ISEB

Independent Schools
Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

MATHEMATICS

LEVEL 1: NON-CALCULATOR PAPER

Monday 27 January 2014

Please read this information carefully before the examination starts.

- This examination is 60 minutes long.

- **All** questions should be attempted.

- A formula sheet is included to help you.

- 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) Work out the following:

   (i) 7 × 8

   Answer: .... (1)

   (ii) 72 ÷ 9

   Answer: .... (1)

(b)

| 21 | 25 | 29 | 33 | 36 | 39 |

From the list of numbers in the box above write down:

   (i) a prime number

   Answer: .... (1)

   (ii) a multiple of seven

   Answer: .... (1)

2. (i) Fill in the missing numbers for the metric conversions below.

   (a) 370 centimetres = ... metres (1)

   (b) 4.5 litres   = ... millilitres (1)

   (c) 12 tonnes   = ... kilograms (1)

(ii) (a) Circle the object below which could be 5 metres in length.

a man's leg   a room   a cruise ship   a mouse   (1)

(b) Circle the object below which could have a mass of 1 tonne.

a child   a television   a car   a jumbo jet   (1)

3. (a) Calculate

(i) 594 − 267

Answer: .... (2)

(ii) 594 + 267

Answer: .... (2)

(b) Work out the cost of 26 footballs at £7 each.

Answer: £ .... (2)

4. (i) Write 9% as a decimal.

    Answer: .... (1)

    (ii) (a) Write the missing number in the box.

    $$\frac{9}{25} = \frac{\boxed{}}{100}$$

    (1)

    (b) Write $\frac{9}{25}$ as a percentage.

    Answer: ....% (1)

    (iii) Write the following numbers in order, starting with the smallest first:

    0.33   9% $\frac{9}{25}$

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

5. Farmer Matthew's chickens lay a total of 100 eggs.

    (i) If he packs 6 eggs in each box, how many boxes can he completely fill?

    Answer: .... (2)

    (ii) How many eggs does he have left over?

    Answer: .... (1)

6. (a) Look at the road signs below.

A

B

C

D

Write down the letter of a road sign which has

(i) one line of symmetry

Answer: .... (1)

(ii) rotational symmetry of order 2

Answer: .... (1)

(iii) no rotational symmetry

Answer: .... (1)

(iv) four lines of symmetry

Answer: .... (1)

(b) Shade in two squares so that the final pattern has no lines of symmetry but rotational symmetry of order 2
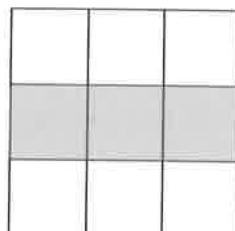
(1)

7. (a) Look at the parallelogram below.
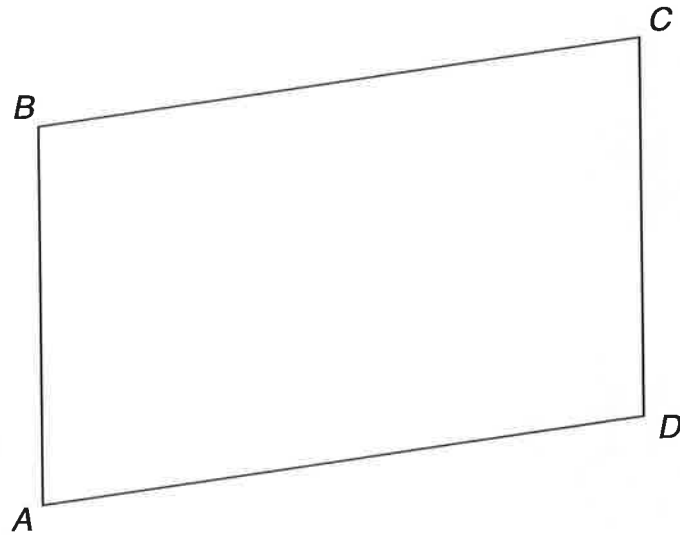
(i) Mark with an arrow (>) a pair of parallel lines. (1)
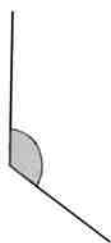
(ii) Measure the length of *BC*.

Answer: *BC* = ... cm (1)

(iii) Work out the perimeter of this parallelogram by measurement.

Answer: .... cm (3)

(b) Look at these three angles *a*, *b* and *c*.

angle *a*   angle *b*   angle *c*
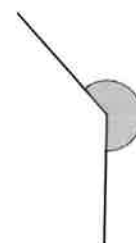
(i) Which of these angles measures about 130°?

