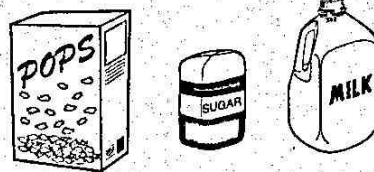
PAPER 2: NON-CALCULATOR PAPER

Monday 1 June 2009

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.
- A completely correct answer may receive no marks unless you show all your working.
- Answers given as fractions should be reduced to their lowest terms.

1. Sarah buys some items for breakfast.



(i) Fill in the gaps in the table to complete her shopping bill.

item	unit price	total cost
3 packets cereal	85 pence per packet	£
2 kilograms sugar pence per kilogram	£ 1.58
.... litres milk	60 pence per litre	£ 2.40
	total bill	£

(1)

(1)

(1)

(1)

(ii) Sarah pays the bill with a £20 note.

How much change should Sarah receive?

Answer: £

(1)

2. (a)

0.3

$\frac{7}{20}$

32%

Write the numbers above in order of size, starting with the smallest.

Answer:,, (2)

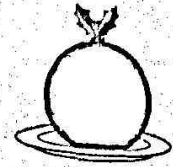
(b) Write 70p as a percentage of £4

Answer: % (2)

(c) Write $\frac{1}{8}$ of a metre in centimetres.

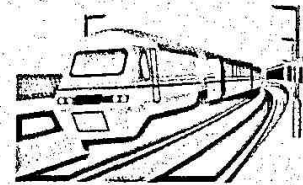
Answer: cm (2)

3. (a) A Christmas pudding has mass 1.5 kilograms.
It is cut into 12 equal slices.
What is the mass of a slice in grams?



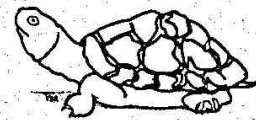
Answer: g (2)

- (b) A mail train leaves London at 21 45 on 30 September.
The journey to Edinburgh takes 5 hours 25 minutes.
At what time and on which date does the train reach
Edinburgh?



Answer: at on (3)

- (c) Tarquin, the tortoise, travels at an average speed of 30 centimetres per minute.
What is his speed in metres per hour?



Answer: m/h (2)

4. (a) Calculate

$$2 + 3 \times 4 - 5$$

Answer: (2)

(b) Write down the square root of $2^4 \times 5^2$

Answer: (2)

(c) (i) Express both 15 and 24 as the product of their prime factors.

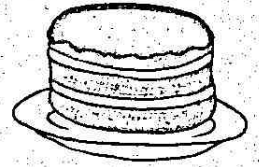
Answer: 15 =

24 = (2)

(ii) Write down the smallest number which can be divided exactly by 15 and 24

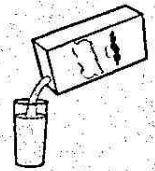
Answer: (1)

5. (a) The headmistress orders 4 cakes for a parents' tea party but only $2\frac{1}{4}$ are eaten.
How many cakes are left over?



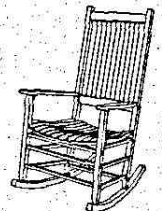
Answer: (1)

- (b) Pip drinks $\frac{2}{3}$ of a carton of orange juice every day.
How many cartons will he drink in 18 days?



Answer: (2)

- (c) Mr Chips uses $\frac{3}{5}$ of a tube of glue each time he makes a chair.
He uses up 15 of these tubes when he makes some chairs.
How many chairs does he make?



Answer: (2)

6. (a) The first term of a sequence is 2

The sequence follows the rule: 'multiply by 3 and then add 1'.

Write down the third and fourth terms of this sequence.

