ST EDWARD’S
OXFORD

13+ ENTRANCE EXAMINATION
2013

MATHEMATICS

1 hour

Name: ____________________________

There are 60 marks available.

Calculators are not allowed.

Show all your working on the paper – answers without working may not get full marks.
1. Work out the following.

1.2 × 6

.............................. 1 mark

1.2 ÷ 6

.............................. 1 mark

2. Work out 374 × 23

.............................. 2 marks

3. (a) I pay £16.20 to travel to work each week. I work for 45 weeks each year.

How much do I pay to travel to work each year? Show your working.

£

2 marks

(b) I could buy one season ticket that would let me travel for all 45 weeks. It would cost £630. How much is that per week?

£

1 mark
4. The number 6 is halfway between 4.5 and 7.5

The number 6 is halfway between 2.8 and .......................

1 mark

The number 6 is halfway between −12 and .......................

1 mark

5. Write each expression in its simplest form.

\[ 7 + 2t + 3t \]

...............................

1 mark

\[ b + 7 + 2b + 10 \]

...............................

1 mark

6. Fill in the missing numbers.

\[ \frac{1}{2} \text{ of } 20 = \frac{1}{4} \text{ of } \ldots \ldots \ldots \ldots \]

1 mark

\[ \frac{3}{4} \text{ of } 100 = \frac{1}{2} \text{ of } \ldots \ldots \ldots \ldots \]

1 mark

\[ \frac{1}{3} \text{ of } 60 = \frac{2}{3} \text{ of } \ldots \ldots \ldots \ldots \]

1 mark
7. Solve these equations.

\[ 2k + 3 = 11 \]

\[ k = \ldots \ldots \ldots \ldots \ \text{1 mark} \]

\[ 6 + 2x = x - 6 \]

\[ x = \ldots \ldots \ldots \ \text{2 marks} \]

\[ 2(2n + 5) = 12 \]

\[ n = \ldots \ldots \ldots \ \text{2 marks} \]

\[ \frac{3(2y + 4)}{14} = 1 \]

\[ y = \ldots \ldots \ldots \ \text{2 marks} \]
8. (a) In a magazine there are three adverts on the same page.

Advert 1 uses \( \frac{1}{4} \) of the page

Advert 2 uses \( \frac{1}{8} \) of the page

Advert 3 uses \( \frac{1}{16} \) of the page

**In total,** what fraction of the page do the three adverts use? Show your working.

2 marks

(b) Cost of advert: £10 for each \( \frac{1}{32} \) of a page

An advert uses \( \frac{3}{16} \) of a page. How much does the advert cost?

£  

1 mark
9. Here is a rectangle.

\[
\begin{array}{c}
\text{2 cm} \\
\hline
\text{8 cm}
\end{array}
\]

(a) A square has the same area as this rectangle. What is the side length of this square?

\[
\text{............................ cm}
\]

1 mark

(b) A different square has the same perimeter as this rectangle. What is the side length of this square?

\[
\text{............................ cm}
\]

1 mark

10. This shape has been made from two congruent isosceles triangles.

What is the size of angle \( p \)?

\[
p = \text{............................}^\circ
\]

2 marks
11. The area of a face of this cube is $9x^2$

Write an expression for the total surface area of the cube. Write your answer as simply as possible.


2 mark

12. Work out the number that is halfway between $27 \times 38$ and $33 \times 38$. Show your working.


2 marks
13. The diagram shows the distance between my home, H, and two towns, A and B. It also shows information about journey times.

(a) What is the average speed of the journey from my home to town A?

.................................................. 1 mark

(b) What is the average speed of the journey from my home to town B?

.................................................. 1 mark

(c) I drive from town A to my home and then to town B. The journey time is 30 minutes. What is my average speed? Show your working.

.............................................................................................................................................................................. 2 marks
14. (a) $m$ is an odd number. Which of the numbers below must be even, and which must be odd? Write ‘odd’ or ‘even’ under each one.