Answer: .... (1)

(ii) Which angle is a reflex angle?

Answer: .... (1)

8. (a) Work out

(i) 7^2

Answer: .... (1)

(ii) $12 + 6 \div 3$

Answer: .... (2)

(b) Fill in the missing numbers:

(i) $45 \div$ .... $= 5$ (1)

(ii) $6 \times 100 = 900 -$ .... (1)

(iii) $56 \div 7 = 2 \times (3 +$ ....$)$ (2)

9. Kim and Tim record which dessert each pupil in their class likes best.

(i) Kim draws this pictogram:

Kim's pictogram

key: ☐ represents 4 pupils

jelly ☐ ☐

chocolate cake ☐ ☐ ☐

ice cream ☐ ☐ ☐
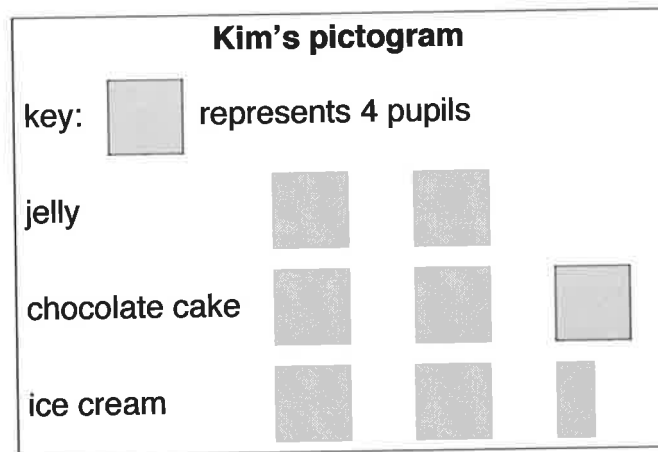
(a) Which is the least popular dessert?

Answer: .... (1)

(b) How many pupils like chocolate cake?

Answer: .... (1)

(c) How many pupils are in the class?

Answer: .... (2)

(ii) Tim records the same information on his barchart below.
Complete Tim's barchart.

Tim's barchart

key: ☐☐☐ the shaded area represents 6 people

jelly

chocolate cake

ice cream
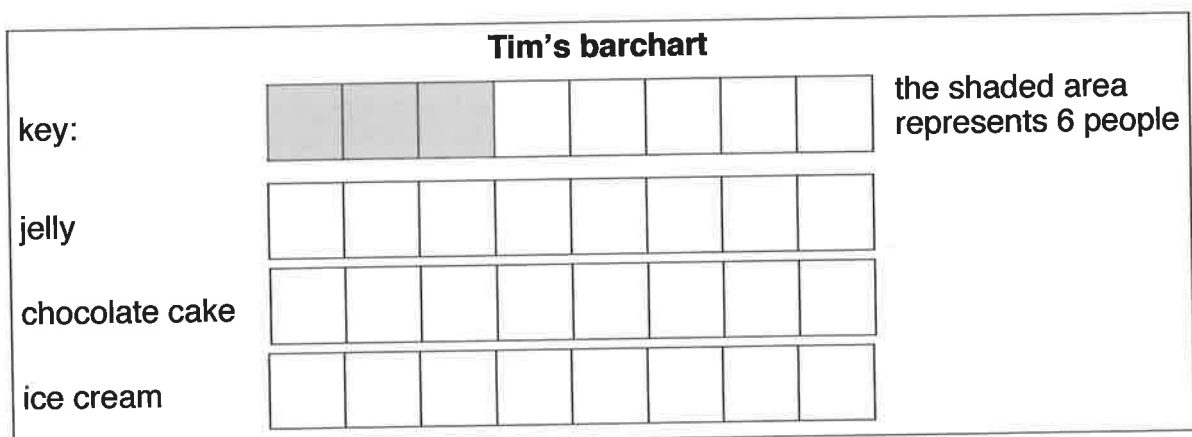
(2)

10. (a) Write 100 as a product of prime factors.

Answer: .... (3)

(b) You are given

number A = 2 × 2 × 2 × 3 × 3
number B = 3 × 3 × 5 × 5 × 5

(i) Which is the larger number, A or B?

Answer: .... (1)

(ii) Write down the largest number which will divide exactly into both A and B.

Answer: .... (1)

(iii) Which of A or B is an even number?

Answer: .... (1)

11. (a) A number pattern is given by

   37   32   27   22   ....

