MATHEMATICS - MARKING SCHEME

Notes for Marking of Scripts

Types of Marks

Method marks are awarded for knowing a correct method of solution and attempting to apply it. Method marks cannot be lost for arithmetic mistakes. They can only be awarded if the method used would have led to the correct answer had not an arithmetic mistake been made. Unless otherwise stated, any valid method not specified in the marking scheme is to be accepted and marked accordingly.

There are two types of Method marks: **M** marks and **(M)** marks.

- **M marks** are only awarded if method is seen.

- **(M) marks** are awarded even when a correct answer is given and no work is shown.

There are two types of Accuracy marks: **A** marks and **B** marks.

- **A** marks are accuracy marks given for correct answer only (c.a.o.).
  - Incorrect answers, even though nearly correct, score no marks.
  - Accuracy marks are also awarded for incorrect answers which are correctly followed through (f.t.) from an incorrect previous answer, **provided that f.t. is indicated in the marking scheme**.
  - No Method marks **M/(M)** or Accuracy marks **A** are awarded when a wrong method leads to a correct answer.
  - When a question is assigned **M** and **A** marks and students present a correct answer without any working, only **A** marks are awarded.

- **B** marks are accuracy marks awarded for specific results or statements independent of the method used.

Misreading
Method marks can still be earned (unless that part of the question is trivialised) but the final Accuracy marks are lost.

Crossed out working
An answer or working that is crossed out and not replaced is marked as if it were not crossed out. If the answer or working is replaced, then the crossed out answer or working is ignored and should not be considered for marking.

Units
In general, missing or inaccurate units are not penalised unless otherwise indicated in the marking scheme.

Other
- Incorrect working or statement following a correct answer is ignored.
- Marks are not sub-divisible; no half marks may be awarded.
- Other abbreviations used:
  - o.e. (or equivalent)
  - e.e.o.o. (each error or omission)
- Markers are advised to indicate the M, (M), A or B marks awarded in the body of the script and then write their total in the margin. The total mark for each question should be written in the table included at the top of page 1 of the main paper. This measure facilitates the moderation of papers.

Marking Scheme (Total: 100 marks)

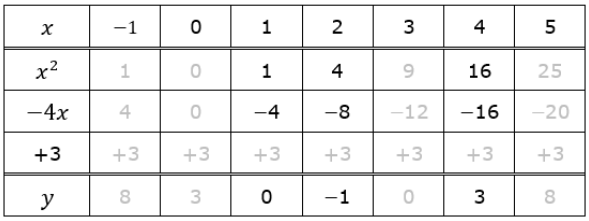
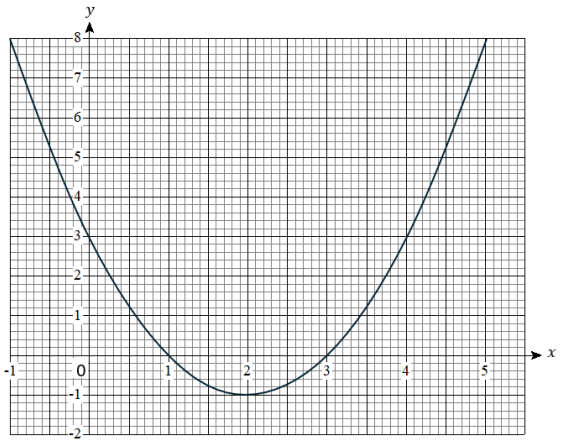
<table>
<tr><th colspan="2">Que.</th><th>Requirements</th><th colspan="2">Mark</th><th>Additional Guidance</th></tr>
<tr><td rowspan="5">1</td><td>a)</td><td>36</td><td>B1</td><td rowspan="5">5</td><td></td></tr>
<tr><td>b)</td><td>6</td><td>B1</td><td></td></tr>
<tr><td>c)</td><td>1 or 9 or 25</td><td>B1</td><td></td></tr>
<tr><td>d)</td><td>18</td><td>B1</td><td></td></tr>
<tr><td>e)</td><td>36</td><td>B1</td><td></td></tr>
<tr><td rowspan="2">2</td><td>a)</td><td>1.1369 × 400
£454.76</td><td>(M)1
A1</td><td rowspan="2">4</td><td rowspan="2">Answers to be given to 2 d.p.</td></tr>
<tr><td>b)</td><td>120 ÷ 1.1369
€105.55</td><td>(M)1
A1</td></tr>
<tr><td rowspan="2">3</td><td>a)</td><td>1, –6</td><td>B1</td><td rowspan="2">3</td><td>Both correct</td></tr>
<tr><td>b)</td><td>i) n + 3
ii) 53</td><td>B1
A1 f.t.</td><td>f.t. from (b)(i)</td></tr>
<tr><td rowspan="2">4</td><td>a)</td><td>3.75 : 0.25
Multiply by 4

