

Dr Halbeisen*

MODULES 110PMA003 & 110PMA107

Department of Pure Mathematics

Week 9, 2001

The pdf-file you may download from

<http://www.math.berkeley.edu/~halbeis/4students/zero.html>

Please hand in your solutions (stapled together with your full name on the first page) at the lecture on Thursday, 29 November 2001.

38. For $h = 0.01$ and $x_0 = 1, x_0 = 2, x_0 = 3, x_0 = 4$, compute $\frac{\ln(x_0 + h) - \ln(x_0)}{h}$.
What might be the precise values of $\ln'(1), \ln'(2), \ln'(3)$ and $\ln'(4)$?
39. (a) Show that the point $(1, 5)$ lies on the curve $y = x^2 + 2x + 2$.
(b) Find the equation of the tangent to this curve at the point $(1, 5)$.
(c) Find the points where the tangent meets the x -axis and the y -axis.
40. Use Pascal's triangle to expand the following:
(a) $(a + b)^3$ (b) $(x + h)^6$ (c) $(2x + 2)^5$
41. Let $f(x) = \sin(x) + \cos(x)$.
(a) Sketch the graph of the function $f(x)$ between $x = -\frac{3\pi}{2}$ and $x = \frac{3\pi}{2}$.
(b) Determine for which x between $-\frac{3\pi}{2}$ and $\frac{3\pi}{2}$ the function $f(x)$ is maximal or minimal.
(c) Find the derivative $f'(x)$ of the function $f(x)$.
(d) Sketch the graph of function $f'(x)$ between $x = -\frac{3\pi}{2}$ and $x = \frac{3\pi}{2}$.
(e) Determine for which x between $-\frac{3\pi}{2}$ and $\frac{3\pi}{2}$ the function $f'(x)$ is equal to 0.

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Office hours (Room 1007): Monday 1 pm–2 pm, Wednesday 2 pm–3 pm