   (i) Write down the next term in this pattern.

   Answer: .... (1)

   (ii) What is the first negative number in this pattern?

   Answer: .... (2)

(b) Here is the start of another number pattern:

   8.6   9.2   9.8   ....

   (i) Write down the next two numbers in this pattern.

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

   (ii) Explain why 21.7 cannot be part of this number pattern.

   ....

   .... (1)

12. Given that $e = 4$ and $f = 2$ calculate

    (i) $3f$

                                      Answer: .... (1)

    (ii) $4e - 3f$

                                        Answer: .... (2)

    (iii) $(e + f)^2$

                                        Answer: .... (2)

    (iv) $\dfrac{ef}{e - f}$

                                        Answer: .... (2)

13. Solve the following equations:

    (i) $c - 2 = 7$

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

    (ii) $4w = 12$

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

    (iii) $3y + 4 = 22$

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

14. Triangle D is drawn on the centimetre-square grid below.
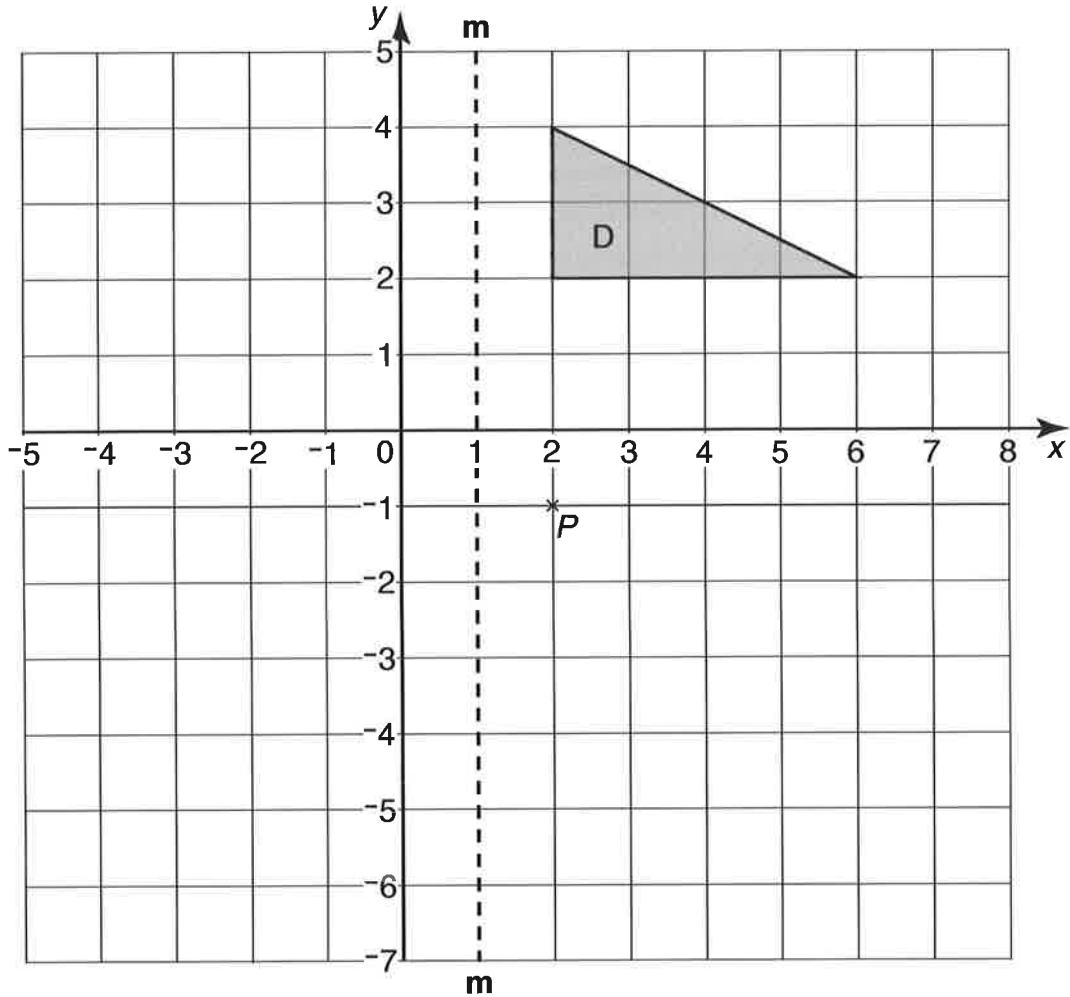
(i) (a) What is the equation for the dashed line labelled **m**?

