



**General Certificate Secondary of Education  
June 2010**

**Mathematics**

**4306/2F**

**Paper 2 Foundation Tier**

**Final**

***Mark Scheme***

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## Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

- M** Method marks are awarded for a correct method which could lead to a correct answer.
- A** Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
- B** Marks awarded independent of method.
- M dep** A method mark dependent on a previous method mark being awarded.
- B dep** A mark that can only be awarded if a previous independent mark has been awarded.
- ft** Follow through marks. Marks awarded following a mistake in an earlier step.
- SC** Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
- oe** Or equivalent. Accept answers that are equivalent.  
eg, accept 0.5 as well as  $\frac{1}{2}$

Q	Answer	Mark	Comments
1(a)	2.85	B1	285 p
	2.24	B1	224 p
	5.09	B1ft	509 p
1(b)	$20 \div 3.75$ or 5.33	M1	Allow a build up method eg, 3.75, 7.50, 11.25 up to at least 18.75
	5	A1	
2	(0).2(0)	B1	
	13	B1	
	$\frac{5}{100}$ 5	B1	oe
3(a)(i)	Rome or 6	B1	
3(a)(ii)	New York or -10	B1	
3(b)	-9	B1	
	1	B1	
	-10	B1	
4	Correct orientation, size and position	B2	B1 Correct orientation and size below mirror line, but wrong position
			B1 Correct position and a reflected shape, some incorrect lengths but at least 4 vertices correct. 2 examples shown
5(a)	$7.50 \times 3$	M1	
	22.50	A1	22.5 gets M1 A0
5(b)	$37.50 \div 7.50$	M1	Their 22.5(0) + 7.5(0) or 30 seen
	5	A1	

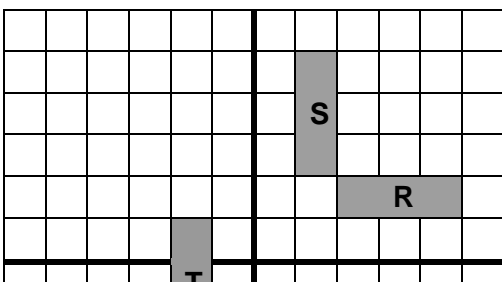
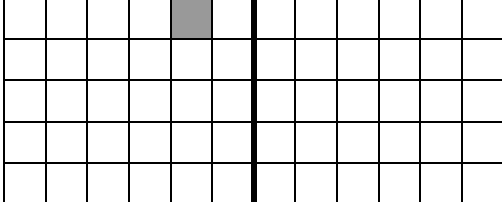
Q	Answer	Mark	Comments
6	Correct horizontal names under bars Ruler, Calculator and Pencil	B1	Allow R, C, P
	'Frequency' or 'number' or 'amount' on vertical axis	B1	oe
	Values 0, 5, 10 15, 20 written at the top of each row	B1	B0 For labelling numbers by middle of each row Ignore any values past 20 Usual error is to miss out 0
7(a)	(2, 4)	B1	SC1 All 3 correct but on wrong lines
	(-3, 1)	B1	
	(-1, -1)	B1	
7(b)	Isosceles	B1	Allow poor spelling
7(c)	(-2, 0)	B1	
8(a)(i)	37	B1	
	Their 37 - 3	B1ft	Answers may not be on answer line
8(a)(ii)	Take away 3 or 52 -3n, 52 - 3xetc	B1	Subtract 3, minus 3, taking off 3, -3 oe B0 For N - 3, n-3, x = - 3 etc
8(b)	-6 (ignore any reference to 10 <sup>th</sup> term)	B1	Minus 6, negative 6 B0 For 6
8(c)	22 (ignore 43 if given as well)	B2	If gives 2 lists then B1 for 22 in one sequence but not the other If gives 2 lists and 22 in both but nothing on answer line then B2
9(a)(i)	Rhombus	B1	
9(a)(ii)	Sides same (2 pairs of) opposite sides Parallel (2 pairs of) opposite angles Equal	B1	A parallelogram with diagonals crossing at right angles 2 lines of symmetry Rotational symmetry order 2
9(b)	45 to 47 inclusive	B1	
9(c)	Square, rectangle	B1	Any order

