

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**

**OCR FUNCTIONAL SKILLS QUALIFICATION IN  
MATHS AT LEVEL 2**

**SEPTEMBER 2011**

The maximum mark for this paper is [60]

## OCR Level 2 Functional Skills Maths Referencing for Coverage and Range

Our ref	Coverage and Range
N1	understand and use positive and negative numbers of any size in practical contexts
N2	carry out calculations with numbers of any size in practical contexts, to a given number of decimal places
N3	understand, use and calculate ratio and proportion, including problems involving scale
N4	understand and use equivalences between fractions, decimals and percentages
A1	understand and use simple formulae and equations involving one- or two-step operations
G1	recognise and use 2D representations of 3D objects
G2	find area, perimeter and volume of common shapes
G3	use, convert and calculate using metric and, where appropriate, imperial measures
S1	collect and represent discrete and continuous data, using information and communication technology (ICT) where appropriate
S2	use and interpret statistical measures, tables and diagrams, for discrete and continuous data, using information and communication technology (ICT) where appropriate
S3	use statistical methods to investigate situations
S4	use probability to assess the likelihood of an outcome

N – Number  
 A – Algebra  
 G – Geometry  
 S - Statistics

<b>Representing</b>	<b>Our Ref</b>
Understand routine and non-routine problems in familiar and unfamiliar contexts and situations.	R1
Identify the situation or problems and identify the mathematical methods needed to solve them.	R2
Choose from a range of mathematics to find solutions.	R3
<b>Analysing</b>	
Apply a range of mathematics to find solutions.	A1
Use appropriate checking procedures and evaluate their effectiveness at each stage.	A2
<b>Interpreting</b>	
Interpret and communicate solutions to multistage practical problems in familiar and unfamiliar contexts and situations.	I1
Draw conclusions and provide mathematical justifications	I2

FS Maths L2 September 2011 Marking Guidance

Task 1 – Garden Tip

Process	Award	On evidence of
<b>Section (a)</b>		
(i) Calculating weight of rubbish [A]	2	1: 11 or $5 \times 2.2$ seen 1: tonnes (an independent mark)
(ii) Estimating number of bags of rubble. [B]	3	1: Statement of comfortable load (5 to 60) kg – must have units _____ and _____  1: $11 \times 1000 = 11000$ kg 1: “11000” $\div$ (“5 to 60 kg”) i.e. follow through on “comfortable load” If clearly working in tonnes the follow through assume the first mark. _____ or _____  2: 183 to 2200 with working (bags) but 1: without working.  Accept double/half the above figures where candidates explicitly mention two men working together carrying a sack. _____ if zero _____ SC1 for <b>explicit</b> statement to the effect “Don’t know but need to know comfortable load.”
<b>Section (b)</b>		
Calculating cost of the different firms [C]	4	Full follow through on “weight of rubbish”. 2: First correct 2: 1 for each subsequent (ie 1 + 1 possible)  Ron’s Rubbish (£)1 237.50 (correct answer only ft from (a)i) 50/50 (£) 1 050 (correct answer only ft from (a)i) The Rubbish Tipper (£)1 200 <b>as answer</b> (correct answer only ft from (a)i)
Choosing the cheapest option [D]	1	Statement of the cheapest option from at least two calculated by candidate (not necessarily correct calculations)

Process	Award	On evidence of
<b>Section (c)</b>		
Making an overall plan/costing for the garden bench <b>[E]</b>	<b>3</b>	<p><b>1:</b> Implied use of (2 to 5) sleepers</p> <p><b>1:</b> Cost consistent with above ie “number” × £21.50 (£43 / 64.50 / 86 / 107.50 / 129 or follow through from “number of sleepers”)</p> <p><b>1:</b> Relevant conclusion comparing above with £200 price ie with Paul’s initial statement.</p>
Drawing a sketch of the garden bench <b>[F]</b>	<b>2</b>	<p><b>2:</b> Sketch(s) broadly consistent with the above with attempt to put in a least one “length” correct units <b>1:</b> lack of any one “length” shown.</p>
Making and labelling a feasible design <b>[G]</b>	<b>3</b>	<p>Based on dimensions of seating area - possibly embedded in drawing or “written” plan – units may be implied</p> <p><b>1:</b> Seat depth <math>\geq 20</math> cm</p> <p><b>1:</b> Seat width <math>\geq 100</math> cm (upper bound 260 cm)</p> <p><b>1:</b> Height of seat above ground <math>h</math>, <math>30 \text{ cm} \leq h \leq 100 \text{ cm}</math></p>
Checking <b>[H]</b>	<b>2</b>	<p><b>2:</b> Clear evidence of a formal checking procedure being carried out at least once (e.g. by reverse calculation or repeating the calculation providing this is clearly a genuine check as opposed to a mere copying exercise).</p> <p><b>1:</b> Clear recognition and relevant statement at any appropriate point that a particular answer to a calculation is appropriate/expected or inappropriate/not expected  _____ <b>or</b> _____</p> <p><b>Two or more</b> calculations relevant to the task correctly performed, together with the absence of idiosyncratic part answers in the course of the task – these will usually be such that they are clearly at least two orders of magnitude different from the real-life quantity or measure. <i>Possible examples for this task might be benches tens of metres high etc.</i></p> <p><b>0:</b> No evidence of checking or consideration of reasonableness of answers – including bland statements to the effect that calculations were checked without any convincing relevant evidence.</p>