Answer: .... (1)

(b) Reflect triangle D in the dashed line **m** and label the new triangle E. (2)

(ii) (a) Write down the coordinates of point *P*.

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

(b) Rotate triangle D through 180° about the point *P*. Label the new triangle F. (2)

(iii) Translate triangle D by *1 square right* and *2 squares down*. Label the new triangle G. (2)

(iv) Calculate the area of triangle D.

Answer: ....cm² (2)

15. (a)   (i) Shade in $\frac{1}{4}$ of this grid.
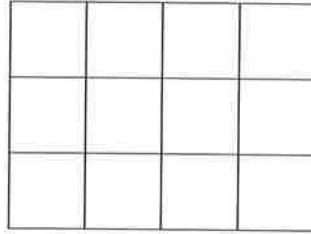
(1)

(ii) Shade in $\frac{2}{3}$ of this grid.
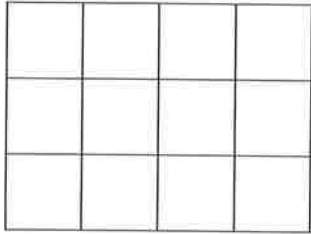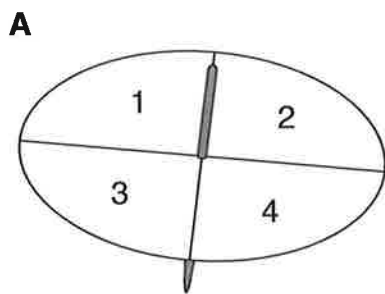

(1)

(iii) Work out $\frac{1}{4} + \frac{2}{3}$

Answer: .... (1)

(b) Jake spends $\frac{1}{4}$ of his pocket money on a magazine.
The magazine costs £3

How much pocket money did Jake start with?

Answer: £ .... (2)

16. (a) Katy is playing with two spinners, **A** and **B**, each divided into equal parts.

A

B
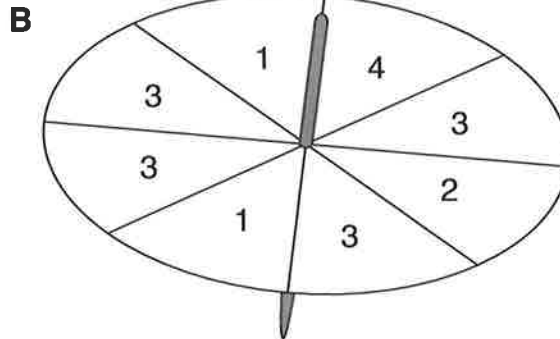
(i) Katy wins if she scores a 2. Which spinner gives her the better chance?
Circle the correct statement below.

spinner **A**   spinner **B**   either **A** or **B**   (1)

(ii) Write down a score which is equally likely on both spinners.
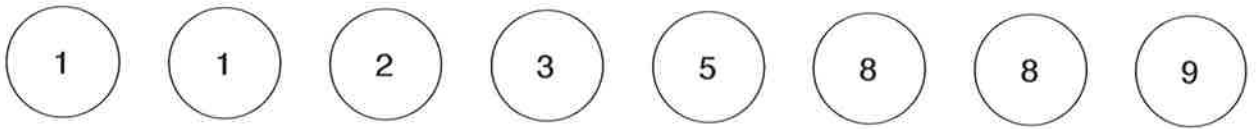
Answer: .... (1)

(iii) What is the most likely score on spinner **B**?

Answer: .... (1)

(iv) Katy spins spinner **B** eight times. On how many occasions does she expect to score a 4?

Answer: .... (1)

(b) Scott has a bag containing eight numbered counters, shown below.

$$\boxed{1} \quad \boxed{1} \quad \boxed{2} \quad \boxed{3} \quad \boxed{5} \quad \boxed{8} \quad \boxed{8} \quad \boxed{9}$$

He picks one counter at random from the bag.

(i) Work out the probability that the counter he picks shows an 8

Answer: .... (1)

(ii) Work out the probability that the counter he picks shows a square number.