Answer: (2)

(b) Write down the sum of the first ten terms of the sequence beginning:

1 -2 3 -4 5

Answer: (2)

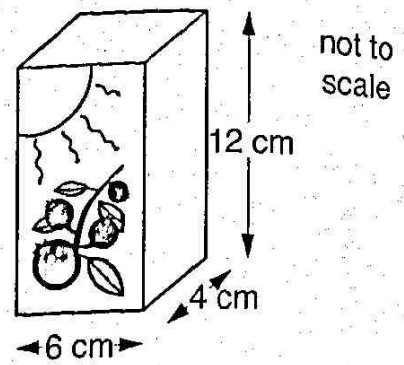
(c) Write down the n th term of the sequence beginning:

2 5 8 11 14

Answer: (2)

7. A carton of blackcurrant juice in the shape of a cuboid measures 6 cm by 4 cm by 12 cm.

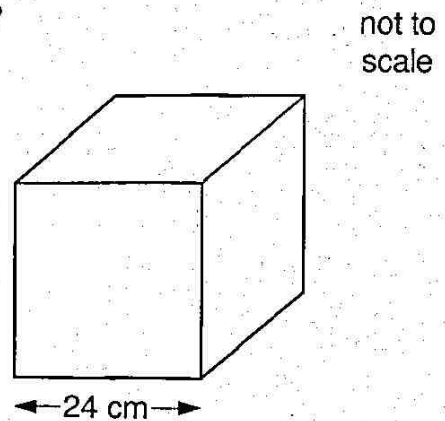
(i) Calculate the volume of the carton.



Answer: cm³ (2)

The cartons are packed tightly in the shape of a solid 24-centimetre cube which is covered with plastic film.

(ii) How many cartons will be used to form the cube?



Answer: (2)

(iii) Calculate the total surface area of the cube.

Answer: cm² (2)

8. When $x = 3$ $y = -2$ $z = -4$
find the value of

(i) $x - y$

Answer: (1)

(ii) xyz

Answer: (2)

(iii) $y^3 - y^2$

Answer: (2)

(iv) $\frac{xz^2}{y+z}$

Answer: (3)

9. (a) Solve the following equations:

(i) $2a - 3 = 4$

Answer: $a = \dots\dots\dots$ (1)

(ii) $5b + 7 = 2b - 8$

Answer: $b = \dots\dots\dots$ (2)

(iii) $\frac{2}{5}(2c+1) = 10$

Answer: $c = \dots\dots\dots$ (3)

(b) (i) Solve the following inequalities:

(a) $3d + 2 \geq 6 - d$

Answer: $\dots\dots\dots$ (2)

(b) $4(d - 2) < 28$

Answer: $\dots\dots\dots$ (2)

(ii) Write down the square numbers which satisfy both inequalities in part (b) (i).

Answer: $\dots\dots\dots$ (1)

10. The letters V, W, X, Y and Z are printed on separate discs and put into a red bag. The numbers 1, 2, 3 and 4 are printed on separate discs and put into a blue bag. A letter is drawn from the red bag and a number is drawn from the blue bag.

(i) Complete the table below to record all possible results.

		blue bag			
		1	2	3	4
red bag	V	V1			
	W			W3	
	X				
	Y				Y4
	Z		Z2		

(1)

(ii) What is the probability of the result being

(a) X4?

Answer: (1)