<table>
<thead>
<tr>
<th>$2m$</th>
<th>$m^2$</th>
<th>$3m - 1$</th>
<th>$(m - 1)(m + 1)$</th>
</tr>
</thead>
</table>

2 marks

(b) $m$ is an odd number. Is the number $\frac{m + 1}{2}$ odd, or even, or is it not possible to tell?

Tick (✓) the correct box.

| odd | even | not possible to tell |

Explain your answer.

1 mark

15. The diagram shows a rhombus. The midpoints of two of its sides are joined with a straight line.

What is the size of angle $p$?

\[p = \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\]

2 marks
16. To make 1 litre of fruit juice cocktail takes

\[ \frac{1}{2} \text{ litre of orange juice} \quad \frac{1}{3} \text{ litre of apple juice} \quad \frac{1}{6} \text{ litre of grape juice} \]

How much fruit juice cocktail would be made if you used 0.75 litres of orange juice?

17. (a) Circle the best estimate of the answer to \( 72.34 \div 8.91 \)

<table>
<thead>
<tr>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
</table>

1 mark

(b) Circle the best estimate of the answer to \( 32.7 \times 0.48 \)

<table>
<thead>
<tr>
<th>1.2</th>
<th>1.6</th>
<th>12</th>
<th>16</th>
<th>120</th>
<th>160</th>
</tr>
</thead>
</table>

1 mark

(c) \textbf{Estimate} the answer to \( \frac{8.62 + 22.1}{5.23} \) Give your answer to \textbf{1 significant figure}.

\[ \text{.................................} \]

1 mark

(d) \textbf{Estimate} the answer to \( \frac{28.6 	imes 24.4}{5.67 	imes 4.02} \)

\[ \text{.................................} \]

1 mark
18. (a) Draw lines to match each $n$th term rule to its number sequence.

<table>
<thead>
<tr>
<th>$n$th term</th>
<th>Number sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>$4n$</td>
<td>4, 7, 12, 19, …</td>
</tr>
<tr>
<td>$(n + 1)^2$</td>
<td>4, 8, 12, 16, …</td>
</tr>
<tr>
<td>$n^2 + 3$</td>
<td>4, 9, 16, 25, …</td>
</tr>
<tr>
<td>$n(n + 3)$</td>
<td>4, 10, 18, 28, …</td>
</tr>
</tbody>
</table>

2 marks

(b) Write the first four terms of the number sequence using the $n$th term rule below.

\[ n^3 + 3 \]

\[ \_\_\_, \_\_\_, \_\_\_, \_\_\_ \]

2 marks
19. Look at these number cards.

\[
\begin{array}{cccccc}
0.2 & 2 & 10 & 0.1 & 0.05 & 1
\end{array}
\]

(a) Choose two of the cards to give the **lowest possible answer**.

\[
\begin{array}{cc}
\square & \times \square = \\
\end{array}
\]

2 marks

(b) Choose two of the cards to give the answer 100

\[
\begin{array}{cc}
\square & \div \square = 100
\end{array}
\]

1 mark

20. Work out

\[
\frac{1 \times 2 \times 3 \times 4 \times 5}{1 \times 2 \times 3} = \]

1 mark

\[
\frac{(1 \times 2 \times 3 \times 4 \times 5)^2}{(1 \times 2 \times 3)^2} = \]

1 mark

21. What is \(\frac{1}{2} \) of \(10^3\):

\[
\]

1 mark
22. a) Find the values of $a$ and $b$ when $p = 10$.

\[ a = \frac{3p^3}{2} \quad b = \frac{2p^2(p-3)}{7p} \]

\[ a = \ldots \ldots . \quad \text{1 mark} \]

\[ b = \ldots \ldots . \quad \text{1 mark} \]

b) Simplify this expression as fully as possible:

\[ \frac{3c d^2}{5cd} \]

\[ \ldots \ldots \ldots \ldots \ldots \ldots . \quad \text{1 mark} \]

END OF TEST