For **Pearson Edexcel**

Level 1/Level 2 GCSE (9 – 1)

Mathematics

Paper 1 (Non-Calculator)

Higher Tier

Churchill Paper 1A – Marking Guide

Method marks (M) are awarded for a correct method or partial method

Process marks (P) are awarded for a correct process as part of a problem solving question

Accuracy marks (A) are awarded for a correct answer, having used a correct method or process

(B) marks are unconditional accuracy marks (no method or process needed)

(C) marks are for communication

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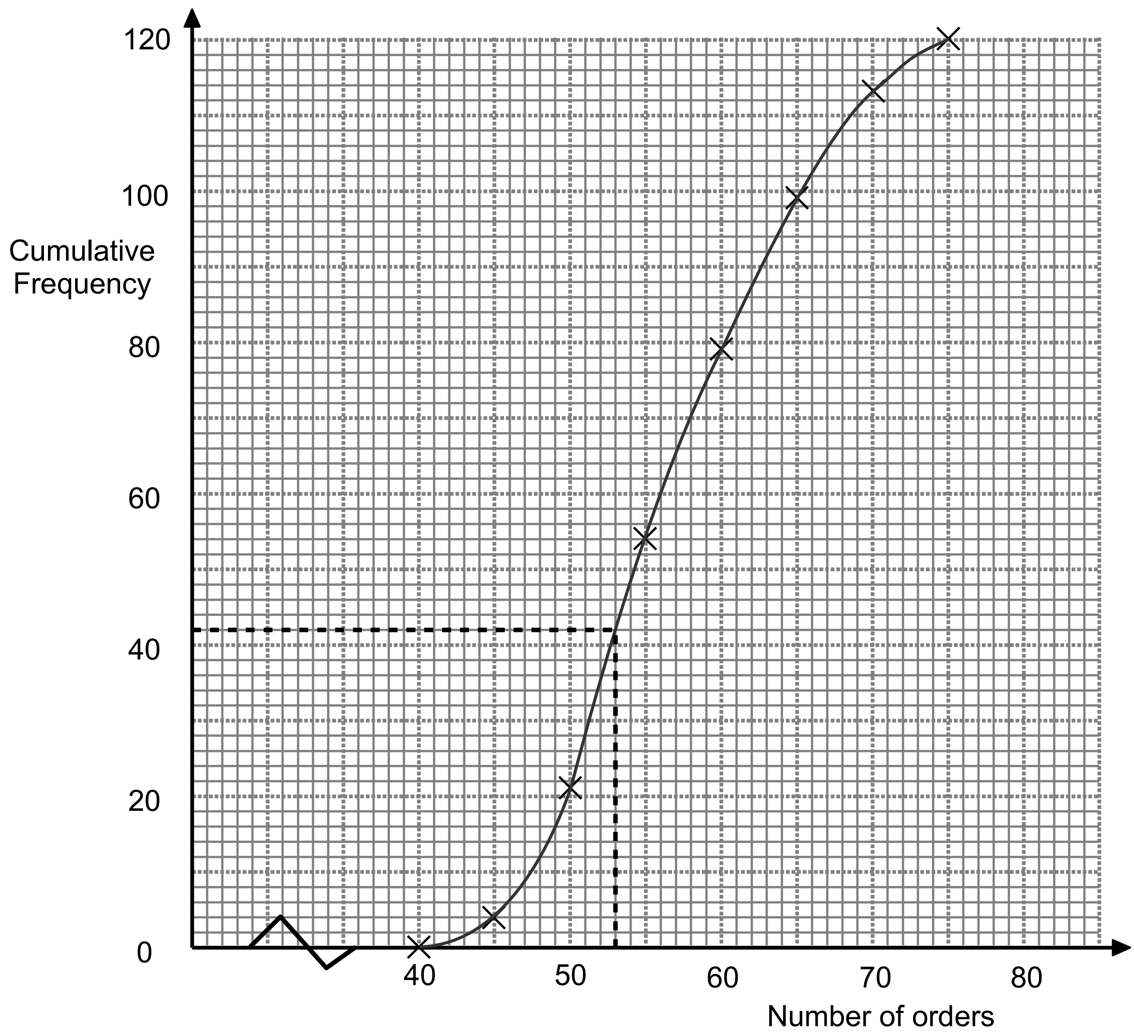
Churchill Paper 1A Marking Guide – Edexcel Higher Tier

