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) $7 \times 8$

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

   (ii) $72 \div 9$

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

   (b) 

   

   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  

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

a child    a television    a car    a jumbo jet

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.

\[
\frac{9}{25} = \boxed{\frac{x}{100}}
\] (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: $BC = \ldots\ldots\ldots\ldots\ldots\ldots\ cm$ (1)

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

Answer: $\ldots\ldots\ldots\ldots\ldots\ldots\ cm$ (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) \(45 \div \ldots = 5\)  

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

(ii) \(6 \times 100 = 900 - \ldots\)

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

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

Answer: .................................. (2)
9. Kim and Tim record which dessert each pupil in their class likes best.
   (i) Kim draws this pictogram:

   ![Pictogram Image]

   (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.

   ![Barchart Image]
10. (a) Write 100 as a product of prime factors.

Answer: .............................................. (3)

(b) You are given

\[ \text{number } A = 2 \times 2 \times 2 \times 3 \times 3 \]
\[ \text{number } B = 3 \times 3 \times 5 \times 5 \times 5 \]

(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) \( \frac{ef}{e - f} \)

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.

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

(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.

(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

(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.

```
1 1 2 3 5 8 8 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:

(i) Draw triangle 5 on the grid below.

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

<table>
<thead>
<tr>
<th>triangle number</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>number of dots on the perimeter of the triangle</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>number of dots completely inside the triangle</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>total number of dots</td>
<td>4</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(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)
area

rectangle

\[ \text{area rectangle} = \text{length} \times \text{width} \]

triangle

\[ \text{area triangle} = \frac{1}{2} \times \text{base} \times \text{height} \]

parallelogram

\[ \text{area parallelogram} = \text{base} \times \text{height} \]

volume

cuboid

\[ \text{volume cuboid} = \text{length} \times \text{width} \times \text{height} \]