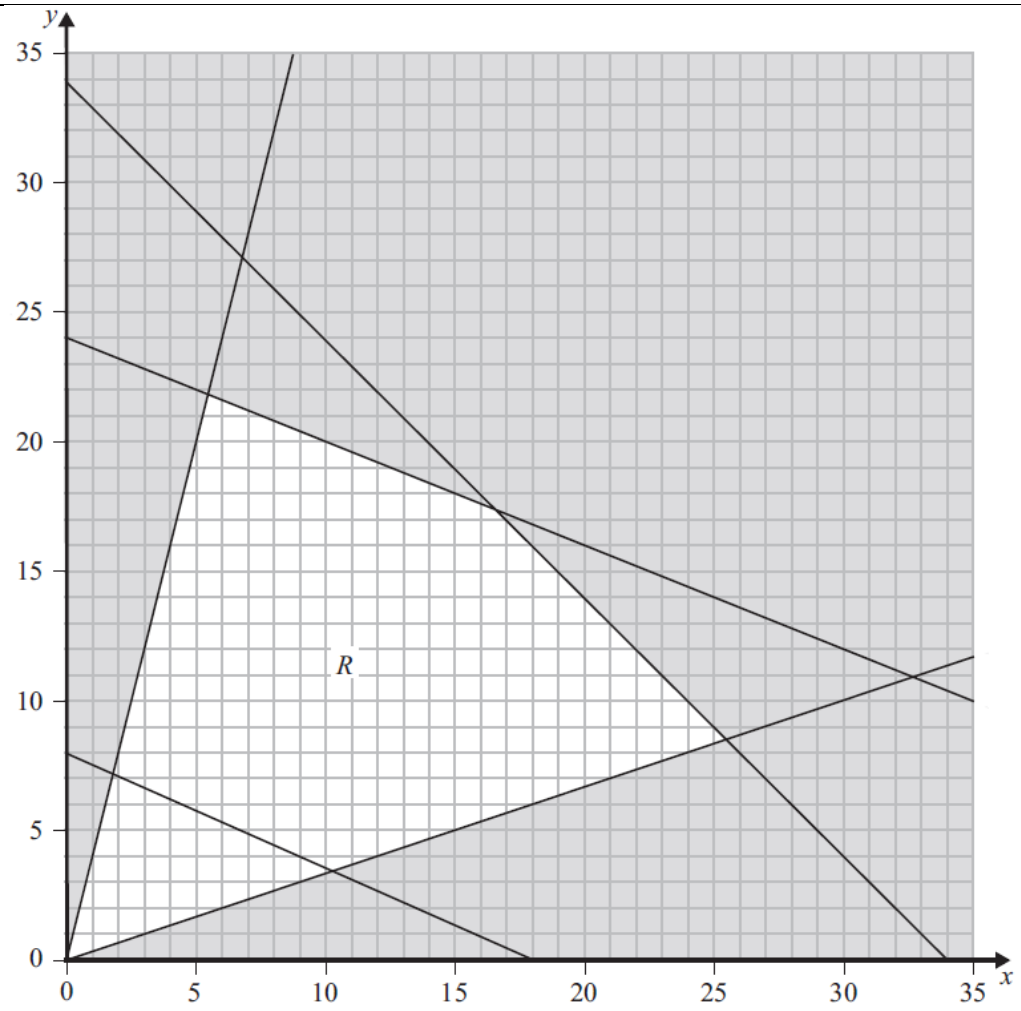
Question Number	Scheme	Marks
6. (a)	$x + y \leqslant 34$ $12x + 30y \leqslant 720 \quad \Rightarrow \quad 2x + 5y \leqslant 120$	B1 M1 A1 **(3)**
(b)		B1 dB1
		(2)
(c)	Objective line drawn Optimal vertex at $\left(16\frac{2}{3},\ 17\frac{1}{3}\right)$ identified 17 small clocks and 17 large clocks	M1 A1 A1
		(3)
(d)	$12 \times 60 - 17 \times 12 - 17 \times 30 = 6$ minutes	B1
		(1)
		9 marks

	Notes for Question 6	
a1B1	CAO	
a1M1	Forms inequality using time information – accept $<$ $\leqslant$ or $=$ for this mark	
a1A1	CAO – fully simplified	
b1B1	Both lines drawn ($2x + 5y = 120$, extended if necessary, should pass through (0, 24) and (20, 16), and $x + y = 34$ should pass through (0, 34) and (34, 0). Both lines must be accurately plotted to within one small square). If the lines do not reach the boundary of the graph paper they must start/finish at least within the given shaded area	
b2B1	Correct region identified with *R* written (dependent on previous B mark) added shading not required	
c1M1	Correct objective line drawn (minimum passes through (0, 2) and (4.5, 0)) or line with reciprocal gradient (correct gradient can be checked using ePen line tool)	
c1A1	Optimal point identified (dependent on correct objective line and correct *R*) indicated by label on the graph or coordinates which round to (17,17). (Note that (16,17) is incorrect)	
c2A1	CAO but must be in context so $x = 17$ and $y = 17$ is A0	
d1B1	CAO including minutes with no incorrect working seen. Accept time 0.1 hours	
	Alternative for (c) and (d) **Note the point (15, 18) is within the feasible region, but is not adjacent to the optimal vertex. However, it produces the optimal solution and may be found by problem solving**	
(c)	Objective line drawn Optimal vertex at $\left(16\frac{2}{3},\ 17\frac{1}{3}\right)$ identified 15 small clocks and 18 large clocks	M1 A1 A1
		(3)
(d)	$12 \times 60 - 15 \times 12 - 18 \times 30 = 0$ minutes	B1
		(1)
c1M1	Correct objective line drawn (minimum passes through (0, 2) and (4.5, 0)) or line with reciprocal gradient (correct gradient can be checked using ePen line tool)	
c1A1	Optimal point identified (dependent on correct objective line and correct *R*) indicated by label on the graph or coordinates which round to (17,17). (Note that (16,17) is incorrect)	
c2A1	CAO but must be in context so $x = 15$ and $y = 18$ is A0	
d1B1	CAO including minutes with no incorrect working seen.	