COMMON ENTRANCE EXAMINATION AT 13+

MATHEMATICS

LEVEL 1: 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 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) What is the value of the 8 in the number 2489?
   Circle the answer written in words in the box below.

   \[
   \begin{array}{cccc}
   \text{eight} & \text{eighty} & \text{eight hundred} & \text{eight thousand}
   \end{array}
   \]

   (1)

   (b) Write these numbers in order of size, starting with the smallest.
   \[
   907 \quad 970 \quad 790 \quad 709
   \]
   Answer: ....................., ....................., ....................., ..................... (1)

   (c) Write a number in each box to make the statements below correct.

   (i) \[34 + \owlin{\boxed{}} = 40\] (1)

   (ii) \[8 \times \owlin{\boxed{}} = 56\] (1)

   (iii) \[\owlin{\boxed{}} - 8 = 4\] (1)

   (iv) \[\owlin{\boxed{}} \div 8 = 4\] (1)

   (d) Work out
   \[
   \begin{align*}
   (i) & \quad 327 \div 10 \quad \text{Answer: .....................} & (1) \\
   (ii) & \quad 76 \times 10 \quad \text{Answer: .....................} & (1) \\
   (iii) & \quad 1.4 \times 100 \quad \text{Answer: .....................} & (1) \\
   (iv) & \quad 9382 \div 100 \quad \text{Answer: .....................} & (1)
   \end{align*}
   \]
2. You are told that \[ 654 \times 325 = 212550 \]

Use this fact to work out

(i) \[ 6540 \times 325 \]

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

(ii) \[ 654 \times 32.5 \]

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

(iii) \[ 212550 \div 325 \]

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

3. (i) Write \( \frac{1}{2} \) as a decimal.

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

(ii) Write \( \frac{3}{4} \) as a percentage.

Answer: ......................... \% (1)
4. (a) Calculate \(2800 - 473\)

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

(b) Calculate \(38 \times 6\)

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

(c) (i) Calculate \(602 \div 7\)

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

(ii) Use your answer to part (c)(i) to work out the value of \(602 \div 14\)

Answer: ........................................ (1)
5. (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
   He buys a bag which costs £8.73
   How much money does he 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) 3 identical skateboards cost £142.20 altogether.
   How much does 1 skateboard cost?

   Answer: £ ........................................... (2)
6. Dan is 9 years old and Emma is 12 years old.
   (i) Write the ratio of Dan’s age to Emma’s age in its simplest form.

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

   Dan and Emma share some money in the ratio of their ages.
   (ii) If Dan has £15, how much does Emma have?

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

7. Work out the value of
   (i) 4 + 8 × 5

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

   (ii) 2 × 3² + 7

   Answer: ................................. (2)
8. (i) What is 10% of 30 metres?

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

(ii) Jessica throws a javelin 30 metres. Her second throw is 20% longer. How long is Jessica’s second throw?

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

9. (i) Write 32 as the product of its prime factors.

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

(ii) Write 320 as the product of its prime factors.

Answer: ................................................... (1)
10. (i) Write each number in the following calculation correct to the nearest whole number:

\[
\frac{2.98 \times 40.4}{1.85}
\]

Answer: \[
\frac{\text{...}}{\text{...}} \times \frac{\text{...}}{\text{...}} \quad (2)
\]

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

\[
\frac{2.98 \times 40.4}{1.85}
\]

Answer: \[
\text{...} \quad (2)
\]

11. (i) What fraction of this shape is shaded?

Give your answer in its lowest terms.

Answer: \[
\text{...} \quad (2)
\]

(ii) There are 28 cherries in a bowl.
Paul takes \(\frac{5}{7}\) of them.
How many cherries does Paul take?

Answer: \[
\text{...} \quad (2)
\]

(iii) Calculate \(\frac{5}{8} + \frac{1}{8}\)
Give your answer in its lowest terms.

Answer: \[
\text{...} \quad (2)
\]
12. (a) At 9 am, the temperature is $-3^\circ C$.
By noon, the temperature has risen by $5^\circ C$.
What is the temperature at noon?

