

Q1. Fixed-point Iteration and Newton's Method.

Consider

$$f(x) = e^x + e^{-x} - 5 - x.$$

Starting from $x_0 = 2$, perform each of the following and fill in the table (round to 4 decimal places).

(a) **Fixed-point iteration** $x_{k+1} = g(x_k)$ with $g(x) = \ln(x + 5 - e^{-x})$.

k	0	1	2	3	4	5
x_k	2					

(b) **Newton's method** for $f(x) = 0$.

k	0	1	2	3	4	5
x_k	2					

Q2. Initial Values.

Consider

$$f(x) = x^5 - 3x^4 + 25.$$

Perform Newton's method up to $k = 4$ for each initial guess and fill in the tables (round to 4 decimal places). What happens in each case? Explain the difference.

(a) $x_0 = -2$:

k	0	1	2	3	4
x_k	-2				

(b) $x_0 = 0.25$:

k	0	1	2	3	4
x_k	0.25				