Answer: .... (2)

(iii) Work out the probability that he picks a counter showing a number less than 5

Answer: .... (1)

TURN OVER FOR QUESTION 17

17. Here is a series of triangles drawn on a grid:

triangle 1   triangle 2   triangle 3   triangle 4
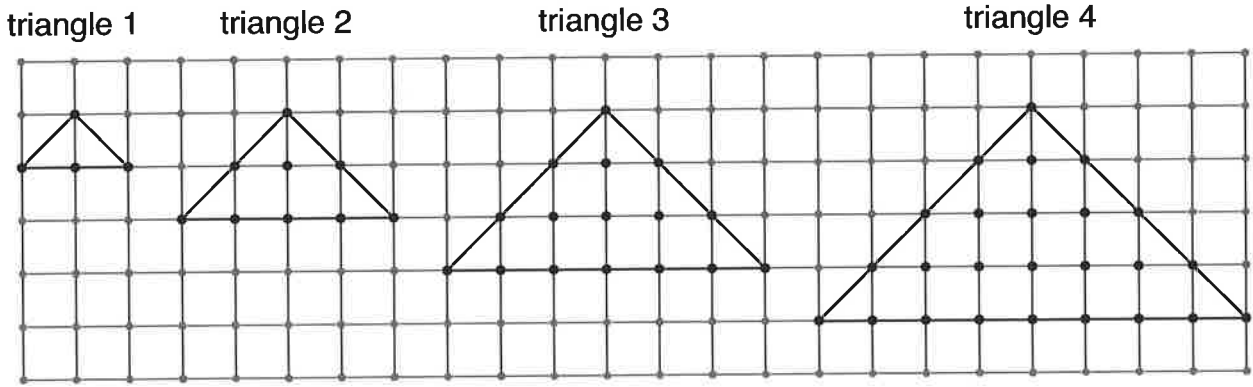
(i) Draw triangle 5 on the grid below.
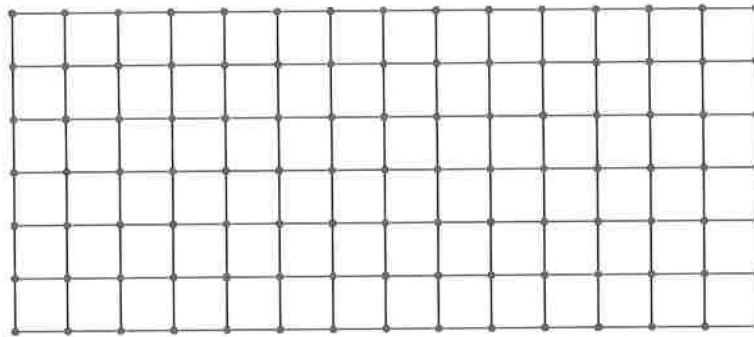
(1)

(ii) Use the diagrams to complete the table below.

triangle number	1	2	3	4	5
number of dots on the perimeter of the triangle	4	8	12		
number of dots completely inside the triangle	0	1			
total number of dots	4	9			

(3)

(iii) Work out

(a) the number of dots on the perimeter of triangle 7

Answer: .... (1)

(b) the total number of dots for triangle 7

Answer: .... (2)

(Total marks: 100)

Formula Sheet

area

rectangle
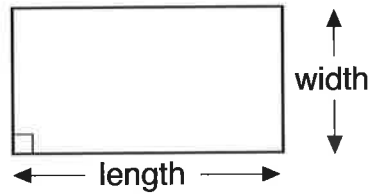
area rectangle = length × width

triangle
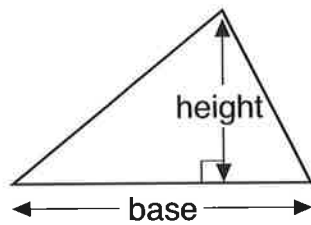
area triangle = $\frac{1}{2}$ × base × height

parallelogram
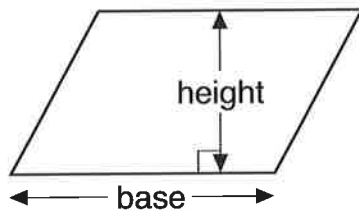
area parallelogram = base × height

volume

cuboid
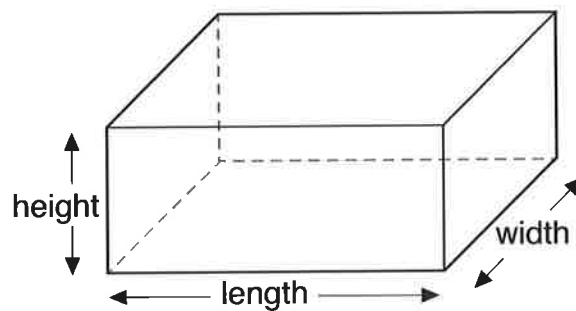
volume cuboid = length × width × height

S.A. 28314**237a**