Lower School Entrance Exam 2015

MATHEMATICS

13+

1 Hour

Name: ..........................................................

School: ..........................................................

Date: ..........................................................

Instructions to Candidates:

- Calculators may **not** be used
- Attempt all questions
- Show ALL working
- Check your answers for accuracy
- Total marks for exam = 100
1 (a) Mary goes out for the day with £20 to spend. She buys a pizza for £9.95 and a large coca cola for £2.45. She pays with a £20 note. How much change should she get?

Answer: £ ……………………….. (2)

(b) Later, she buys a magazine for £3.55 and a chocolate bar for 95p with her change. How much of the £20 does she have left now?

Answer: £ ……………………….. (2)

(c) Mary would also like to buy some gel pens, which cost 47p each. How many can she buy with the amount of money she has left?

Answer: ……………………….. (2)
2 (a) Write 36% as a fraction

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

(b) Convert \(\frac{13}{25}\) to a decimal

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

(c) Calculate \(\frac{7}{12}\) of £84.72

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

3 (a) Lottie is making a cake. She needs to measure out 150 grams of flour from a 2 kilogram bag of flour. Write 150 grams as a fraction of 2 kilograms.

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

(b) She also needs to measure out 120 grams of sugar from a 2 kilogram bag of sugar. What is 120 grams as a percentage of 2 kilograms?

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

(c) Write the ratio of flour to sugar used in its simplest form

Answer: ................................. (2)
4  The table shows the temperatures recorded at 3 cities on 1 December 2013.

<table>
<thead>
<tr>
<th>Place</th>
<th>Lowest temperature in °C</th>
<th>Highest temperature in °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reykjavik</td>
<td>-15.4</td>
<td>-5.8</td>
</tr>
<tr>
<td>Newcastle</td>
<td>-1.5</td>
<td>4.9</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>15.3</td>
<td>25.1</td>
</tr>
</tbody>
</table>

(a) What is the difference between the lowest and highest temperature in Reykjavik?

Answer: ................................°C (2)

(b) What is the difference between the lowest and highest temperature in Newcastle?

Answer: ................................°C (2)

(c) Which city has the greatest difference between the highest and lowest temperatures on 1st December 2013?

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

5 (a) Polly buys a dress for £36. Prices were later reduced by 15% in a sale. How much would the same dress cost in the sale?

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

(b) A pair of leggings costs £17.50 before the sale. They are reduced by £3.50 in the sale. What is this reduction as a percentage of the original cost?

Answer: ......................... (2)
6. Showing all your working, calculate the following:

(a) \( \frac{3}{5} + \frac{1}{4} \)

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

(b) \( \frac{4}{5} \times \frac{15}{8} \)

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

(c) \( \frac{15}{8} \div \frac{3}{5} \)

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

(d) \( \frac{15}{16} - \frac{2}{3} \)

Answer: .......................  (2)
7 (a) Round each number in the calculation below to one significant figure.

\[ \frac{52.7 \times 4.3}{8.4 - 2.9} \]

Answer: 

(b) Using your answer to part (a), estimate the answer to the above calculation. Show ALL your working.

Answer: 

8 (a) A shopkeeper buys 15 iPads at £467 each. How much does he spend in total?

Answer: £

(b) Teen Shop spends £1 million buying new dresses for the summer. Approximately how many dresses costing £49 each can they buy?

Answer: £
9 (a) Write 120 as a product of its prime factors, using indices.
   
   (i) Write 84 as a product of its prime factors, using indices.
      Answer: ………………………..  (2)
   
   (ii) What is the largest factor of both 84 and 120?
       Answer: ………………………..  (2)

10 (a) Calculate \(16 - 15 \div 3 + 4\)
      Answer: ………………………..  (2)

(b) Calculate \(2(12 \div 4) - 2 \times 3^2\)
      Answer: ………………………..  (2)
11 (i) Robbie is taking part in a 120 kilometre sponsored bike ride.

He cycles the first 75 kilometres in 3 hours. What is his average speed in kilometres per hour during this time?

Answer: ……………………..km/h  (2)

(ii) There are 8 kilometres to every 5 miles. Convert 120 kilometres to miles.

Answer: ……………………miles  (2)

(iii) Robbie finishes the ride in 7 hours 30 minutes. Calculate his average speed in kilometres per hour.

Answer: ………………………km/h (2)
12  Simplify
(i)  \(6x - 5y + 5x + 7y\)

(ii)  \(6x^2 \times 5x^3\)

(iii)  \(\frac{12a^3}{4}\)

Answer: ………………………..  (2)

Answer: ………………………..  (2)

Answer: ………………………..  (2)

Answer: ………………………..  (1)

13  Multiply out and simplify
(a)  \(5x - 2(3x - 4)\)

Answer: ………………………..  (2)

(b)  Factorise completely

\(15x - 20y\)

Answer: ………………………..  (2)
14. Given that \( a = -3, b = 5, c = -2 \). Find the value of

(i) \( 5a + 3c \)  

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

(ii) \( (a + b)^2 \)  

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

(iii) \( 2b^2 - 3c^2 \)  

Answer: ..................................  (3)
15  A room is 6 metres long, 4 metres wide and 2.5 metres high.

(i)  Find the area of the ceiling

(a)  Answer: ……………………….m$^2$ (1)

(b)  Find the total area of the four walls

Answer: ………………………. m$^2$ (2)

(ii) The area of the windows, doors and other parts of the room which do not need to be painted is 8 m$^2$ in total. Calculate the total area of the walls which does need to be painted and write the ratio of this area to the area of the ceiling as a ratio in its lowest terms.

Answer: ……………………….. (2)

(iii) It costs £44 to paint the ceiling. Find the cost of painting the walls.

Answer: £……………………….. (2)
Solve

(i) \(5a = -15\)

(ii) \(\frac{1}{4}b = -1\)

(iii) \(4c + 9 = 5\)

(iv) \(3d - 5 = 22 - 6d\)

(v) \(4(e - 6) = 1\)
On the grid above

(i) (a) plot the points (−1, −3), (−1, −1), (−2, −1). (1)

(b) Join these points and label the triangle A. (1)

(ii) Write the equation of the line labelled $l$

Answer: …………………………(1)

(iii) Reflect triangle A in the line $l$ and label the image B. (1)

(iv) Rotate triangle A **anti-clockwise** through 90° about the point (0,0) and label the image C. (2)

(v) Translate triangle A by 2 units left and 3 units up. Label the image D. (2)

END OF EXAM

TOTAL MARKS 100