## Task 2 – Babies

Process	Max.	Award ... on evidence of ...	R	A	I
<b>Part (a)</b>					
Using table top predict sex of baby [A]	1	1: Girl /g	R1		
<b>Part (b)</b>					
Using table to count months when boy is predicted [B]	1	1: 5 seen or 12 seen as a denominator	R1		
Calculating probability of 25-year old having a boy [C]	1	1: $\frac{5}{12}$ o.e. isw or 5 in/out of 12 but <b>not</b> odds or 5:12	R2		
<b>Part (c)</b>					
(i) Finding missing numbers [D]	2	1: 1110 seen 1: 218 seen (may have to look for this)  lff total of zero scored award 1 for 892 seen.	R3	A2	
(ii) Investigating claim that greater probability babies being born at night [E]	4	1: Explicit statement of time interval that constitutes night 1: Correct number of births within this period of time (within range of crib sheet) seen 1: Comparing <b>proportion</b> of babies born at night from above (be aware of non-standard approaches, but must be based on a proportional argument) 1: A conclusion consistent with above For comparison condone naive numerical comparison (i.e. comparing number at night with number during day)		A1	I1 I2 I2
<b>Part (d)</b>					
Comparing probabilities of night birth in 1950/1 with that of present time. [F]	4	1: Using same “night time window” for both, must be stated as such 1: Calculating correct number born in this time period (within range of crib sheet) seen – this can also imply the first mark) 1: Calculating proportion born at night at present (as for [E] must be proportion) 1: Consistent comparison made between 1950/1 and present a correct qualitative comparison is acceptable.	R2 R2		I2 I2

Process	Max.	Award ... on evidence of ...	R	A	I									
<b>Part (e)</b>														
Investigating claim that baby boys are heavier than baby girls <b>[G]</b>	5	<p><b>2:</b> mean or median correctly calculated for boys or 1: attempt to calculate (e.g. “number” ÷ 18 or 56.4 ÷ “number” 1 for ordered list)</p> <p><b>2:</b> mean or median correctly calculated for girls or 1: attempt to calculate (e.g. “number” ÷ 26 or 87.75 ÷ “number” 1 for ordered list)</p> <p><b>1:</b> Comparison of above to respond to initial question posed.</p> <table border="1"> <thead> <tr> <th></th> <th>boys</th> <th>girls</th> </tr> </thead> <tbody> <tr> <td>mean</td> <td>3.1(333)</td> <td>3.3(75)</td> </tr> <tr> <td>median</td> <td>3.38</td> <td>3.4</td> </tr> </tbody> </table> <p style="text-align: center;"><b>or</b></p> <p><b>If zero scored for mean/median calculation:</b></p> <p>award <b>1</b> for naive totals (b= 56.4 and g: 87.75) and <b>1</b> for consistent comparison – allow comparison and working based on one column LHS= 43.89 / 27.62 RHS 43.86 / 28.78 (for both marks)</p> <p style="text-align: center;"><b>or</b></p> <p><b>1:</b> Girls heavier than boys made on comparison of correct maximum weights (girls = 4.16 and boys = 3.87) <b>or</b> minimum (girls=2.12 and boys = 1.74),</p> <p><b>1:</b> comparison, (So using max. or min. and <math>g &gt; b = 1+1</math>)</p>		boys	girls	mean	3.1(333)	3.3(75)	median	3.38	3.4	R2 R2	A1 A1	I2
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median	3.38	3.4												
Evidence of checking <b>[H]</b>	2	<p><b>2:</b> Clear evidence of a checking procedure being applied</p> <p><b>1:</b> Any recognition that answers are appropriate/expected or inappropriate/not expected or no obvious errors (3 or more correct calculation or part calculations)</p> <p><b>0:</b> Obvious incorrect answers or no evidence of checking or considering appropriateness of answer</p>		A2 A2										
			<b>SR=5</b>	<b>8R</b>	<b>6A</b>	<b>6I</b>								

