

MAPLE PROJECT 2
Derivative, Implicit differentiation
Due date March 2, 2007

1. Use the following steps to find the derivative of

$$f(x) = \sqrt[5]{x^2 + \sin(x)}$$

- (i) Find $f(x+h)$.
- (ii) Find $\frac{f(x+h) - f(x)}{h}$, and simplify.
- (iii) Find $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$, explain your result and then verify the answer directly (using an appropriate Maple command.)

2. Find the x-coordinate of points on the graph of

$$y = 3x^4 + 8x^3 - 24x^2 - 48x + 19$$

Where the tangent line has slope of 4. Find the equation of the tangent lines at these points. Verify your result by plotting the graph of $y = f(x)$ along with tangent lines in an appropriate range which includes the (real) x-coordinates you have found above.

Hint: Use an appropriate scale for the y-axis in order to see the entire graph.