Q	Answer	Mark	Comments												
10(a)	180 cm	B1													
10(b)	$3.25 \times 52$	M1													
	169	A1	Allow answer that rounds to 169 to 3sf 16.9 with no working is MOA0												
11	$\Sigma x$ or 44	M1	At least 4 additions seen												
	Their $\Sigma x \div 8$	M1 Dep	$44 \div 8$												
	5.5	A1	Treat answer of 6 from 5.5 as fw												
12(a)	5	B1													
	7	B1													
12(b)	Examples that score B1: Can only get 6.40 Can only get 6.60 £6.50 is not a multiple of 20p No amount of 20p can add up to 6.50 $6.50 \div 0.2 = 32.5$ 65 is odd and 2 is even 0.20 does not divide 6.50 20 does not go into 50 50 is not a multiple of 20 cannot make 50 using 20 need a 10p list including 40, 60 eg, 540, 560 she only has 7 coins she has not enough coins	B1	B0 For incorrect, contradictory or incomplete statements eg, 20p coins only make even totals it will come out odd it's not in the 20 times table 6.50 is an odd number 50 is an odd number 6.50 is not a multiple of 2 20 does not go into 6.50 as it is an even number need 10p and 6.50 is odd (correct + incorrect statement) need 30p to make 50p need a 50p												
12(c)	$6 \times 50p$ $4 \times 50p$ and $5 \times 20p$	B2	B1 for 2 or 3 correct answers												
	$2 \times 50p$ and $10 \times 20p$ $15 \times 20p$														
13	<table border="1" style="border-collapse: collapse; text-align: center;"> <tr> <td>xx</td> <td></td> <td></td> </tr> <tr> <td>sss</td> <td>sss</td> <td>sss</td> </tr> <tr> <td>sss</td> <td></td> <td>xx</td> </tr> <tr> <td>xx</td> <td></td> <td></td> </tr> </table>	xx			sss	sss	sss	sss		xx	xx			B2	B1 For each diagram B0 If more than one new square added Allow poor drawing of squares If gives 3 diagrams and 2 correct and 1 wrong then B1 only
xx															
sss	sss	sss													
sss		xx													
xx															

Q	Answer	Mark	Comments
14	12.5(0) × 4 or 50	M1	242 ÷ 4
	242 – 80 – 50 or 112	A1	60.5(0)
	Their 112 ÷ 4	M1 Dep	Their 60.5(0) – 20 – 12.5(0)
	28	A1	
15(a)	21	B1	
15(b)	13	B1	
15(c)	63	B1	
15(d)	42	B1	
16(a)(i)	9.05263 ....	B1	9.052631579
16(a)(ii)	9.1	B1ft	ft Provided their answer to (a)(i) is given to more than 1dp
16(b)	133.(....)	B1	
16(c)	0 or 1	B1	Either answer
17	3P = 12	M1	P = 4 or 4 seen
	2P + 2Q = 14 can be shown using numbers eg, if they have working leading to P is 6 then  2 × 6 + 2 × 1 = 14 scores M1M1A0 or M0M1A0 depending on whether they have a valid method for P	M1	M2 for 8 + 2Q = 14
	3	A1	
18(a)	2 × 4 × 5	M1	Do not allow fw eg, 6 × 40 is M0
	40	A1	40 <sup>3</sup> is M1A0 with no working 40 × 40 × 40 = 40 <sup>3</sup> is M0A0
18(b)	Length <sup>3</sup> = 216	M1	$\sqrt[3]{216}$
	6	A1	Allow embedded answer eg, 6 × 6 × 6 = 216 unless contradicted on answer line when only award M1A0