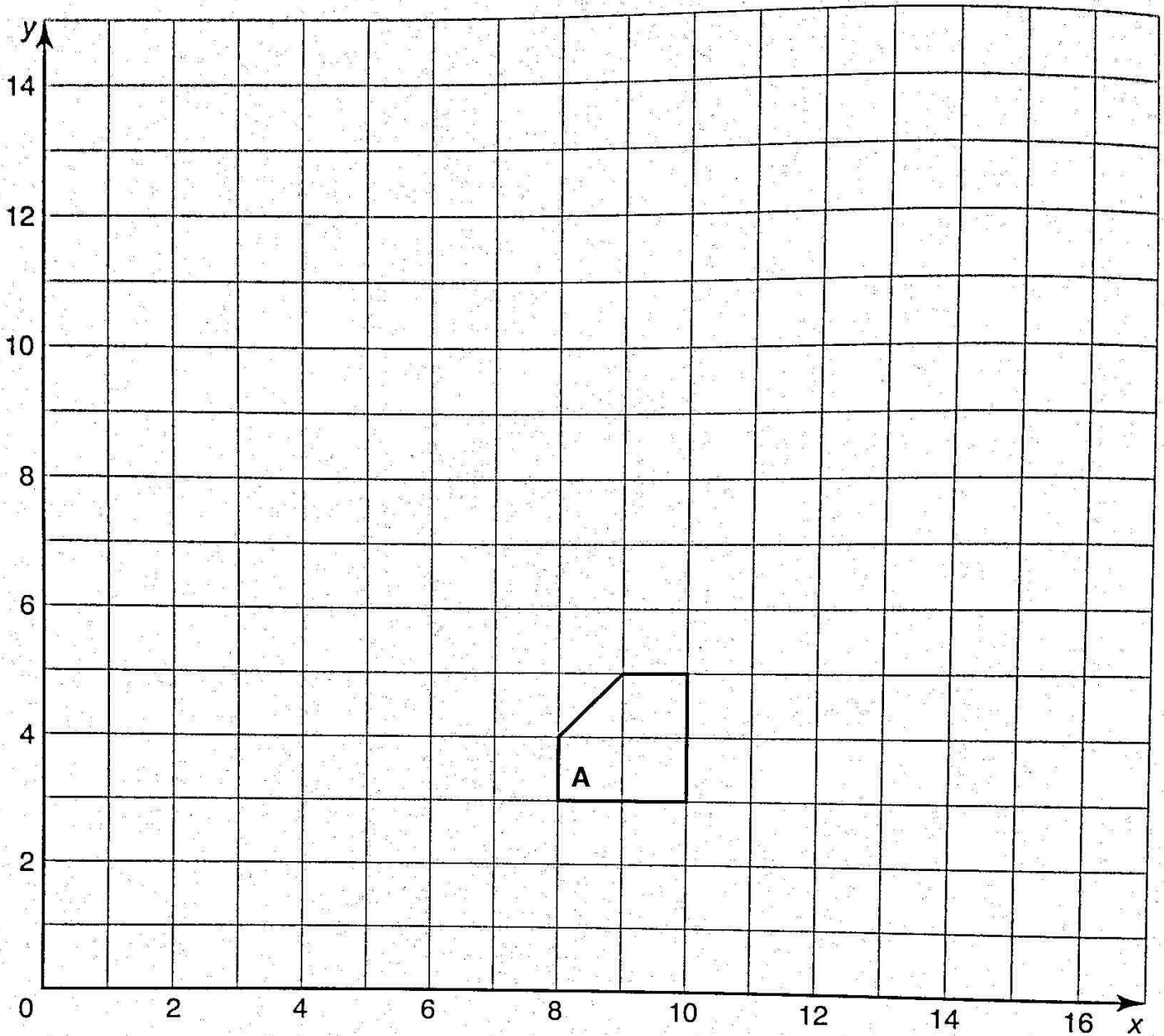
(b) a letter with rotational symmetry of order 2 and a number greater than 3?
(Do look carefully at how the letters are printed.)

Answer: (2)

(c) a letter with exactly 1 line of symmetry and a number which is a multiple of 2?

Answer: (2)

11.



- (i) On the grid above
- (a) draw and label the line $x = 6$ (1)
 - (b) reflect shape **A** in the line $x = 6$ and label the image **B** (2)
 - (c) rotate shape **A** through 180° about $(12, 4)$ and label the image **C** (2)
 - (d) with centre $(8, 1)$, enlarge shape **A** by scale factor 3 and label the image **D** (2)
- (ii) What is the order of rotational symmetry of shape **A**?

