Question	Scheme	Marks	AOs
2	When $n = 1,\ 2^{3n+1} + 3\left(5^{2n+1}\right) = 16 + 375 = 391$ $391 = 17 \times 23$ so the statement is true for $n = 1$	B1	2.2a
	Assume true for $n = k$ so $2^{3k+1} + 3\left(5^{2k+1}\right)$ is divisible by 17	M1	2.4
	$\mathrm{f}(k+1) - \mathrm{f}(k) = 2^{3k+4} + 3\left(5^{2k+3}\right) - 2^{3k+1} - 3\left(5^{2k+1}\right)$	M1	2.1
	$= 7 \times 2^{3k+1} + 7 \times 3\left(5^{2k+1}\right) + 17 \times 3\left(5^{2k+1}\right)$		
	$= 7\mathrm{f}(k) + 17 \times 3\left(5^{2k+1}\right)$	A1	1.1b
	$\mathrm{f}(k+1) = 8\mathrm{f}(k) + 17 \times 3\left(5^{2k+1}\right)$	A1	1.1b
	If the statement is true for $n = k$ then it has been shown true for $n = k + 1$ and as it is true for $n = 1$, the statement is true for all positive integers n	A1	2.4
		(6)	
		(6 marks)	

Notes:

B1: Shows the statement is true for $n = 1$

M1: Assumes the statement is true for $n = k$

M1: Attempts $\mathrm{f}(k+1) - \mathrm{f}(k)$

A1: Correct expression in terms of $\mathrm{f}(k)$

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A1: Obtains a correct expression for $\mathrm{f}(k + 1)$

A1: Correct complete conclusion