Applications of Euler's method

I. Let's suppose that we have a derivable function f such that for any real x,

$$f'(x) = \frac{1}{1+x^2} \quad and \quad f(0) = 0$$

1. Prove that for very small values of h, and any Integer n, we have the relationship :
$$f((n+1)h) \approx f(nh) + \frac{h}{1+(nh)^2}$$

2. Use a Spreadsheet program to calculate f(1), f(2), f(10), [*give 3 decimals*]
3. Use this spreadsheet program to draw the curve of that function on [0,10]
4. Is there an asymptote for the graph of that function ?
5. Can you "guess" what is that function ?

II. Let's suppose that we have a derivable function f such that for any real x,

$$f'(x) = 2x \text{ and } f(0) = 0$$

1. Prove that for very small values of h, and any Integer n, we have the relationship : $f(nh) \approx h^2[n^2 - n]$
2. Use a Spreadsheet program to calculate f(1), f(2), f(10) [*give 3 decimals*]
3. Use this spreadsheet program to draw the curve of that function on [0,10]
4. Is there an asymptote for the graph of that function ?
5. Can you "guess" what is that function ?