Student 2: High Merit

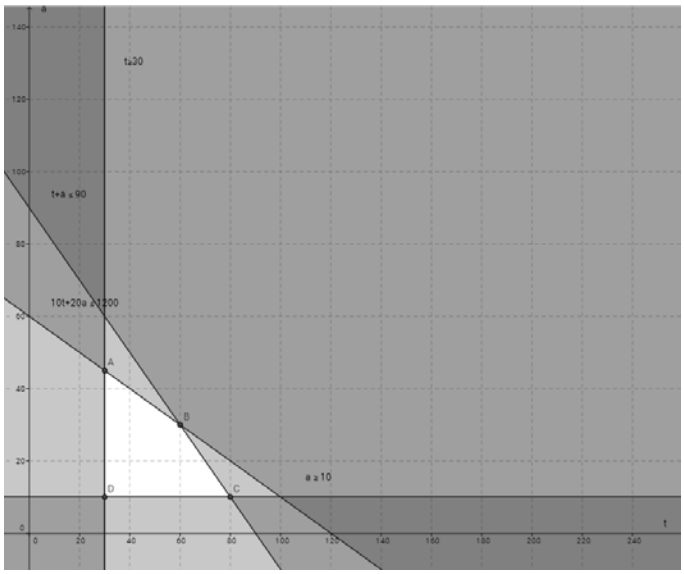
NZQA Intended for teacher use only

a = artichokes t = tomatoes

equations

$10t + 20a \leq 1200$ $t + a \leq 90$ $t \geq 30$ $a \geq 10$

Income equation: $10{,}000t + 25000a = I$



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Each set of co-ordinates which are the vertices for the feasible region are put into the profit equation $I = 10{,}000t + 250000a$

Vertices	$10{,}000t + 25000a$	$10{,}000t + 20000a$
A (30,45)	1,425,000	
B (60,30)	1,350,000	
C (80,10)	1,050,000	
D (30,10)	550,000	

In the current year, Ted should plant 30 hectares of tomatoes and 45 hectares of artichokes in order to maximise his income. If he does this, his income will be $1,425,000 according to his expectation regarding how much he will receive per hectare. 2

Future payments of tomatoes: artichokes is predicted at 1:2. As the value was previously $10,000 per hectare of tomatoes and $25,000 per hectare of artichokes, the future value can be estimated at $10,000 for tomatoes and $20,000 for artichokes.
The new income equation will therefore be $I = 10{,}000t + 20000a$ 3

In future years Ted could pant either 30 hectares of tomatoes and 45 hectares of artichokes or 60 hectares of tomatoes and 30 hectares of artichokes, both options providing $1,200,000.

However, seeing as artichokes are very labour-intensive, Ted's best option would be to plant 60 hectares of tomatoes and 30 hectares of artichokes in future years. 4