

For **OCR**

# Mathematics

## Paper 1 (Calculator)

### Foundation Tier

#### Churchill Paper 1A – Marking Guide

Method marks (M) are awarded for using a correct method and are not lost for purely numerical errors

Accuracy marks (A) are awarded for a correct answer and depend on preceding M marks

(B) marks are awarded independent of method



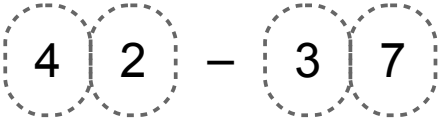
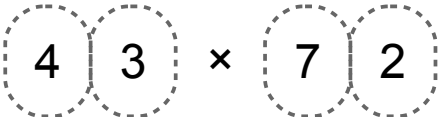
Written by Shaun Armstrong

This paper is part of a product for use in the single school or college that has purchased the licence.

However, this paper is available as a sample that can be used without licence.

## Churchill Paper 1A Marking Guide – OCR Foundation Tier

- 1 (a)** e.g. The mean cost for each person's food and drink B1
- (b)** Actual total =  $2 \times \text{£}4.85 + 5 \times \text{£}5.99 + 3 \times \text{£}2.95 + 4 \times \text{£}3.50$  M1 A1  
 $= \text{£}9.70 + \text{£}29.95 + \text{£}8.85 + \text{£}14$   
 $= \text{£}62.50$   
 Millie's estimate =  $\text{£}63$   
 She overestimated by 50p M1 A1 Total 5
- 

- 2 (a)**  (total 0 to 10) M1  
A1
- (b)**  (40 and 70) M1  
A1
- (c)** Must be 4-digit and start with 4 or 7  
 Must end with 2 or 4  
 So:
- |      |                  |    |         |
|------|------------------|----|---------|
| 4372 |                  |    |         |
| 4732 | (any 2)          | B1 |         |
| 7342 |                  |    |         |
| 7432 | (any 4)          | B1 |         |
| 7234 |                  |    |         |
| 7324 | (all, no extras) | B1 | Total 7 |
- 

- 3** Let Gill have  $\text{£}x$  so Kat has  $\text{£}4x$  M1  
 After spending  $\text{£}3$  Kat has  $\text{£}(4x - 3)$  M1  
 Kat now has twice as much as Gill so:  
 $4x - 3 = 2x$  M1  
 $2x - 3 = 0$   
 $2x = 3$   
 $x = 1.5$  M1  
 Gill has  $\text{£}1.50$   
 So Kat now has  $2 \times \text{£}1.50 = \text{£}3$  A1
- [Quick method:  $\text{£}3$  must be equal to 2 lots of what Gill has.]* Total 4
- 

- 4 (a)** 3 : 1 B1
- (b)**  $3 + 4 = 7$   
 $84 \div 7 = 12$  M1  
 $3 \times 12 = 36$  M1  
 $4 \times 12 = 48$   
 36 and 48 A1 Total 4
-

<b>5</b>	<b>(a)</b> Number of grey triangles = $2 \times$ pattern number $2 \times 22 = 44$ grey triangles	M1 A1	
	<b>(b)</b> In each pattern there are 2 more white triangles than grey ones $40 \times 2 = 80$ $80 + 2 = 82$ white triangles	M1 A1	
	<b>(c)</b> Combining the rules for grey and white we have		
	Total number of triangles = $\boxed{4} \times$ Pattern number + $\boxed{2}$	M1 A1	Total 6

<b>6</b>	<b>(a)</b> Triangular prism	B1	
	<b>(b)</b> Angle $ABC = 90^\circ$	B1	
	Angle $BHC = 45^\circ$	B1	
	Angle $CHF = 90^\circ$	B1	Total 4

<b>7</b>	<b>(a)</b> 0.7	B1	
	<b>(b)</b> $0.1 + 0.3 = 0.4$ $1 - 0.4 = 0.6$	M1 A1	
	<b>(c)</b> e.g. The probability of a red bead being picked is 0.1 which is $\frac{1}{10}$ . There must be at least 1 red bead so there must be at least 10 beads for $\frac{1}{10}$ of the beads to be red.	B2	
	<b>(d)</b> $= 0.3 \times 0.3$ $= 0.09$	M1 A1	Total 7

<b>8</b>	<b>(a)</b> $= \frac{3}{2} \times 4 = 6$ eggs	B1	
	<b>(b)</b> $75 \div 30 = 2.5$ $2.5 \times 250 = 625$ ml of milk	M1 A1	
	<b>(c)</b> $20 \div 4 = 5$ lots of 4 eggs $2000 \div 250 = 8$ lots of 250 ml milk $500 \div 30 = 16$ and a bit lots of 30 g butter Smallest of these is 5 lots of 4 eggs She can make $5 \times 2 = 10$ portions	M1 A1	Total 6