Q	Answer	Mark	Comments
19	$26 \times 34 \div 100$	M1	Build up methods are OK provided they show how to get to a total of 34 or 134 Allow arithmetic errors for M1 eg, 30% = 7.6 (not 7.8), 1% = 0.26 $7.6 + 4 \times 0.26 = 8.64$ $26 + 8.64 = 34.64$ gets M1A0A1
	8.84	A1	
	26 + their 8.84 or 34.84	A1ft	
Alt 19	134	B1	
	$26 \times 134 \div 100$	M1	M2 For $26 \times 1.34$
	34.84	A1ft	
20	$47 \div 5$	M1	Sight of 9.4 and/or 37.6 is M1
	Adam 37.60 Beth 9.40	A1	37.6 and/or 9.4 is M1A0 Reversed answers scores M1A0
21(a)	24	B1	
21(b)	$\frac{1}{5}$	B2	B1 Any equivalent fraction even if decimal values such as $\frac{2.5}{12.5}$ , $\frac{10}{50}$ or 20% or 0.2 B1 For 1 out of 5, 1 in 5 B0 For 10 out of 50 B0 For 1:5 or 1:4
21(c)	$\frac{1500}{50} \times 22$ , 44% of 1500	M1	oe 840 seen is M1 as MR
	660	A1	
22(a)	Top box	B1	
22(b)	Bottom box	B1	
22(c)	Top box	B1	
23	Distance 14.8 to 15.2	B1	
	Bearing 245 to 249	B2	Allow -111 to -115 B1 For 65 to 69 or 111 to 115



Q	Answer	Mark	Comments
24(a)		B2	<p>Do not penalise for no labelling or incorrect labelling if shape is in a correct position to score B2 or B1</p> <p>B1 For line <math>y = x</math> drawn or</p> <p>B1 For reflection in <math>y = -x</math> to get <math>(-2, -1), (-2, -2), (-5, -1), (-5, -2)</math></p>
24(b)		B2	<p>B1 For any translation of S of <math>\frac{3}{y}</math></p> <p>or <math>\begin{pmatrix} x \\ -4 \end{pmatrix}</math> where <math>x</math> and <math>y \neq 0</math></p> <p>B1 For translation <math>\begin{pmatrix} -4 \\ -3 \end{pmatrix}</math> to get <math>(-3, 2), (-2, 2), (-3, -1), (-2, -1)</math></p> <p>NB B0 for reflection in <math>y</math> axis or <math>x</math> axis</p>

25(a)	Either	B1	
25(b)	Testing any prime value for $p$ , $p$ must be squared	M1	Correct value of $n$ for a prime value of $p$ eg, 10, 2 15, 3 55, 7 gets M1A0
	Examples of correct values are 31, 5 127, 11 367, 19 967, 31	A1	Values wrong way round implies M1A0
25(c)	$p^2 = n - 6$	M1	<p>Correct reverse flow diagram</p> <p><math>p \rightarrow \text{square} \rightarrow + 6 \rightarrow n</math></p> <p><math>p \leftarrow \sqrt{\quad} \leftarrow - 6 \leftarrow n</math></p>
	$p = \sqrt{(n - 6)}$ and/or $p = -\sqrt{(n - 6)}$ or $\sqrt{(n - 6)} = p$	A1	<p>Must have <math>p =</math></p> <p>Square root must be over all terms ie, <math>p = \sqrt{n - 6}</math> with no working is M0A0</p> <p>Allow <math>\pm</math> in front of root</p>

Q	Answer	Mark	Comments
26(a)	All equally likely circled	B1	
	Valid explanation such as dice has no memory so any values equally likely. It's a fair dice so not biased.	B1 Dep	
26(b)(i)	5	B1	
26(b)(ii)	0.42 plotted or 0.42 seen or 42/100	B1	<p>Allow either calculation or plot as this is a lead in to part (b)(iii)</p> <p>Accuracy of plot to <math>\frac{1}{2}</math> square accuracy</p> <p>42 <math>\div</math> 100 gets B0</p>
26(b)(iii)	16 or 17	B1	
26(b)(iv)	<p>No ticked and reason 0.42 &gt; 0.16 or 42 &gt; 17</p> <p>Should be about a sixth and 0.4 is bigger than this</p> <p>In 100 throws there should be about 16 sixes and there are more than this</p>	B1	<p>oe need a comparison with a sixth</p> <p>If 'Yes' ticked then B0</p> <p>If neither box is ticked but answer makes it clear that dice is biased give B1</p>