

# 11+ CEM Mathematics

## Paper 1

## Answers

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Section 1

| Question | Answer   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
|----------|--|---|---|---|---|---|---|---|---|---|---|--|---|---|--|--|--|--|---|---|--|--|---|---|---|--|--|--|---|---|--|--|--|---|---|---|--|--|--|---|--|
| 1        | <p><b>10 circuits</b></p> <p>30km to cycle in 30 days of September. This equals to 1km per day.<br/> <math>1\text{km} = 1000\text{m}</math><br/> <math>1000 \div 100 = 10</math> circuits per day.</p>   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
| 2        | <p><b>40 seats</b></p> <p>Using ratios, occupied seats to empty seats = 4:1<br/>                     5 total parts where 1 part is empty seats.<br/> <math>200 \div 5 = 40</math> empty seats.</p>   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
| 3        | <p><b>21 sweets</b></p> <p>Add up all the sweets to form an equation, then solve for S.<br/> <math>S + (S + 4) + 3S = 39</math><br/> <math>5S + 4 = 39</math><br/> <math>5S = 35</math><br/> <math>S = 7</math><br/>                     Cindy = <math>3S = 3 \times 7 = 21</math> sweets.</p>   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
| 4        | <p><b>34</b></p> <p>Using BIDMAS, multiplication comes first.<br/> <math>5 + (3 \times 12) - 7</math><br/> <math>5 + 36 - 7 = 34</math></p>  |   |   |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
| 5        | <p><b>11</b></p> <p>Square rooting both sides gives: <math>x - 3 = 8</math><br/>                     Solve for x: <math>x = 11</math></p>  |   |   |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
| 6        | <p><b>24 bags</b></p> <p>Using long division: <math>408 \div 17 = 24</math> bags.</p> <div style="text-align: center;"> <table border="1" style="border-collapse: collapse; margin: auto;"> <tr><td></td><td></td><td>0</td><td>2</td><td>4</td></tr> <tr><td>1</td><td>7</td><td>4</td><td>0</td><td>8</td></tr> <tr><td></td><td>-</td><td>0</td><td></td><td></td></tr> <tr><td></td><td></td><td>4</td><td>0</td><td></td></tr> <tr><td></td><td>-</td><td>3</td><td>4</td><td></td></tr> <tr><td></td><td></td><td>6</td><td>8</td><td></td></tr> <tr><td></td><td></td><td>-</td><td>6</td><td>8</td></tr> <tr><td></td><td></td><td></td><td>0</td><td></td></tr> </table> </div> |   |   | 0 | 2 | 4 | 1 | 7 | 4 | 0 | 8 |  | - | 0 |  |  |  |  | 4 | 0 |  |  | - | 3 | 4 |  |  |  | 6 | 8 |  |  |  | - | 6 | 8 |  |  |  | 0 |  |
|          |  | 0 | 2 | 4 |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
| 1        | 7  | 4 | 0 | 8 |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
|          | -  | 0 |   |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
|          |  | 4 | 0 |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
|          | -  | 3 | 4 |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
|          |  | 6 | 8 |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
|          |  | - | 6 | 8 |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
|          |  |   | 0 |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |
| 7        | <p><b>135 degrees</b></p> <p>There are 360 degrees in a circle. The circle is split into 8 sectors.<br/> <math>360 \div 8 = 45</math> degrees.<br/>                     The arrow turns through 3 sectors to reach E.</p>  |   |   |   |   |   |   |   |   |   |   |  |   |   |  |  |  |  |   |   |  |  |   |   |   |  |  |  |   |   |  |  |  |   |   |   |  |  |  |   |  |

|                           |  |
|---------------------------|--|
|                           | $3 \times 45 = 135$ degrees.   |
| 8                         | <b>16 times greater</b><br>A square with sides $x$ has an area of $x^2$ .<br>Therefore, a square with sides $4x$ would have an area of: $4x \times 4x = 16x^2$ . |
| 9                         | <b>48 percent</b><br>$25 - 13 = 12$ boys<br>$12/25 = 48/100 = 48\%$  |
| 10                        | <b>6 pieces</b><br>$1.44\text{m} = 144\text{cm}$<br>$144 \div 24 = 6$ .  |
| 11                        | <b>£150</b><br>Perimeter of the garden = $8 + 8 + 12 + 12 = 40\text{m}$<br>$40 \div 4 = 10$ parts of fencing.<br>$10 \times 15 = \text{£}150$                    |
| 12                        | <b>98</b><br>$10\%$ of 280 = 28<br>$5\%$ of 280 = 14<br>$3 \times 28 + 14 = 98$  |
| <i>Section 1 Subtotal</i> | <i>/12</i>   |