### Task 3 – The Birthday Cake

Process	Max.	Award ... on evidence of ...	R	A	1
<b>Part (a)</b>					
(i) Working out number of people served by 15 cm and 20 cm diameter cakes.  [A]	1	1: 45 (people)	R2		
(ii) Finding the diameter of cakes in 3-tier arrangement to serve about 130.  [B]	2	2: 20 (cm) 25 (cm) and 30 (cm) or 30 / 30 / 15 or 1: 25/25/20 or 15/25/30 or 30+45+60	R2		I1
<b>Part (b)</b>					
(i) Finding amount of flour need for cakes in (ii).  [C]	3	3: 1300g / 1.3 kg / 2lb 15oz / 47oz (i.e. units needed) allow follow through from (ii) or 2: 1300 / 1.3 / 37 allow follow through from (ii) or 1: Any two of these numbers seen: 200 400 700	R2	A1	I1
(ii) Constructing timetable for preparation of ingredients and cooking all three cakes.  [D]	5	Full follow through from (a)(ii). Accept timeline or itemised list essentially 1 for each activity in the list of 4 below, , but 2 for the first correct. Allow all time formats and all reasonable embellishments such “time to warm oven”, “walk to entrance” etc. providing cooking times correct.  Preparation: 11:45 (or 9:45, ambiguity in prep. time) to 12:45 20 cm cake in at 12:45 out at 3:30 25 cm cake in at 12:45 out at 4:30 30 cm cake in at 12:45 out at 6:00  Allow with full credit finishing times back to about 2 pm based on the above.  Mark in spirit of above the situation where cakes finish together:	R2 R3	A1	I1 I1

Process	Max.	Award ... on evidence of ...	R	A	1
		<p>Prep. 1 or 3 hours (beginning 11:45 or 9:45) seen or implied by timetable then:  30 cm cake in at 12:45 out at 6pm  25 cm cake in at 2:15 out at 6 pm  20 cm cake in at 3:15 out at 6 pm</p> <p style="text-align: center;">_____ or _____</p> <p>1: Explicitly stated or implied prep. time of 1 hour or 3 hours  1: Three sets of timings (not necessarily correct) imply a ranking in cooking times of 30cm / 25cm / 20cm  1: At least one correct cooking time stated or implied from timetable (2 <math>\frac{3}{4}</math> , 3 <math>\frac{3}{4}</math> , 5 <math>\frac{1}{4}</math> hours for 20/25/30 cakes)</p>			
<b>Part (c)</b>					
<p>Finding weight of icing sugar needed for top of 25 cm cake.</p> <p style="text-align: center;"><b>[E]</b></p>	<b>3</b>	<p>3: 200 (g)  <b>or</b>  2: 600 [<math>\div</math> 3] [<math>\times</math> 2] 1 for each operation  Allow calculation and answers based on "icing sugar + egg white" i.e. 210 g / 420 g / 630 / 630 <math>\div</math> 3</p>	R2	A1 A1	
<b>Part (d)</b>					
<p>Calculating ingredients needed to make icing sugar for all three cakes.</p> <p style="text-align: center;"><b>[F]</b></p>	<b>4</b>	<p>2: Specific mention that the 25 cm is the "in-between" sized cake or similar or argument based on possibly naive proportionality <b>or</b> 1: 3 x 25 cm cake clearly used with no reason given <b>or</b> unclear/wrong scaling method but correct rank order for the three chosen cake sizes.  1: 1800 g to 2 kg of icing sugar  1: 90 to 95 g of egg white</p>	R2	A1	I1 I2
<p>Checking</p> <p style="text-align: center;"><b>[G]</b></p>	<b>2</b>	<p>2: Clear evidence of a checking procedure being applied  1: Any recognition that answers are appropriate/expected or inappropriate/not expected or no obvious errors (3 or more correct calculation or part calculations)  0: Obvious incorrect answers or no evidence of checking or considering appropriateness of answer</p>		A1	A1
		<b>SR=6</b>	<b>7 R</b>	<b>7 A</b>	<b>6 I</b>