Mark scheme H UNIT 15
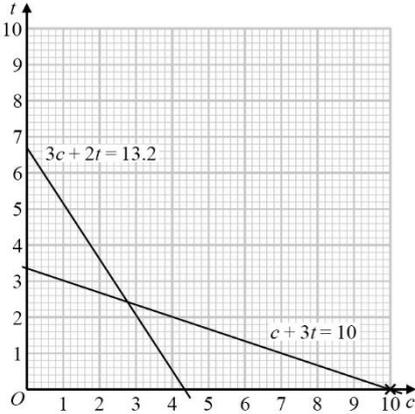
This is a calculator test (50 minutes).

The following marks are awarded for each question.

B	Unconditional accuracy mark.
M	Method mark – the correct method must be shown but there may be an arithmetic error; the sight of the value given in brackets implies the award of the method mark.
A	Accuracy mark – unless the question specifies that working **must** be shown then the sight of the correct answer implies the award of full marks (unless the answer clearly comes from incorrect working).
C	Communication mark.
P	Process mark to show correct process for problem solving. Any other process of a similar standard to achieve an accurate result is acceptable to achieve this mark.
FT	Incorrect values may be **followed through** from one step to the next **provided** that the correct method is seen in each step and the only errors are arithmetic. This is shown in mark schemes by putting a number in inverted commas.
OE	Or equivalent answer mark.

Q	Answer	Mark	Comment
1	Correct shading	M1	Line $x = 2$ drawn
		A1	Shading to left of $x = 2$
3	Correct shading	M1	For lines $x = -2$ and $x = 1$
		M1	For lines $y = -1$ and $y = 2$
		A1	Accept unshaded region provided this unshaded region is identified

5a	$3c + 2t = 13.20$, (1)$c + 3t = 10$	B2	For both equations.
			(B1 for one correct equation.) Condone use of other letters. Accept 1320 and 1000
5b		B2	For both graphs correctly drawn.
			(B1 for 1 correctly drawn graph)
5c	Coffee costs (or $c = 2.8(0)$)	B1	ft their graph intersection.
	Tea costs (or $t = 2.4(0)$)		

7	$x > -1$, $y \geq -2$, $y < 2x + 3$, $x + y \leq 3$	B4	B1 for each correct inequality (inequalities are all oe eg $x + y \leq 3$ may be written $y \leq 3 - x$)
			SCB2 for the student who gets mixed up with $<$ & $\leq$ and $>$ & $\geq$
9	$2x^3 + 13x^2 + 17x - 12$	P1	Expansion of 2 brackets with 3 of 4 terms correct, e.g.
			$(x + 3)(2x - 1) = 2x^2 - x + 6x - 3$
		P1	A fully correct process to multiply all 3 brackets
		A1	

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11a	$(2, -1)$ and minimum	P1	$(x - 2)^2 - 4 + 3$ oe (or minimum) or other correct method, e.g. $x = \dfrac{-b}{2a} = \dfrac{4}{2}$
		P1	$(x - 2)^2 - 1$ or one correct coordinate e.g. $(2, y)$ or $(x, -1)$
		A1	
11b	$(-4, 19)$ and maximum	P1	$-((x + 4)^2 - 16) + 3$ oe (or maximum) or other correct method, e.g. $2\,x = \dfrac{-b}{2a} = \dfrac{8}{-2}$
		P1	$-(x + 4)^2 + 19$ or one correct coordinate e.g. $(-4, y)$ or $(x, 19)$
		A1	
13	$a = -3,\ b = -13,\ c = 15$	P1	$(x + 3)(x - 1)(x - 5)$
		P1	For correct process to expand all 3 brackets e.g.$(x^3 - 5x^2 + 2x^2 - 10x - 3x + 15)$
		A1	

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Question	Topic	Step	Marks
1	Represent inequalities in one variable graphically	8th	2
3	Represent inequalities in one variable graphically	8th	3
5a	Set up and solve a pair of simultaneous equations in two variables	9th	2
5b	Solve simultaneous equations representing a real-life situation graphically and interpret the solution in the context of the question	9th	2
5c	Solve simultaneous equations representing a real-life situation graphically and interpret the solution in the context of the question	9th	1
7	Solve two simultaneous inequalities algebraically and show the solution set on a number line or give the integer solutions	9th	4
8a	Solve quadratic inequalities in one variable, by factorising and sketching the graph to find critical values	7th	2
8b	Solve quadratic inequalities in one variable, by factorising and sketching the graph to find critical values	7th	2
9	Expand two or more brackets	10th	3
11a	Deduce turning points by completing the square	10th	3
11b	Deduce turning points by completing the square	10th	3

| 13 | Know that a cubic function can have 1, 2 or 3 solutions | 10th | 3 |