1	**(a)**	Jeremy marks 1 homework in 60 ÷ 12 = 5 minutes	M1	
		Kira marks 1 homework in 120 ÷ 30 = 4 minutes		
		Liz marks 1 homework in 6 minutes		
		Therefore Kira is the quickest	A1	
	(b)	In 20 minutes Jeremy marks 4 homeworks		
		and Kira marks 5 homeworks		
		Together they mark 9 homeworks in 20 minutes	P1	
		36 ÷ 9 = 4 so they take 4 × 20 = 80 minutes	P1	
		4.30 pm + 80 minutes = 5.30 pm + 20 minutes = 5.50 pm	A1	
		They finish marking at 5.50 pm		Total 5
2	**(a)**	1 chain costs 180 ÷ 20 = £9		
		1 bead costs 750 ÷ 500 = £1.50	P1	
		1 spacer costs 90 ÷ 100 = £0.90		
		1 heart charm costs 120 ÷ 30 = £4		
		Total = 9 + (8 × 1.50) + (4 × 0.90) + 4	P1	
		= 9 + 12 + 3.60 + 4		
		= £28.60	A1	
	(b)	Profit on 1 bracelet = 39.90 – 28.60 = £11.30		
		Profit on 15 bracelets = 15 × 11.30	M1	
		= 10 × 11.30 + 5 × 11.30		
		= 113 + 56.50		
		= £169.50	A1	Total 5
3	**(a)**	B and D	B1	
	(b)	$p = 4$, $q = -5$	B2	
	(c)	2	B1	
	(d)	$x = 1$	B1	Total 5
4		$p = 4q - 7$		
		$p + 7 = 4q$	M1	
		$q = \dfrac{p+7}{4}$	A1	Total 2
5		Angle in semi-circle = 90º		
		$a = 180 - (90 + 38)$	M1	
		$a = 180 - 128$		
		$a = 52$	A1	Total 2

6 **(a)** **(i)** M1 A1

Number of orders (N)	Cum. Freq.
$40 < N \le 45$	4
$40 < N \le 50$	21
$40 < N \le 55$	54
$40 < N \le 60$	79
$40 < N \le 65$	99
$40 < N \le 70$	113
$40 < N \le 75$	120

(ii) B3



(b) 42 (approx, from graph) B1 Total 6

7 The angles in a triangle add up to 180º so		
$4x + 3x + 20 + 5x - 8 = 180$	M1	
$12x + 12 = 180$		
$12x = 168$		
$x = 14$	A1	
$4x = 56$, $3x + 20 = 62$ and $5x - 8 = 62$	M1	
As angle ABC = angle ACB the triangle is isosceles The two sides opposite the equal angles are the same length Hence, $AB = AC$	C1	Total 4

8 Last week = 100% This week = 120% = 240		
So, 10% = 240 ÷ 12 = 20	P1	
100% = 10 × 20 = 200 Leanne sent 200 emails last week	A1	Total 2