### Section 2

| Question | Answer  |
|----------|---|
| 1        | C<br>$(7a + 14b)$ can be factorised (divide by 7) to give $7(a + 2b)$   |
| 2        | B<br>$4 \times 1.40 = \text{£}5.60$<br>$3 \times 0.79 = \text{£}2.37$<br>$5.60 + 2.37 = \text{£}7.97$<br>Change from $\text{£}10$ :<br>$10 - 7.97 = \text{£}2.03$ |
| 3        | E<br>Total length of chairs = $5 \times 0.8 = 4\text{m}$<br>Total length of tables = $7.6 - 4 = 3.6\text{m}$<br>Length of 1 table = $3.6 \div 3 = 1.2\text{m}$    |

|    |  |
|----|--|
| 4  | B<br>25% of 30 = 7.5<br>10% of 70 = 7 = LOWEST<br>20% of 40 = 8<br>50% of 15 = 7.5<br>60% of 12 = 7.2  |
| 5  | C<br>Meetings: $5 \times 30 = 150$ mins<br>Lunch break = 90 mins<br>Other breaks = $3 \times 20 = 60$ mins<br>Project = 3 hours = 180 mins<br>Total time = $150 + 90 + 60 + 180 = 480$ mins or 8 hours.<br>8 hours after 8:45 is 16:45.      |
| 6  | D<br>Cut in half: 2 sections.<br>Cut into thirds: $2 \times 3 = 6$ sections.<br>Cut into half: $6 \times 2 = 12$ sections.   |
| 7  | B<br>Let x be the width (shorter side) of the rectangle.<br>Form an equation, then solve for x.<br>Perimeter = $2x + 2(x + 30) = 220$<br>$2x + 2x + 60 = 220$<br>$4x + 60 = 220$<br>$4x = 160$<br>$x = 40\text{cm}$                          |
| 8  | B<br>Counting backwards in steps of 6:<br>26, 20, 14, 8, 2, -4.  |
| 9  | C<br>360 degrees in a circle which represents 12 hours.<br>Each hour = $360 \div 12 = 30$ degrees.<br>3 hours = $3 \times 30 = 90$ degrees.  |
| 10 | D<br>15 minutes is a quarter of an hour.<br>If he can complete 30 miles in 1 hour, he will drive 7.5 miles in a quarter of that time. ( $30 \div 4$ )  |
| 11 | D<br>Writing out the 11 times table: 11, 22, 33, 44, 55, 66, 77, 88, 99 ...<br>91 is not a multiple of 11.<br>Writing out the 13 times table: 13, 26, 39, 52, 65, 78, 91 ...<br>91 is a multiple of 13 and is also odd. It belongs in Box Z. |

|                           |   |
|---------------------------|---|
| 12                        | A<br>4 bars of milk chocolates: 4M<br>Calculate the number of dark chocolate purchased:<br>$45 \div 15 = 3$ bars of dark chocolates - 3D.<br>Therefore, 3D + 4M |
| 13                        | C<br>If one portion is $\frac{1}{20}$ , then the whole jug serves 20 guests.<br>If only 50% of the jug is used, it has served 10 guests.                        |
| 14                        | B<br>John now owns 8 guitars and 6 violins.<br>The ratio of guitars to violins is 8:6 which is simplified to 4:3.   |
| 15                        | A<br>The lowest common multiple of 2, 3 and 4, is 12.<br>Therefore, $N + 12$ is divisible by all the factors listed.  |
| <i>Section 2 Subtotal</i> | <i>/15</i>  |
| <i>Total</i>              | <i>/27</i>  |

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