9 e.g. Perimeter =  $10 \times \text{side length of square} = 35 \text{ cm}$  M1  
 So, side length of square =  $35 \div 10 = 3.5 \text{ cm}$  A1  
 Sides of rectangle measure  $2 \times 3.5 = 7 \text{ cm}$   
 and  $3 \times 3.5 = 10.5 \text{ cm}$   
 Area of rectangle =  $7 \times 10.5 = 73.5 \text{ cm}^2$  M1 A1 Total 4

---

10 (a) Mortle to Numby on map  $\approx 3.8 \text{ cm}$   
 Numby to Otton on map  $\approx 8.5 \text{ cm}$   
 Total distance on map =  $3.8 + 8.5 = 12.3 \text{ cm}$  M1  
 Actual distance =  $5 \times 12.3 = 61.5 \text{ km}$  M1  
 Time taken =  $30 + 50 = 80 \text{ minutes}$   
 80 minutes =  $80 \div 60 = 1\frac{1}{3} \text{ hours}$  M1  
 Average speed =  $61.5 \div 1\frac{1}{3}$  M1  
 = 46.125  
 Lisa's average speed was 46 km/h (2sf) A1

*[Accept 45 to 47.5]*

(b) e.g. It is likely to be an underestimate as it assumes the roads go in straight lines between the towns. The actual route will be quite a bit longer giving a higher average speed. B2 Total 7

---

11 (a) There must be a whole number of each so there must be at least 8 girls M1  
 There will then be 5 boys M1  
 Smallest number of children =  $8 + 5 = 13$  A1

(b) e.g.  $60\% = \frac{3}{5}$   
 There must be a whole number of each so there must be at least 5 vans M1  
 Smallest number of lorries =  $5 + 3 = 8$  A1 Total 5

---

12  $\pounds 500 = \text{€}1.38 \times 500 = \text{€}690$  M1  
 $\text{€}690 - \text{€}465 = \text{€}225$   
 $\text{€}225 = \pounds 225 \div 1.31 = \pounds 171.76$  [ or  $\pounds 172$  to nearest pound ] M1 A1 Total 3

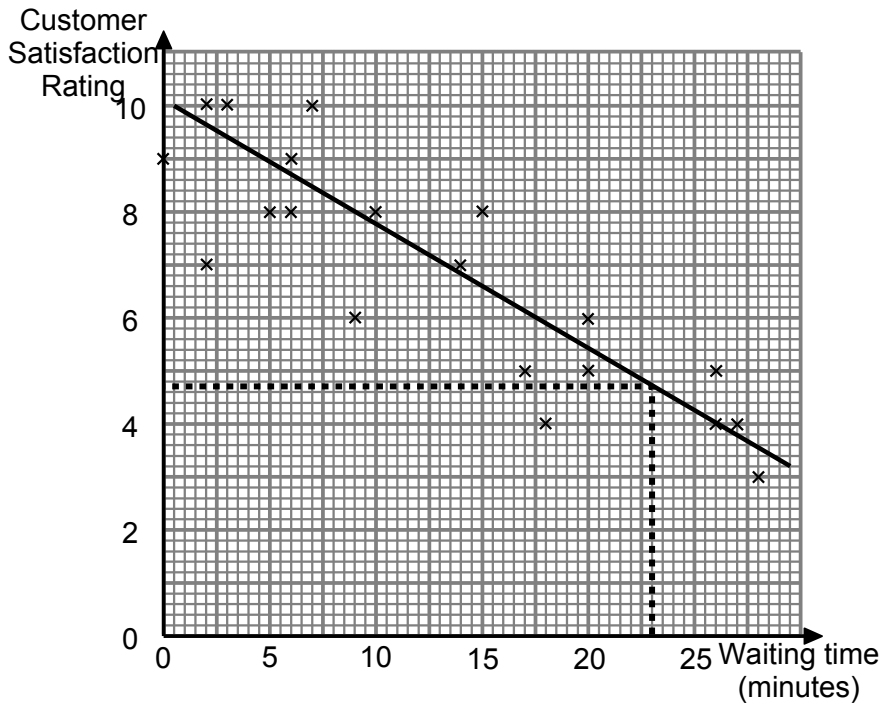
---

13 (a) 9 callers gave a rating of 8 or more

Percentage =  $\frac{9}{20} \times 100\% = 45\%$

M1 A1

(b)



M1

5 (from their line – nearest whole number or raw value)