Answer: order

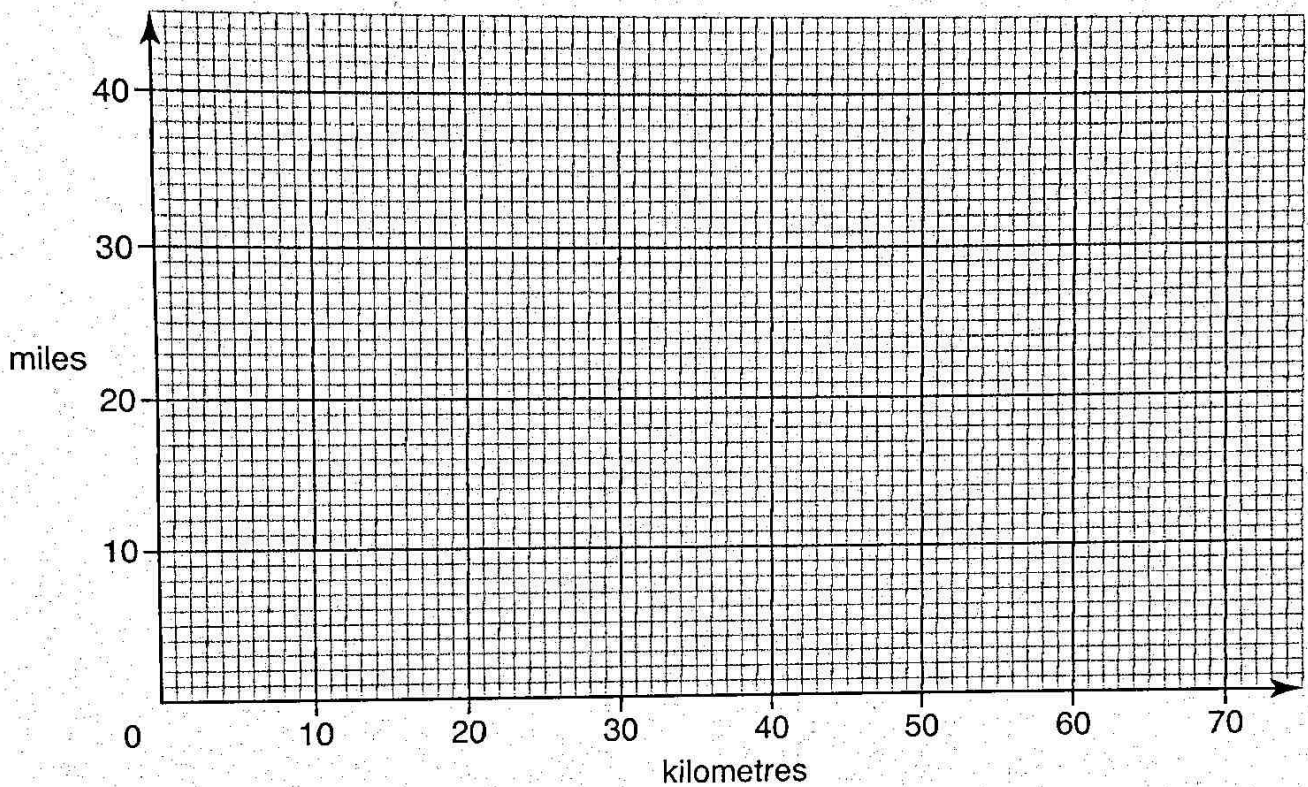
12.

8 kilometres are equivalent to 5 miles

(i) How many miles are equivalent to 64 kilometres?

Answer: miles (1)

(ii) Draw a graph to convert kilometres to miles for distances up to 64 kilometres.



(2)

(iii) Use the graph to answer the following questions, **showing clearly where you take your readings**.

(a) Robert completed a 36-kilometre walk for charity.

What is this distance in miles?

Answer: miles (1)

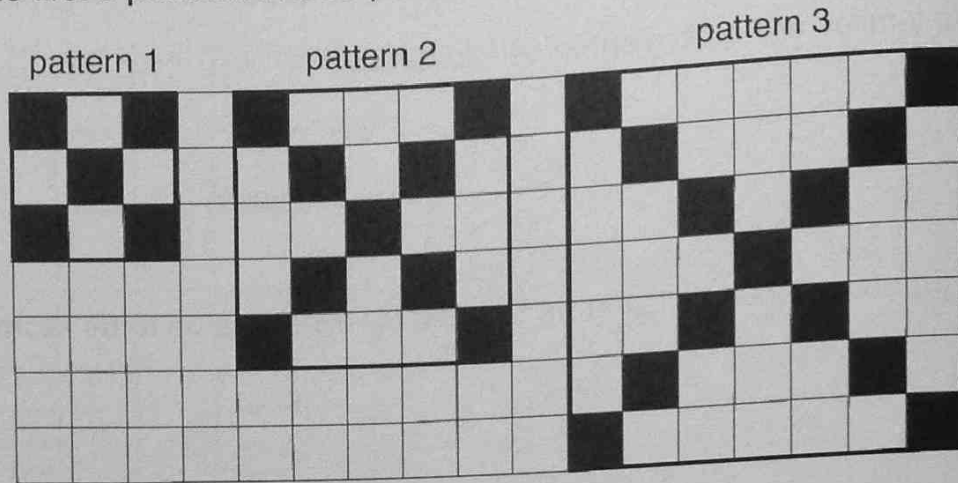
(b) The urban speed limit is 30 miles per hour.

