# 55

"False praise can ruin others."

Differentiation

The differentiation problem is actually a tangent problem or slope problem. Finding out tangent for circle at a given point is very easy. But finding out tangent for a curve, which got irregular slope is little bit difficult. So now we can define the tangent as a line, which is drawn from a point to its nearest point. That is dx should be very small.

The definition of derivation says

$$f'(x) = \lim_{\Delta x \to 0} \frac{f(x + \Delta x) - f(x)}{\Delta x}$$
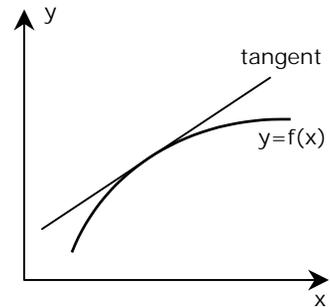
55.1 Program

The following program finds out the derivation of a function $y = 4 - x^2$ at a given point.

```c
#include <math.h>

#define EQUATION( x )   ( 4 - (x)*(x) )   /* to be differentiated */

#define x          ( 3 )
#define dx         ( 0.00000001 )

int main( void )
{
   double result, dy;
   dy = EQUATION( x + dx ) - EQUATION( x );
   result =  dy / dx;
   printf( "Result of Differentiation( 4-x*x ) at x=3 is %lf \n",
                result );
   return(0);
}
```