OCR
RECOGNISING ACHIEVEMENT

GCSE

Applications of Mathematics (Pilot)

General Certificate of Secondary Education

Unit **A381/01:** Foundation Tier

Mark Scheme for January 2011

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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Marking instructions

1. Mark strictly to the mark scheme.

2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.

3. Work crossed out but not replaced should be marked.

4. **M** (method) marks are not lost for purely numerical errors.
   A (accuracy) marks depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
   B marks are independent of **M** (method) marks and are awarded for a correct final answer or a correct intermediate stage.

5. Two additional situations may appear in the mark scheme allowing the award of **A** marks or independent (**B**) marks:
   i. Correct answer with no working
   ii. Follows correctly from a previous answer whether correct or not ("ft" on mark scheme and on the annotations tool).

6. As a general principle, if two or more methods are offered, mark only the method that leads to the answer on the answer line. If two (or more) answers are offered, mark the poorer (poorest).

7. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the **MR** annotation. **M** marks are not deducted for misreads.

8. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.

9. If the correct answer is seen in the body and the answer given in the answer space is a clear transcription error allow full marks unless the mark scheme says 'mark final answer' or cao. If the answer is missing, but the correct answer is seen in the body allow full marks. If the correct answer is seen in working but a completely different answer is seen in the answer space, then accuracy marks for the answer are lost. Method marks would still be awarded.

10. Ranges of answers given in the mark scheme are always inclusive.

11. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work.

12. Award 0 if:
    - There is any attempt that earns no credit. This could, for example, include the candidate copying all or some of the question, or any working that does not earn any marks, whether crossed out or not.

13. Where a follow through mark is indicated on the mark scheme for a particular part question, you must ensure that you refer back to the answer of the previous part question if this is not shown within the image zone.

14. Anything in the mark scheme which is in square brackets […] is not required for the mark to be earned, but if present it must be correct.

Abbreviations

The following abbreviations are commonly found in GCSE Mathematics mark schemes.

- Where you see **oe** in the mark scheme it means **or equivalent.**
- Where you see **isw** in the mark scheme it means **ignore subsequent working** (after correct answer obtained), provided the method has been completed**.**
- Where you see **cao** in the mark scheme it means **correct answer only.**
- Where you see **soi** in the mark scheme it means **seen or implied.**
- Where you see **www** in the mark scheme it means **without wrong working.**
- Where you see **rot** in the mark scheme it means **rounded or truncated.**
- Where you see **seen** in the mark scheme it means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.
- Where you see **figs 237**, for example, this means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point e.g. 237000, 2·37, 2·370, 0·00237 would be acceptable but 23070 or 2374 would not.

Question				Marks	Guidance	
1	(a)		7 to 11 (metres)	1		
	(b)		✓ × ✓ ✓ × × × ✓	3	**B3** All 8 correct **B2** 6 or 7 correct **B1** 4 or 5 correct **SC1** for blank if consistently correct read as crosses	Zero if all ticks or crosses
	(c)		19 to 23°	1		
	(d)		400 or 440 or 438 given as answer	1		
2	(a)		529	1		
	(b)	(i)	36	1		
		(ii)	33	1		
		(iii)	1000	1	Condone 10 x 10 x 10	
3	(a)	(i)	(£) 39.20	1		Must be correct money notation
		(ii)	300 (kg)	1		

<table>
<tr>
<td></td>
<td></td>
<td>(iii)*</td>
<td>(£) 80.80 as answer, with costing for total cost of seed £39.20 indicated and compared with cost of buying 300 kg from supermarket £120 or the equivalent based on clear statement and working based on unit cost</td>
<td>4</td>
<td>4: (£)80.80 + at least one supporting calculation* or key number and these labelled/explained in some manner.

3: (£)80.80 + at least one supporting calculation* or key number.

2: figs 888 + at least one supporting calculation* or key number.
_____ or _____
(£)80.80 with little or no coherent working.

1: At least one key number or relevant calculation.
_____ or _____
Figs 888 seen but with incoherent working.</td>
<td>For example:
<table>
<tr><th>Possible calculation</th><th>Key Number</th><th>Label/units</th></tr>
<tr><td>300÷2.5</td><td>120</td><td>cost of super market potatoes</td></tr>
<tr><td>2500÷100</td><td>25</td><td>g of potato per p</td></tr>
<tr><td>1500÷196
or
3920 ÷300</td><td>13/13.1/13.06</td><td>06p per kg of potatoes per p for GYO</td></tr>
<tr><td>39.2 x 2.5÷300</td><td>32.6/32/33</td><td>price in p for 2.5 kg of GYO</td></tr>
<tr><td>120-39.20</td><td></td><td>saving</td></tr>
</table>
</td>
</tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td>_____ OR _____
Based on cost per bag
(or similar – 4 not available as not for 20kg of seed potatoes)

3: 67/68p + at least one supporting calculation* or key number.

2: figs 67/68 + at least one supporting calculation* or key number.
_____ or _____
67/68p with little or no coherent working.

