PROBLEM SOLVING - GCSE EDEXCEL (Higher)
Marking Schem

1MA0_1H

Question		Working	Answer	Mark	Notes
1	(a)	$360 \div 60 = 6$ $300 \div 60 = 5$ $6 \times 5 =$	Yes and 30 3	M	1 for dividing side of patio by side of paving slab eg. $360 \div 60$ **or** $300 \div 60$ **or** $3.6 \div 0.6$ **or** $3 \div 0.6$ **or** 6 and 5 seen (may be on a diagram) **or** 6 divisions seen on length of diagram **or** 5 divisions seen on width of diagram M1 for correct method to find number of paving slabs eg. $(360 \div 60) \times (300 \div 60)$ oe **or** 6×5 **or** 30 squares seen on diagram (units may not be consistent) A1 for Yes **and** 30 (**or** 2 extra) with correct calculations **OR** M1 for correct method to find area of patio **or** paving slab eg 360×300 **or** 108000 seen **or** 60×60 **or** 3600 seen **or** 3.6×3 **or** 10.8 seen **or** 0.6×0.6 **or** 0.36 seen M1 for dividing area of patio by area of a paving slab eg. $(3.6 \times 3) \div (0.6 \times 0.6)$ oe (units may not be consistent) A1 for Yes **and** 30 (**or** 2 extra) with correct calculations **OR** M1 for method to find area of patio or area of 32 slabs eg. $60 \times 60 \times 32$ **or** 360×300 M1 for method to find both area of patio **and** area of 32 slabs eg. $60 \times 60 \times 32$ **and** 360×300 (units may not be consistent) A1 for Yes **and** 115200 **and** 108000 **OR** Yes **and** 11.52 **and** 10.8 **NB : Throughout the question, candidates could be working in metres or centimetres**

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	(b)	1726 25890 27616 (grid method shown) |			800	60	3
30	24000	1800	90
2	1600	120	6	 24000+1800+90+1600+120+6 = 27616	276.16	3	M1 for complete correct method with relative place value correct. Condone 1 multiplication error, addition not necessary. **OR** M1 for a complete grid. Condone 1 multiplication error, addition not necessary. **OR** M1 for sight of a complete partitioning method, condone 1 multiplication error. Final addition not necessary. A1 for digits 27616 A1 ft (dep on M1) for correct placement of decimal point after addition (of appropriate values) (SC: B1 for attempting to add 32 lots of 8.63)
2	(a)		30	2	M1 for 25 ÷ 10 or 2.5 seen or 10 ÷ 25 or 0.4 seen or 12 + 12 + 6 oe or a complete method eg. 25 × 12 ÷ 10 oe A1 cao
	(b)	*1000 ÷ 200 × 12*	60	2	M1 for 500÷50 or 1000÷200 or 500÷10 OR correct scale factor clearly linked with one ingredient eg. 10 with sugar or 5 with butter or flour or 50 with milk OR answer of 120 or 600 A1 cao

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3		Acton after 24, 48, 72, 96, 120 Barton after 20, 40, 60, 80, 100, 120 LCM of 20 and 24 is 120 9:00 am + 120 minutes **OR** Acton after 24, 48, 1h 12 m, 1h 36m, 2h Barton after 20, 40, 1 h, 1h 20m, 1h 40m, 2h LCM is 2 hours 9:00 am + 2 hours **OR** Times from 9:00 am when each bus leaves the bus station Acton at 9:24, 9:48, 10:12, 10:36, 11:00 Barton at 9:20, 9:40, 10:00, 10:20, 10:40, 11:00 **OR** $20 = 2 \times 2 \times 5$ $24 = 2 \times 2 \times 2 \times 3$ $2 \times 2 \times 2 \times 3 \times 5 = 120$	11:00 am	3	M1 for listing multiples of 20 and 24 with at least 3 numbers in each list ; multiples could be given in minutes or in hours and minutes (condone one addition error in total in first 3 numbers in lists) A1 identify 120 (mins) **or** 2 (hours) as LCM A1 for 11:00 (am) **or** 11(am) **or** 11 o'clock **OR** M1 for listing times after 9am when each bus leaves the bus station, with at least 3 times in each list (condone one addition error in total in first 3 times after 9am in lists) A1 for correct times in each list up to and including 11:00 A1 for 11:00 (am) **or** 11(am) **or** 11 o'clock **OR** M1 for correct method to write 20 and 24 in terms of their prime factors 2, 2, 5 and 2, 2, 2, 3 (condone one error) A1 identify 120 as LCM A1 for 11:00 (am) **or** 11(am) **or** 11 o'clock