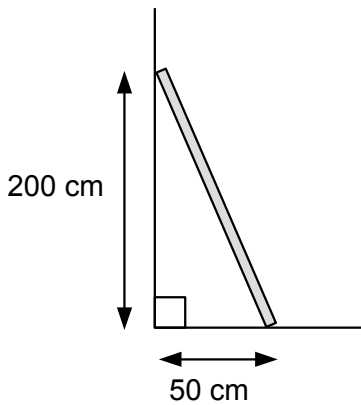
A1

(c) e.g. The line of best fit would predict a negative score but the rating is on a scale of 1 to 10 so this is not possible

B1

Total 5

14



Using Pythagoras'

$$a^2 + b^2 = c^2$$

$$50^2 + 200^2 = c^2$$

$$2500 + 40000 = c^2$$

$$42500 = c^2$$

$$c = \sqrt{42500}$$

$$c = 206.15\dots$$

M1 A1

M1

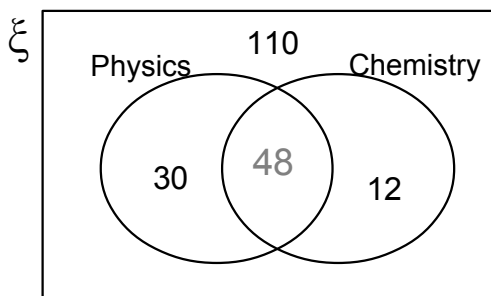
The ladder is 206 cm long (3sf)

A1

Total 4

- 15 (a)** e.g. 17, 34, 51, 68, 85, (102)  
So there are 5 M1  
A1
- (b)** e.g.  $1 + 20 = 21$ , not square  
 $4 + 20 = 24$ , not square  
 $9 + 20 = 29$ , not square M1  
 $16 + 20 = 36$ , square  
The two numbers are 16 and 36  
The sum =  $16 + 36 = 52$  A1
- (c)** e.g. 1 Factors 1  
2 Factors 1, 2  
3 Factors 1, 3  
4 Factors 1, 2, 4 M1  
5 Factors 1, 5  
6 Factors 1, 2, 3, 6  
7 Factors 1, 7  
8 Factors 1, 2, 4, 8  
 $1 + 2 + 4 + 8 = 15$       The number is 8 A1      Total 6
- 

- 16 (a)**  $78 - 48 = 30$ ,  $60 - 48 = 12$   
 $30 + 48 + 12 = 90$  M1  
 $200 - 90 = 110$



A1

- (b)**  $= \frac{110}{200}$        $[ = \frac{11}{20} ]$  B1      Total 3
- 

- 17 (a)** Median =  $\frac{1}{2}(n + 1)$ th value =  $\frac{1}{2}(31 + 1)$ th value = 16<sup>th</sup> value  
There are 6 in first class  
There are  $6 + 10 = 16$  in 1st & 2nd classes so 16<sup>th</sup> is in second class M1  
The median is in the class  $25 < N \leq 30$  A1
- (b)** e.g. The class intervals have different widths and the 5 large values between 50 and 70 could pull the mean above 35 B1      Total 3
-

<b>18</b>	<b>(a)</b> e.g. 2.3 km costs £4.20		
	1 km costs $\text{£}4.20 \div 2.3 = \text{£}1.826\dots$	M1	
	6.1 km costs $6.1 \times \text{£}1.826\dots = \text{£}11.139\dots$	M1	
	As it is Sunday, cost = $1.5 \times \text{£}11.139\dots = \text{£}16.708\dots$	M1	
	I estimate the taxi will cost £16.71	A1	
	<b>(b)</b> e.g. I have assumed that the cost increases smoothly with distance rather than charging for each half km etc.	B1	Total 5
<hr/>			
<b>19</b>	y-intercept = -1	B1	
	Gradient [using (-4, 1) to (4, -3)] = $\frac{-3 - 1}{4 - (-4)} = \frac{-4}{8} = -\frac{1}{2}$	M1	
	Equation is $y = -\frac{1}{2}x - 1$	A1	Total 3
<hr/>			
<b>20</b>	<b>(a)</b> This approximation will have lowered her estimate as the actual value of $\pi$ is larger than 3, i.e. 3.14...	B1	
	<b>(b)</b> She has assumed the lichen covers a circular area. The shape of the lichen will not be a perfect circle. It will have indents and bits sticking out which means that her estimate could be too big or too small.	B1	
		B1	Total 3
<hr/>			
<b>21</b>	<b>(a)</b> = $x^2 - 5x - 2x + 10$	M1	
	= $x^2 - 7x + 10$	A1	
	<b>(b)</b> $y = -9$ or 7	B2	
	<b>(c)</b> $(z + 1)(z + 6) = 0$	M1	
	$z = -6$ or $-1$	A1	Total 6

**TOTAL FOR PAPER: 100 MARKS**