6			$2^{2k} - 1$ or $4^k - 1$ (where k is an integer > 1) $= (2^k)^2 - 1$ $= (2^k - 1)(2^k + 1)$ $(2^k + 1) > 1$ and $k > 1$, hence $(2^k - 1) > 1$ Hence $(2^k - 1)(2^k + 1)$ is the product of two integers, both > 1, and hence $2^n - 1$ is not prime	**M1** **A1** **M1** **A1** **[4]**	**3.1a** **2.1** **1.1** **2.2a**	or $2^{2k+2}-1$ or $2^{2k+4}-1$ Allow $2^{2n}-1$ $= (2^{k+1}-1)(2^{k+1}+1)$ oe or $(2^{k+2}-1)(2^{k+2}+1)$ oe Both statements needed	**Induction:** Assume $2^k - 1$ is ÷ by 3 (k even) M1 Let $2^k - 1 = 3p$ (p integer) $2^{k+2} - 1 = 4\times2^k - 1$ M1 $= 4\times2^k - 4 + 3$ $= 4(2^k - 1) + 3$ $= 4 \times 3p + 3$ A1 which is ÷ by 3 When $k = 2$: $2^2 - 1 = 3$ so ÷ by 3 A1 Hence true for all even n. Claim true