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4	$$\frac{20 \times 300}{0.5}$$	12000	3	B1 for 20 or 300 used M1 for "20" × "300" or $\frac{"20"}{0.5}$ or $\frac{"300"}{0.5}$, values do not need to be rounded A1 for answer in the range 11200 –13200 SC B3 for 12000 with or without working
5	LCM (80, 50) = 400 Matt 400 ÷ 50 = 8 Dan 400 ÷80 = 5 **OR** 50 = 2 × 5 (× 5) 80 = 2 × 5 (× 2 × 2 × 2)	Matt 8 Dan 5	3	M1 lists multiples of both 80 (seconds) and 50 (seconds) (at least 3 of each but condone errors if intention is clear, can be in minutes and seconds) or use of 400 seconds oe. M1 (dep on M1) for a division of "LCM" by 80 or 50 or counts up "multiples" (implied if one answer is correct or answers reversed) A1 Matt 8 and Dan 5 SC B1 for Matt 7, Dan 4 **OR** M1 for expansion of both 80 and 50 into prime factors. M1 demonstrates that both expansions include 10 oe A1 Matt 8 and Dan 5 SC B1 for Matt 7, Dan 4

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6	 Sq G S Tot F 2 4 15 21 M 6 14 9 29 Tot 8 18 24 50	4	4	M1 for a correct first step which results in a value that could be in the table: eg. 50 – 18 – 8 (= 24) or 50 – 21 (= 29) or 8 – 6 (= 2) M1 for a correct method to find a second value that could be in the table using their first value eg "29" – 9 – 6 (=14) or "24" – 9 (=15) M1 for a fully correct and complete method. A1 cao
7	40, 80, 120 15, 30, 45, 60, 75, 90, 105, 120 40 = 2 × 2 × 2 × 5 15 = 3 × 5	3 and 8 or any multiple of 3,8	3	M1 for multiples of both 40 and 15 (at least 2 of each shown but condone errors if intention is clear) or for 40 × 15 M1 (dep on M1) for a complete method to find a common multiple of 40 and 15, eg. 120, 240, 600 condoning one arithmetic error in any lists of multiples shown A1 for 3, 8 or any multiple of 3, 8 OR M1 for factors 2,2,2,5 and factors 3,5 M1 (dep on M1) for a complete method to find a common multiple of 40 and 15 A1 for 3, 8 or any multiple of 3, 8

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Question	Working	Answer	Mark	Notes

8		Conclusion (supported)	5	M1 for finding the area of one rectangle which is not 6 × 10
				   eg 2×2.5 (=5) or 4×10 (=40) or 2.5×6 or 5×2
				
				M1 for a complete method to find the total area
				   eg 5+5+40 or 60−10 (=50)
				
				M1 for a complete method to find the number of tins needed
				eg "50" ÷ 5 ÷ 2.5 (=4)
				OR for a complete method to find the number of litres needed.
				eg "50" ÷ 5 (=10)
				OR for a complete method to find the area covered by 3 tins
				eg 3×2.5×5 (=37.5)
				
				A1 for 50 (m^2) and 4 (tins needed)
				   or for 10 (litres) and 7.5 (litres)
				   or for 50(m^2) and 37.5(m^2)
				
				C1 (dep M2) for a conclusion supported by their calculations

9	<table><tr><td></td><td>S</td><td>A</td><td>B</td><td></td></tr><tr><td>M</td><td>4</td><td>9</td><td>10</td><td>23</td></tr><tr><td>F</td><td>6</td><td>11</td><td>26</td><td>43</td></tr><tr><td></td><td>10</td><td>20</td><td>36</td><td>66</td></tr></table>	11	4	M1 for a correct first step which results in a value that could be in the table: ie. 66 − 10 − 20 (= 36) or 66 − 43 (= 23) or 10 − 4 (= 6) M1 for correct method to find a second value that could be in the table using their first value eg "23" − 4 - 10 (= 9) or "36" - 10 (= 26) M1 for a fully correct and complete method. A1 cao

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10		270	3	M1 for correct use of formula for volume of a cylinder using exact or (some) approximate figures eg $\pi \times 31^2 \times 97.5$ or $\pi \times 31^2 \times 100$ or using an estimate of π eg $\pi = 3$ in the volume formula M1 for a complete method to find an estimate for the volume in cm^3 with at least 2 values rounded eg $\pi \times 30^2 \times 100$ ($= 270\,000$) eg $3.1 \times 30^2 \times 100$ eg $3 \times 31^2 \times 100$ A1 accept answer in the range $270 - 300$ from a method using estimates
11		130	4	M1 for setting up two correct equations eg $3p + 4c = 440$ $4p + 3c = 470$ M1 for adding the two equations eg $7p + 7c = 910$ or for a correct method to eliminate one variable (allow one error) M1 for a method to find $p + c$ eg $910 \div 7$ or for a complete method to find both p and c (p = 80, c = 50) A1 for 130 or £1.30(p) **NB:** Allow any letters for variables. Allow a non-algebraic approach eg 7 kg potatoes and 7 kg carrots costs a total of 910