

Q	Marking instructions	AO	Marks	Typical solution
8(a)	Identifies the algebraic mistake	2.3	E1	Kai has not expanded the brackets correctly
	Identifies the mistake that all cases have not been exhausted	2.3	E1	Kai has not considered numbers of the form $3m+2$
	<b>Subtotal</b>		<b>2</b>	

Q	Marking instructions	AO	Marks	Typical solution
8(b)	Completes manipulation correctly in Step 4 to obtain $(3m + 1)(9m^2 + 6m)$ OE	2.1	B1	Step 4: $= (3m + 1)(9m^2 + 6m + 1 - 1)$ $= (3m + 1)(9m^2 + 6m)$ $= 3(3m + 1)(3m^2 + 2m)$ which is a multiple of 3
	Manipulates expression with a third substitution using either $n = 3m + 2$ or $n = 3m - 1$	1.1a	M1	Step 5: when $n = 3m + 2$ , $n^3 - n = (3m + 2)((3m + 2)^2 - 1)$ $= (3m + 2)(9m^2 + 12m + 3)$ $= 3(3m + 2)(3m^2 + 4m + 1)$ which is a multiple of 3
	Manipulates correct expression to convincingly show multiple of 3 Equivalent working for $n = 3m - 1$ $n^3 - n$ $= (3m - 1)((3m - 1)^2 - 1)$ $= (3m - 1)(9m^2 - 6m)$ $= 3(3m - 1)(3m^2 - 2m)$ OE	1.1b	A1	$n^3 - n$ is always a multiple of 3 for all positive integer values of $n$
	Completes rigorous argument by clearly showing the factor of 3 in the two cases required and concludes appropriately	2.1	R1	
	<b>Subtotal</b>		<b>4</b>	

	<b>Question Total</b>		<b>6</b>	
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