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11	2c	Find the equation of the tangent to the curve $y = (2x + 1)^4$ at the point where $x = -1$.	3
$y = (2x + 1)^4$ Using the function of a function rule: $\frac{dy}{dx} = 4(2x + 1)^3 \cdot \frac{d}{dx}(2x + 1)$ $= 4(2x + 1)^3 \cdot 2$ $= 8(2x + 1)^3$ At $x = -1$, gradient $m = 8(2(-1) + 1)^3$ $= 8 \times -1$ $= -8$		At $x = -1$, $y = (2(-1) + 1)^4$ $= 1 \quad \therefore (-1, 1)$ Using $y - y_1 = m(x - x_1)$ $y - 1 = -8(x - (-1))$ $y - 1 = -8(x + 1)$ $y - 1 = -8x - 8$ $8x + y + 7 = 0$	State Mean: 2.34/3

* These solutions have been provided by [projectmaths](#) and are not supplied or endorsed by the Board of Studies

Board of Studies: Notes from the Marking Centre

Nearly all candidates recognised this as a calculus question and showed logical working that demonstrated a good understanding of the required steps. This allowed for part marks for the occasional imperfect responses. There were errors in differentiating, with $4(2x+1)^3$ or $8x(2x+1)^3$ being the usual incorrect answers, but often the rest of the working followed correctly. Sometimes notation was poor and lack of parentheses resulted in the wrong gradient or point. Candidates are encouraged to show clear substitutions to avoid careless errors. Several candidates substituted $x = 0$ and either used $(0,1)$ or $(-1,-1)$ in their equation of the line. In better responses, candidates clearly showed the derivative, the gradient m , the point and finally the equation of the line. A small number of candidates provided only the gradient of the tangent rather than the equation of the tangent (stopping at $m = -8$). Some also correctly evaluated $f'(-1) = -8$ then used this as the y value of the point rather than as the gradient. Candidates need to take care when copying the x value into the writing booklet as some used $x = 1$ instead of $x = -1$.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/