Decision 1 Algorithms Questions

6 Two algorithms are shown.

Algorithm 1

Line 10	Input P
Line 20	Input R
Line 30	Input T
Line 40	Let $I = (P * R * T)/100$
Line 50	Let $A = P + I$
Line 60	Let $M = A/(12 * T)$
Line 70	Print M
Line 80	Stop

Algorithm 2

Line 10	Input P
Line 20	Input R
Line 30	Input T
Line 40	Let $A = P$
Line 50	$K = 0$
Line 60	Let $K = K + 1$
Line 70	Let $I = (A * R)/100$
Line 80	Let $A = A + I$
Line 90	If $K < T$ then goto Line 60
Line 100	Let $M = A/(12 * T)$
Line 110	Print M
Line 120	Stop

In the case where the input values are $P = 400$, $R = 5$ and $T = 3$:

(a) trace **Algorithm 1**;   *(3 marks)*

(b) trace **Algorithm 2**.   *(4 marks)*

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5 A student is using the following algorithm with different values of A and B.

Line 10	Input A, B
Line 20	Let $C = 0$ and let $D = 0$
Line 30	Let $C = C + A$
Line 40	Let $D = D + B$
Line 50	If $C = D$ then go to Line 110
Line 60	If $C > D$ then go to Line 90
Line 70	Let $C = C + A$
Line 80	Go to Line 50
Line 90	Let $D = D + B$
Line 100	Go to Line 50
Line 110	Print C
Line 120	End

(a) (i) Trace the algorithm in the case where $A = 2$ and $B = 3$.   *(3 marks)*

    (ii)   Trace the algorithm in the case where $A = 6$ and $B = 8$.   *(3 marks)*

(b)   State the purpose of the algorithm.   *(1 mark)*

(c)   Write down the final value of C in the case where $A = 200$ and $B = 300$.   *(1 mark)*

Decision 1 Algorithms Answers

6(a)										
	P	R	T	I	A	M	M1		SCA	
	400	5	3							
				60						
					460		A1			
						12.8	A1	3	AWRT	

(b)											
	P	R	T	A	K	I	M	M1		variables	
	400	5	3	400							
					0						
					1						
						20					
				420				A1		1st pass	
					2						
						21					
				441				A1F		2nd pass	
					3						
						22.05					
				463.05							
							12.9	A1	4	All correct AWRT	
						Total			**7**		

5(a)(i)	(A)	(B)	C	D			
	2	3	0	0	M1		SCA: as far as $D = 3$
			2				
				3			
			4		A1		For 4
				6			
			6		A1	3	All correct
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(ii)	(A)	(B)	C	D			
	6	8	0	0	M1		SCA: as far as $D = 8$
			6				
				8			
			12		A1		For 12
				16			
			18				
				24			
			24		A1	3	All correct
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(b)	Find LCM	B1	1	Allow lowest common denominator
(c)	600	B1	1	
	Total		**8**	