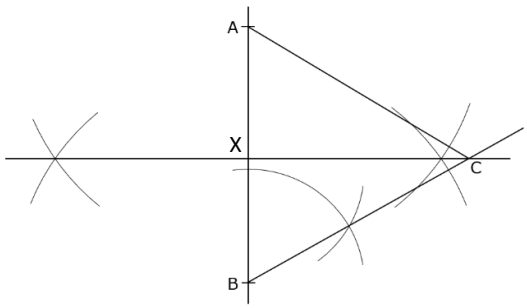
15 : 1</td><td>
M1

A1</td><td rowspan="2">6</td><td>Accept any other correct method of simplification</td></tr>
<tr><td>b)</td><td>2 : 3 : 7 (12 parts)
Clara = $\frac{7}{12} \times 288$
= €168
Alan = $\frac{2}{12} \times 288$ = €48
Difference = €120</td><td>
(M)1
A1
(M)1
A1</td><td>Or
288 ÷ 12
= €24
€24 × (7 – 2)
= €120</td></tr>
<tr><td rowspan="2">5</td><td>a)</td><td><table><tr><td colspan="2"></td><td colspan="4">Crate A</td></tr><tr><td colspan="2"></td><td>A</td><td>B</td><td>K</td><td>O</td></tr><tr><td rowspan="4">Crate B</td><td>A</td><td>(A, A)</td><td>(B, A)</td><td>(K, A)</td><td>(O, A)</td></tr><tr><td>F</td><td>(A, F)</td><td>(B, F)</td><td>(K, F)</td><td>(O, F)</td></tr><tr><td>K</td><td>(A, K)</td><td>(B, K)</td><td>(K, K)</td><td>(O, K)</td></tr><tr><td>P</td><td>(A, P)</td><td>(B, P)</td><td>(K, P)</td><td>(O, P)</td></tr></table></td><td>B2</td><td rowspan="2">5</td><td>B1 for every 8 correct possibilities.

Accept also if fruit from Crate B are listed first.</td></tr>
<tr><td>b)</td><td>i) $\frac{1}{8}$
ii) $\frac{1}{4}$
iii) $\frac{9}{16}$</td><td>B1
B1
B1</td><td>o.e.
o.e.</td></tr>
</table>

