Problem 1 (**6 points**)

Find the linear approximations of $f(x)$ at x_0:

a) $f(x) = \sqrt{x}$; $x_0 = 4$

b) $f(x) = x^3$; $x_0 = 1$

c) $f(x) = cos(\Pi x)$; $x_0 = \frac{1}{2}$

Problem 2 (**4 points**)

Compute the derivative of $f(x)$:

a) $f(x) = sinh^{-1}(\sqrt{x^2})$;

b) $f(x) = -tanh^{-1}(-x)sech(x^2)$;

Problem 3 (**5 points**)

Show that the following equation has exactly one root

$$x^3 + e^x = 0$$

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[1]The quiz lasts 20 minutes.