1: At least one key number or relevant calculation.
_____ or _____
figs 67/68 seen but with incoherent working.</td><td>For example:

<table><tr><td>Possible calculation</td><td>Key Number</td><td>Label/units</td></tr><tr><td>15÷2.5</td><td>6</td><td>Bags of potatoes</td></tr><tr><td>1.96 ÷ 6</td><td>0.32/0.33/0.3266</td><td>Cost per bag DGYO</td></tr><tr><td>100 – (33/32)</td><td>67 / 68</td><td>Saving per bag for GYO</td></tr></table></td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>25 (metres)</td><td>1</td><td></td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>70 (metres)</td><td>1</td><td>FT 20 + 2 × (i)</td><td></td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>4</td><td>3</td><td>B3 www
M1 attempt to calculate
$\frac{1}{3}$ of 24 ($\Rightarrow$8 seen.) or
$\frac{2}{3}$ of 24 ($\Rightarrow$ 16 if clear from working)
M1 8 or “8” ÷ 2</td><td></td></tr>
</table>

		(ii)	$\frac{1}{6}$	**1**	**isw**	Condone $\frac{4}{24}$ or (16/17)%
	(d)	**(i)**	440 (g)	**1**	430 to 450	
		(ii)	0.44 (kg)	**1**	0.43 to 0.45 with **FT** from **(i)**	
		(iii)	3.08 (kg)	**1**	3.07 to 3.09 or **FT** from above scale reading. i.e. (ii) + (iii) = 3.52	
	(e)		(£) 360	**2**	**B1** sight of **figs** 36 or £40	
4	**(a)**		20 (cm)	**2**	Allow ± 0.4 cm i.e. 19.6 to 20.4 **B1** sight of 5 ± 0.1	
	(b)		8.49	**2**	**B1** 8.48 / 8.4 / 8.5 / 8.48...	2nd mark is for the correct rounding so follow through on "3×$\sqrt{8}$ " 2 dp
5	**(a)**		(£) 20 (£) 60	**1+1**	**SC1** If "20" + "60" = 80	
	(b)		(£) 45	**1**		
	(c)		(£) 35	**1**	Allow **FT** from £80 – "£45" i.e. "35"+"45" = 80	
6			3 & 47 13 & 37 17 & 33 23 & 27	**4**	**B2** for each different correct pair **or** **B1** for each pair with one correct condition	Ignore errors/repeats (ie especially reversed e.g. 13, 37 & 37, 13)

7			a = 155° b = 25° c = 65° d = 65°	**1** **1** **2** **1**	 **B1 (a)** = 90 + **(c)** **FT** on **(c)**	
8	**(a)**		11x – 15 as final answer	**3**	**B2** for 2x + 9x – 15 **or** **B1** for 2x + 3(3x – 5) or 11x or ⁻15 seen	
	(b)	**(i)**	15	**3**	**M1** for 11x – 15 = 150 **FT** *their* **(a)** **and** **M1** for 11x = 165 **and** **M1** for x = 15	eg 4x – 5 = 150 or 2x = 150 **FT** their first step **FT** their second step
		(ii)	40 cao	**1**		
8	**(a)**		11x – 15	**3**	Given as final answer **B1** 2x + 3(3x – 5) **or** **B2** 2x + 9x – 15	
	(b)	**(i)**	x = 15	**3**	Given as final answer or **M1** 11x – 15 = 150 **M1** 11x = 165 **A1** x = 15	1st step
		(ii)	40	**1**	Allow full **FT** from the above	
9	**(a)**	**(i)**	280	**2**	**B1** for 8 × 5 or 40 seen	
		(ii)	Yes, 88 (points)	**2**	**B1** for 29 x 8 or 232 seen	

<table>
<tr>
<td></td><td>(b)</td><td>(i)</td><td>Emirate (Tower) or 500 s or Jameson</td><td>1</td><td></td><td></td>
</tr>
<tr>
<td></td><td></td><td>(ii)</td><td>Clear statement of comparison made on basis of step or climbing rate for all runners (or other rational equivalent) with correct answers and conclusion (answering the question) clearly stated.

.</td><td>4</td><td>2: M ½ each correct rate* (step e.g. ($\frac{1776}{640}$ or better) or height or equivalent reciprocal only, round total up).
_____ and _____
1: At least two of the rates labelled or explained or correct units given.
_____ and _____
1: Clear and unambiguous selection from at least three rates (based on the candidates' calculated rates)
_____ or _____
Semi-qualitative argument based on given table, possibly naive as not based on rate calculation of some kind. e.g. Erikson climbed the most steps and greatest height.

* see table.</td><td>Condone inverses of these quantities, but must be the correct comparison based on these for the final mark.

Condone indication by tower name or by runner.

<table>
<tr><td></td><td>Cho</td><td>Erikson</td><td>Gold</td><td>Jameson</td></tr>
<tr><td></td><td>CN Tower</td><td>Taipai 101</td><td>Empire State</td><td>Emirate Tower</td></tr>
<tr><td>steps</td><td>1776</td><td>2046</td><td>1576</td><td>1334</td></tr>
<tr><td>height</td><td>338</td><td>448</td><td>320</td><td>265</td></tr>
<tr><td>time</td><td>640</td><td>665</td><td>760</td><td>500</td></tr>
<tr><td>Step rate/ reciprocal</td><td>2.78
0.35</td><td>3.08
0.32</td><td>2.07
0.48</td><td>2.67
0.37</td></tr>
<tr><td>Height rate / reciprocal</td><td>0.53
1.88</td><td>0.67
1.49</td><td>0.42
2.38</td><td>0.53
1.88</td></tr>
</table>
(quoted to 2 sf, but 1 dp acceptable)

Full FT on candidate's figures.</td>
</tr>
</table>

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