6		Payment Plan 1 $\frac{85}{100} \times 1400$ = €1190 Payment Plan 2 €500 + €1200 = €1700 Difference = €510	 (M)1 A1 (M)1 A1 A1	**5**	
7		a = 80° Alternate angles are equal b = 70° Corresponding angles are equal c = 30° Angles in a triangle add up to 180°	B1 M1 B1 M1 B1 M1	**6**	
8	a)	i) Marking the bearing of ship B from ship A ii) 068°	B1 B1	**4**	 ± 2° Award mark even if "0" is not seen
	b)	Bearing of 300° AC = 6 cm	B1 B1		± 2° ± 0.1 cm
9	a)	i) 10 × 2 + 7 = 27 ii) $10x + 7 = 14$ $10x = 7$ $x = 0.7$	(M)1 A1 M1 A1	**7**	 o.e.
	b)	i) $m = \frac{change\ in\ y}{change\ in\ x} = \frac{4-1}{-2-4}$ $= -0.5$ ii) (B) $y = 3 - \frac{1}{2}x$	M1 A1 B1		 o.e.
10	a)	i) $1 - (\frac{1}{8} + \frac{1}{4})$ $1 - \frac{3}{8} = \frac{5}{8}$ ii) $\frac{5}{8} \times 160 = 100$ iii) Physics: $\frac{5}{8} \times 360 = 225°$ Biology: 90° Pie chart correctly completed	M1 A1 A1 f.t. M1 B1 A1 f.t.	**9**	 f.t. from (a)(i) f.t. from (a)(i)
	b)	51 + 68 + 72 + 84 + 92 + 76 = 443 72 × 7 = 504 Seventh mark = 504 − 443 = 61	M1 M1 A1		

11	a)	$3x + 36 - 8x - 16$ $-5x + 20$	M1 A1	**6**	
	b)	$5xy(3x + 4y)$	B2		B1 for correct partial factorisation
	c)	$\frac{12 \times 3}{3 - 7 \times (-1)^2} = \frac{36}{-4}$ -9	M1 A1		
12	a)	$kax = V$ $x = \frac{V}{ka}$	(M)1 A1	**6**	
	b)	$10x + 20y = 150$ $28x - 20y = -36$ $38x = 114$ $x = 3$ $2 \times 3 + 4y = 30$ $4y = 24$ $y = 6$	M1 A1 (M)1 A1		
13	a)	 x | -1 | 0 | 1 | 2 | 3 | 4 | 5 x^2 | 1 | 0 | 1 | 4 | 9 | 16 | 25 $-4x$ | 4 | 0 | -4 | -8 | -12 | -16 | -20 +3 | +3 | +3 | +3 | +3 | +3 | +3 | +3 y | 8 | 3 | 0 | -1 | 0 | 3 | 8	B3	**8**	B1 for every three correct values
	b)	 	M2 A1		Award M1 for at least three points correctly plotted For smooth curve
	c)	-1	A1 f.t.		f.t. from (a) and (b)
	d)	1.25 (Accept from 1.1 to 1.4)	A1 f.t.		f.t. from (b)

14	a)	16 cm^2	B1		
	b)	$0.5 \times (3 + 10) \times 4$ 26 cm^2	M1 A1		
	c)	6 cm	B1	**8**	
	d)	Area of shape C = 64 cm^2 Area of shape D = 45 cm^2 Total Area = 26 + 16 + 64 + 45 = 151 cm^2	B1 B1 (M)1 A1 f.t.		f.t. from (a), (b) and (c)
15	a)	Tan ∠AYB = $\frac{4}{8}$ ∠AYB = $Tan^{-1}(0.5)$ ∠AYB = 26.565…°	M1 M1 A1		Accept 27° or more accurate
	b)	$AY^2 = 4^2 + 8^2$ AY = $\sqrt{80}$ AY ≈ 9 m	M1 M1 A1	**9**	
	c)	∠XBA = ∠ABY XB : AB = 2 : 4 = 1 : 2 AB : BY = 4 : 8 = 1 : 2 Similar since two sides are in the same ratio and the included angle is equal	M1 M1 A1		Award M1 for any correct ratio of sides
16	a)	Line AB = 7 cm	B1		± 0.1 cm
	b)	Perpedicular bisector Arcs seen	M1 A1		Award marks even if point X is not marked
	c)	i) 60° Arcs seen ii) Point C marked and line AC drawn  	M1 A1 B1	**9**	± 1°
	d)	i) 6.1 cm ii) Area = 0.5 × 7 × 6.1 = 21.35 cm^2	B1 M1 A1		± 0.2 cm f.t. from (d)(i) Accept answers in the range 20.65 ≤ A ≤ 22.05