For **Pearson Edexcel**
Level 1/Level 2 GCSE (9 – 1)

Mathematics

Paper 1 (Non-Calculator)

Higher Tier

Churchill Paper 1A – Marking Guide

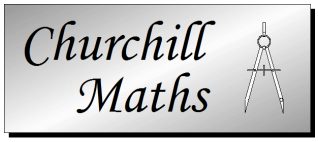
Method marks (M) are awarded for a correct method or partial method

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



Written by Shaun Armstrong

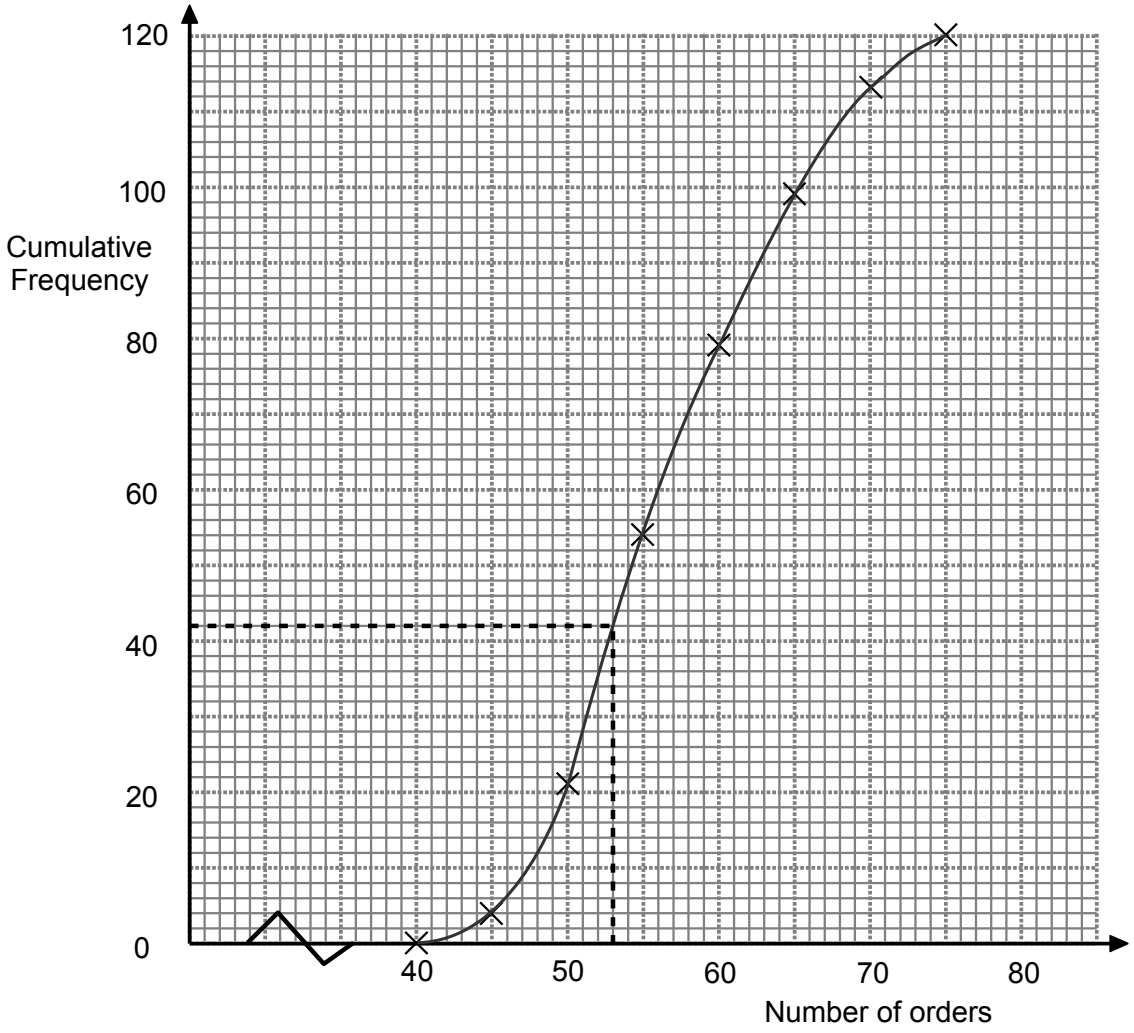
Churchill Paper 1A Marking Guide – Edexcel Higher Tier

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	
		$q = \frac{p+7}{4}$	A1	Total 2
5		Angle in semi-circle = 90°		
		$a = 180 - (90 + 38)$	M1	
		$a = 180 - 128$		
		$a = 52$	A1	Total 2

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

Number of orders (N)	Cum. Freq.
$40 < N \leq 45$	4
$40 < N \leq 50$	21
$40 < N \leq 55$	54
$40 < N \leq 60$	79
$40 < N \leq 65$	99
$40 < N \leq 70$	113
$40 < N \leq 75$	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 A1 Total 2
Leanne sent 200 emails last week

---

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

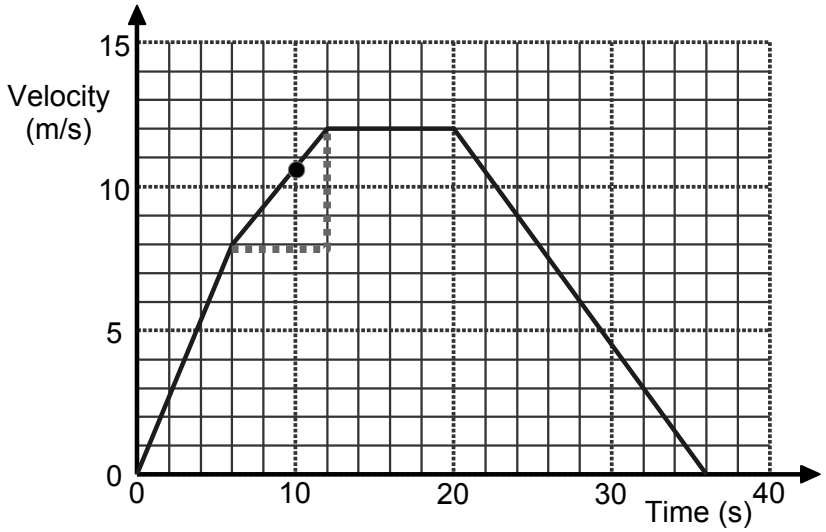
---

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

---

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

---

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

---

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

---

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

---

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]

---

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 $OP = \frac{4-0}{8-0} = \frac{1}{2}$ P1

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

---

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

---

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