Answer: ........................................ $^\circ C$ (1)

(b) There are two different temperature scales: Celsius ($^\circ C$) and Fahrenheit ($^\circ F$).
Fred uses the following method to convert Celsius to Fahrenheit:

multiply by 2 then add 30

Use Fred’s method to convert

(i) $35^\circ$ Celsius into Fahrenheit

Answer: ........................................ $^\circ F$ (2)

(ii) $70^\circ$ Fahrenheit into Celsius

Answer: ........................................ $^\circ C$ (2)
13. Given that $x = 2$ and $y = 3$ find the value of

(i) $5x + y$

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

(ii) $xy$

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

(iii) $y^2 - x$

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

(iv) $\frac{7x - 2y}{2}$

Answer: .................................. (2)
14. Calculate the size of each of the angles marked $a$, $b$, $c$, $d$ and $e$

(i)

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

$b = \ldots \ldots \ldots \ldots \ldots (2)$

(ii)

Answer: $c = \ldots \ldots \ldots \ldots \ldots (2)$

$d = \ldots \ldots \ldots \ldots \ldots (2)$

(iii)

Answer: $e = \ldots \ldots \ldots \ldots \ldots (2)$
15. The currency in the Czech Republic is the koruna (CZK). The graph below can be used to convert between pounds and CZK.

(i) **Showing clearly where you take your readings on the graph**, convert

(a) £10 to CZK

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

(b) 360 CZK to pounds

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

(ii) Tomas has 36000 CZK.

Use your answer to part (i)(b) to find how much this is in pounds.

Answer: £ .......................... (1)
16. (i) Construct an equilateral triangle with sides 8 centimetres long.
   *(One side has been drawn for you already.)*

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

(iii) Measure the perpendicular height of the triangle. 
     Give your answer correct to the nearest millimetre.

   Answer: .......................... cm  

(iv) Calculate the area of the triangle.

   Answer: .......................... cm$^2$
17. Look at the grid below.

(i) On the grid, plot and label the points \( A(2, 4), B(5, 1) \) and \( C(7, 3) \).

(ii) Plot a fourth point \( D \) so that \( ABCD \) is a rectangle.

18. Chris writes down a number.
He multiplies it by 9 and then takes away 5
The result is 22
Find the number which Chris wrote down.

Answer: ...........................................
19. The patterns below are made up of grey and white squares.

![Patterns 1, 2, and 3](image)

(i) Draw pattern 4 in the grid below.

![Grid](image)

(ii) Complete the table below to show the number of grey and white squares in the patterns above.

<table>
<thead>
<tr>
<th>pattern</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>grey squares</td>
<td>4</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>white squares</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

(iv) How many white squares are there in pattern 30?

Answer: ................. (1)
20. (a) Circle the correct answer to each part of this question.

(i) Which expression means ‘start with \( e \), halve it and then add one’?\
\[
2e + 1 \quad \frac{e + 1}{2} \quad \frac{1}{2} + 1e \quad \frac{e}{2} + 1
\]  
(1)

(ii) Which expression means ‘start with \( w \), add five and then double’?\
\[
5w + 2 \quad 2w + 5 \quad 2(w + 5) \quad w^2 + 5
\]  
(1)

(b) The lengths of this triangle are shown in centimetres.

\[
\begin{tikzpicture}
\draw (0,0) -- (2,0) -- (1,1) -- cycle;
\draw (1,0) node[below] {2\(x\)};
\draw (1,1) node[above] {not to scale};
\draw (0.5,0) node[below] {2\(x\)};
\draw (0,0) node[below] {2\(x - 1\)};
\draw (1,0.5) node {$x$};
\end{tikzpicture}
\]

(i) Write an expression, in terms of \( x \), for the perimeter of the triangle.

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

In fact, the perimeter is 54 cm.

(ii) Form an equation and solve it to find the value of \( x \)

Answer: \( x = \) ..................................  (2)

(Total marks: 100)
area

rectangle

area rectangle = length \times width

triangle

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

parallelogram

area parallelogram = base \times height

volume

cuboid

volume cuboid = length \times width \times height