Q	Marking Instructions	AO	Marks	Typical Solution
13(a)	Substitutes $x=-\frac{1}{5}$ into $125x^3+150x^2+55x+6$ and obtains zero. Must see $-\frac{1}{5}$ bracketed correctly in the cubed and squared term with a multiplication sign if missing brackets in the 55x term or a further step to indicate correct evaluation eg -1 + 6 -11 +6 = 0	1.1a	M1	$125\left(-\frac{1}{5}\right)^3+150\left(-\frac{1}{5}\right)^2+55\left(-\frac{1}{5}\right)+6=0$ Since $P\left(-\frac{1}{5}\right)=0$ $(5x+1)$ must be a factor of $P(x)$
	Completes factor theorem argument to show that $(5x+1)$ is a factor of $125x^3+150x^2+55x+6$ Statement can come first but must be in the right direction AND be accompanied by the evaluation ie $P\left(-\frac{1}{5}\right)=0 \Rightarrow (5x+1)$ is a factor of $P(x)$ Accept $P\left(-\frac{1}{5}\right)=$ in front of evaluation. Not $(5x+1)$ is a factor $\Rightarrow P\left(-\frac{1}{5}\right)=0$	2.1	R1	
	Subtotal		**2**	

Q	Marking Instructions	AO	Marks	Typical Solution
13(b)	Obtains quadratic factor of the form $25x^2+bx+6$, or states other roots. PI by correct answer	1.1a	M1	$(5x+1)(5x+2)(5x+3)$
	Obtains second linear factor. Condone $(x+0.4)$ or $(x+0.6)$ OE PI by correct answer.	1.1a	M1	
	Obtains $(5x+1)(5x+2)(5x+3)$ OE	1.1b	A1	
	Subtotal		**3**	

Q	Marking Instructions	AO	Marks	Typical Solution
13(c)	Deduces $250n^3+300n^2+110n+12$ $=2(5n+1)(5n+2)(5n+3)$ FT their three factors from part (b) Condone use of a different letter to n	2.2a	M1	$250n^3+300n^2+110n+12$ $=2(5n+1)(5n+2)(5n+3)$ $(5n+1),(5n+2)$ and $(5n+3)$ are three consecutive whole numbers. The three algebraic factors must contain a multiple of 3 and must also contain a multiple of 2 and the extra 2 gives $2\times2\times3=12$ therefore $250n^3+300n^2+110n+12$ is a multiple of 12.
	Explains that the factors contain three consecutive (positive whole) numbers. Must have their three factors in a form which give consecutive positive whole numbers.	2.4	R1	
	Completes reasoned argument to show $250n^3+300n^2+110n+12$ is a multiple of 12. Reasons that the three algebraic factors must contain a multiple of 3 and must also contain a multiple of 2 and the extra 2 gives $2\times2\times3=12$ therefore $250n^3+300n^2+110n+12$ is a multiple of 12. Condone conclusion about $2(5n+1)(5n+2)(5n+3)$	2.4	R1	
	Subtotal		**3**	

	Question Total		**8**	