Kimi drove at 37 miles per hour.

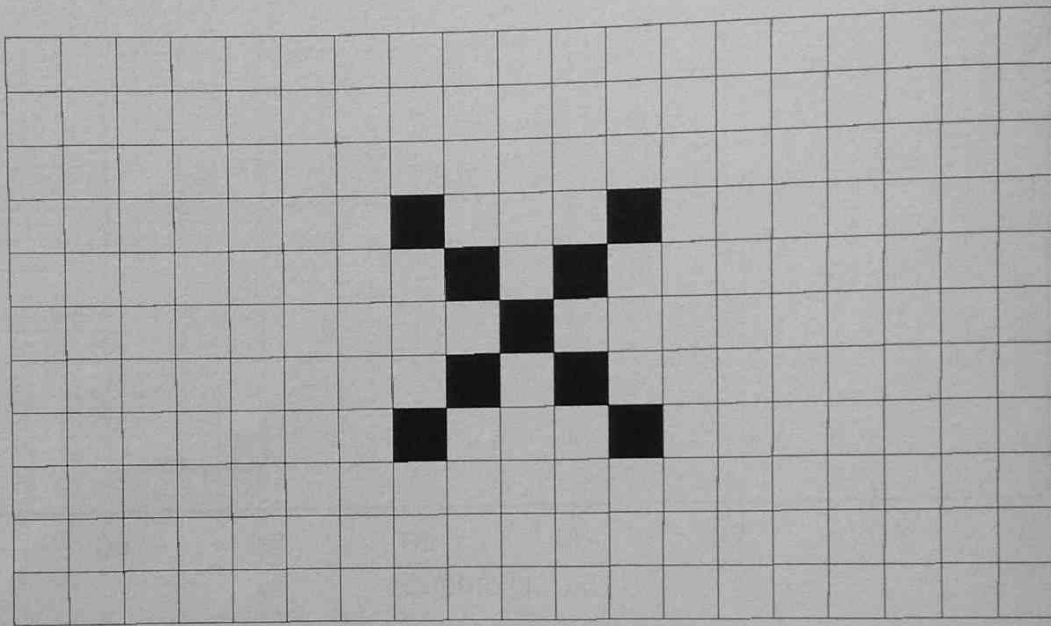
By how many kilometres per hour did Kimi break the speed limit?

Answer: km/h (2)

13. Here are the first 3 patterns in a sequence:



(i) Complete pattern 4 below.



(1)

(ii) Complete the table below.

pattern number	1	2	3	4
number of shaded squares	5	9		
number of unshaded squares	4		36	

(2)

(iii) How many shaded squares are there in pattern 10?

Answer: (2)

(iv) How many unshaded squares are there in pattern 10?

Answer: (2)

A pattern has 900 unshaded squares.

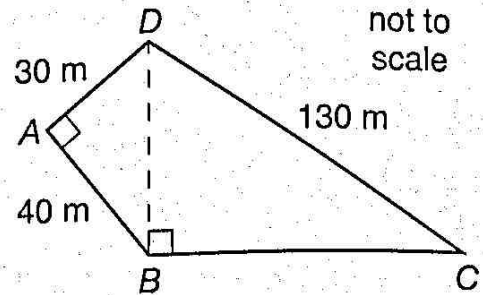
(v) What is the total number of squares in this pattern?

Answer: (3)

TURN OVER FOR QUESTION 14

14. Ann sketches the paddock where she keeps her ponies. (Distances are in metres.)

(i) Calculate the length of BD and of BC .



Answer: $BD = \dots\dots\dots$ m (2)

$BC = \dots\dots\dots$ m (3)

(ii) Using a scale of 1 centimetre : 10 metres, make an accurate scale drawing of the paddock.

(The vertex B has been drawn for you.)

B^+

(3)

(iii) Measure and write down the size of angle ABC .

Answer: $\widehat{ABC} = \dots\dots\dots^\circ$ (1)

(Total marks: 100)