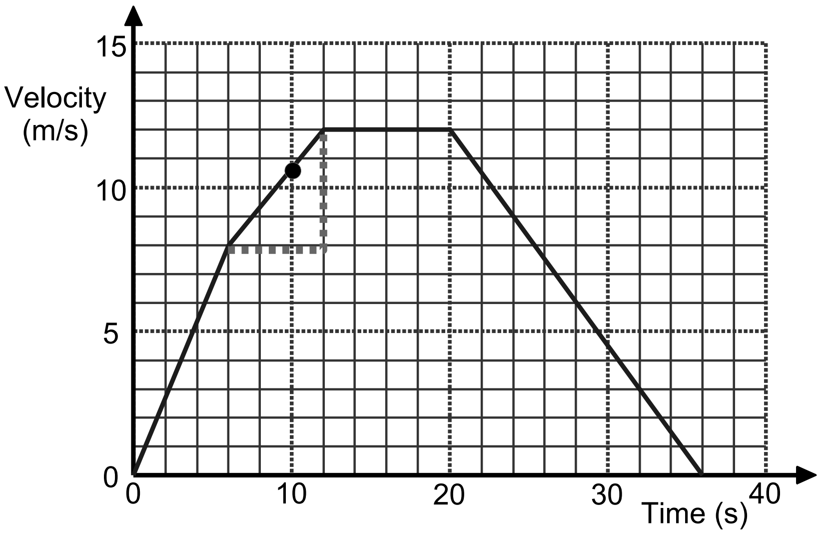
9 **(a)** = 7 × 6 = 42 ways	B1	
(b) Smallest 2 frame sizes: no. of combinations = 2 × 7 × 3 = 42	M1	
Largest 3 frame sizes: no. of combinations = 3 × 7 × 6 = 126 Total no. of combinations = 42 + 126 = 168	A1	Total 3

10 **(a)** e.g. She can not be sure of this because 10 is a very small number of trials	C1	
(b) No. of times red bead picked = 7 + 6 + 8 + 6 = 27	M1	
No. of trials = 40 P(Faria picks a red bead) = $\frac{27}{40}$	A1	
(c) No, she is wrong. We know the probability that one bead will be green is $\frac{6}{10}$. However, we don't know the probability that the second will be green, given that the first was green, because we don't know how many beads are in the bag. Her answer assumes that the bag contains 10 beads so that after removing one green bead there are 9 beads left, 5 of which are green.	C2	Total 5

11 Area of triangular XS = $\frac{1}{2} \times 9p \times 2p = 9p^2$		
Volume of prism = $9p^2 \times 3p = 27p^3$	P1	
Let length of edge of cube be x Volume of cube = $x^3 = 27p^3$ $x = \sqrt[3]{27p^3} = \sqrt[3]{27}\,p = 3p$	P1 A1	Total 3

12 **(a)** 8 seconds B1

(b)



Acceleration = gradient of line = $\frac{12-8}{12-6} = \frac{4}{6} = \frac{2}{3}$ m/s^2 M1 A1

(c) Distance = area under graph

$= (\frac{1}{2} \times 6 \times 8) + [\frac{1}{2} \times (8 + 12) \times 6] + (8 \times 12) + (\frac{1}{2} \times 16 \times 12)$ M2

$= 24 + 60 + 96 + 96$

$= 276$ m A1 Total 6

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13 $5y = (4 \times 10^7) + (2 \times 10^6)$

$5y = (4 \times 10^7) + (0.2 \times 10^7)$

$5y = 4.2 \times 10^7$ P1

$10y = 8.4 \times 10^7$

$y = 8.4 \times 10^6$ P1 A1 Total 3

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14 In a normal week, let Henrik earn h and Rob earn r

$h : r = 3 : 2$ so $h = \frac{3}{2}r$ (1) B1

$h + 20 : r + 20 = 4 : 3$ so $h + 20 = \frac{4}{3}(r + 20)$ P1

$3(h + 20) = 4(r + 20)$

$3h + 60 = 4r + 80$ (2)

Sub (1) into (2) $3 \times \frac{3}{2}r + 60 = 4r + 80$ P1

$\frac{9}{2}r + 60 = 4r + 80$

$\frac{1}{2}r = 20$

$r = 40$

So, $h = \frac{3}{2} \times 40 = 60$

In the week before Christmas, Henrik earns $h + 20 = £80$ A1 Total 4

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15 **(a)** B1

sin 0º	sin 30º	sin 45º	sin 60º	sin 90º
0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1

