Homeworks for 7^{th} week

1. Using differential approximate the values
   (a)
   $$\sqrt{382}$$
   (b)
   $$\ln 1,3$$
   (c)
   $$\sin(-0{,}02)$$
   (d)
   $$\mathrm{arctg} 1,1$$
2. Compute the Taylor's polynomial of order 3 at point x_0
   (a) $f(x) = x \cdot e^{-x}$, $x_0 = 0$
   (b) $f(x) = \sqrt{x}$, $x_0 = 4$
   (c) $f(x) = e^{-x^2}$, $x_0 = 0$
   (d) $f(x) = \cos^2 x$, $x_0 = \pi$
3. Find the differential of f at point x_0 with general Δx
   (a) $f(x) = \sqrt{x^2 + 1}$, $x_0 = 1$
   (b) $f(x) = \sqrt{\frac{1+x}{1-x}}$
   (c) $f(x) = x \sin 2x$, $x_0 = 0$
4. Sketch the graph of function and draw the differential, difference and error of approximation (with general Δx)
   (a) $f(x) = e^{x+1}$, $x_0 = -1$
   (b) $f(x) = \ln(2 - x) + 1, x_0 = 1$
5. Using Taylor's polynomial of order n approximate the values h
   (a) $h = \sqrt[5]{e}$, $n = 3$
   (b) $h = \mathrm{cotg} 1{,}5$, $n = 2$
6. Check the assumption of Newton's method and find the first approximation of roots of the function f
   (a) $f(x) = e^x + x^2 - 3$
   (b) $f(x) = x^4 + x - 1$ for the root on the interval $(0, 1)$