Question Number	Scheme	Marks
8. (a)	$y \leqslant 3x + 4$ $x + 2y \geqslant 24$ $2x + 5y \leqslant 100$ $4x + y \leqslant 64$	B1 B1 **(2)**
(b)	$4x + y = 64$ $\quad x + 2y = 24$ $2x + 5y = 100 \quad \Rightarrow \left(\frac{110}{9}, \frac{136}{9}\right) \quad y = 3x + 4 \quad \Rightarrow \left(\frac{16}{7}, \frac{76}{7}\right)$	M1 A1 A1
	$P = ax + by$ $\frac{110}{9}a + \frac{136}{9}b = \frac{628}{9} \quad \Rightarrow 55a + 68b = 314$ $\frac{16}{7}a + \frac{76}{7}b = \frac{260}{7} \quad \Rightarrow 4a + 19b = 65$ $a = 2 \quad b = 3$ $(P =)\ 2x + 3y$	dM1 A1
		(5)
(c)	(3, 11)	B1
		(1)
		8 marks

Notes for Question 8		
a1B1	Any two inequalities correct – condone strict inequalities here (accept equivalent forms)	
a2B1	All four inequalities correct (accept equivalent forms)	
b1M1	Attempts to solve either pair of simultaneous equations to find min and max points (they may attempt to find all 4 vertices) **Note they may use calculators to solve these equations, with no working shown. The correct two pairs of coordinates implies M1 A1 A1 (These values may be seen on the diagram)** **If the correct coordinates are not seen and no working is shown, this is M0**	
b1A1	One pair correctly solved (accept decimal equivalents awrt (12.22, 15.11) and (2.29, 10.86)	
b2A1	Both pairs correctly solved (accept decimal equivalents)	
b2dM1 (cM1 on ePen)	Forms a pair of simultaneous equations using $P = ax + by$ and their minimum and maximum values and solves to obtain a and b **(dependent on the previous M mark) Condone use of alternative letters instead of a and b (but not x and y)**	
b3A1 (cA1 on ePen)	CAO – ($P =$) $2x + 3y$ (must follow from correct working) Note we do not need $P =$, but if they write e.g. $2x + 3y = 0$ this is A0	
c1B1 (dB1 on ePen)	CAO (note the correct coordinates may be embedded in a calculation of the minimum profit e.g. 2(3) + 3(11) = 39 (we will accept a value of 39 with no obvious wrong working as evidence of the correct point) Accept 3, 11 here	

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