(b) Area $ABC = \frac{1}{2} \times 6 \times 8 \times \sin 30^\circ$ P1

$= 24 \times \frac{1}{2}$

$= 12\text{ cm}^2$

Area $PQR = \frac{1}{2} \times 3 \times 8 \times \sin 45^\circ$

$= 12 \times \frac{\sqrt{2}}{2}$

$= 6\sqrt{2}\text{ cm}^2$ M1

Triangle ABC has the larger area A1 Total 4

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16 **(a)** $g(5) = \frac{5+3}{2} = 4$ M1

$fg(5) = f(4) = 3 \times 4 - 1 = 11$ A1

(b) Let $g(x) = -2$

$\frac{x+3}{2} = -2$ P1

$x + 3 = -4$

$x = -7$

Therefore $g^{-1}(-2) = -7$ A1 Total 4

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17 David is not correct

e.g. When $x = \frac{1}{16}$: $\sqrt{x} = \sqrt{\frac{1}{16}} = \frac{1}{4}$ M1

$\sqrt[4]{x} = \sqrt[4]{\frac{1}{16}} = \frac{1}{2}$

$\frac{1}{4} < \frac{1}{2}$ making his statement incorrect A1 Total 2

[Any value in the interval $0 < x < 1$ can be used]

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18 Sub $P\,(2a, a)$ into equation: $(2a)^2 + a^2 = 80$ — P1

$5a^2 = 80$

$a^2 = 16$

$a = 4$ [can't be -4 as positive constant]

P is (8, 4)

Gradient of $OP = \dfrac{4-0}{8-0} = \dfrac{1}{2}$ — P1

Gradient of tangent $= \dfrac{-1}{\left(\frac{1}{2}\right)} = -2$ — P1

Equation of tangent: $y = -2x + c$

$4 = (-2 \times 8) + c$ — P1

$c = 4 + 16 = 20$

Hence, $y = -2x + 20$

y-intercept = 20 so R is (0, 20)

Crosses x-axis when $y = 0$: $0 = -2x + 20$

$2x = 20$

$x = 10$ so Q is (10, 0)

Area of $OQR = \frac{1}{2} \times 10 \times 20 = 100$ — A1 — Total 5

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19 **(a)** $\overrightarrow{XY} = \overrightarrow{XO} + \overrightarrow{OY}$

$= -\frac{1}{2}\overrightarrow{OA} + \frac{1}{3}\overrightarrow{OC}$ — P1

$= -2\mathbf{p} + 2\mathbf{q}$ — A1

(b) $\overrightarrow{BC} = \overrightarrow{BO} + \overrightarrow{OC}$

$= -\overrightarrow{OB} + \overrightarrow{OC}$

$= -(3\mathbf{p} + 3\mathbf{q}) + 6\mathbf{q}$ — P1

$= -3\mathbf{p} + 3\mathbf{q}$

$= \frac{3}{2}\overrightarrow{XY}$

As $\overrightarrow{BC}$ is a multiple of $\overrightarrow{XY}$ they have the same direction

so BC is parallel to XY — A1 — Total 4

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20 **(a)** **(i)** $x^2 + 4x - 3 = (x + 2)^2 - 2^2 - 3$ — P1

$= (x + 2)^2 - 7$ — A1

(ii) $(x + 2)^2 - 7 = 0$

$(x + 2)^2 = 7$

$x + 2 = \pm\sqrt{7}$

$x = -2 \pm \sqrt{7}$ — B1

(b) $y = 1 \pm \sqrt{2}$

$y - 1 = \pm\sqrt{2}$

$(y - 1)^2 = 2$ — P1

$y^2 - 2y + 1 = 2$ — P1

$y^2 - 2y - 1 = 0$

$a = -2$ and $b = -1$ — A1 — Total 6

TOTAL FOR PAPER: 80 MARKS

