

Newton's Method

Estimating a solution to $\cos x - x = 0$; we started with initial guess $x_1 = 1$.

The chalkboard shows the following work:

$\cos x = x$

$\cos x - x = 0$

$f(x)$

$\begin{cases} f(x) = \cos x - x \\ f'(x) = -\sin x - 1 \end{cases}$

$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

$= x_n + \frac{\cos x_n - x_n}{+\sin x_n + 1}$

$= x_n + \frac{\cos x_n - x_n}{\sin x_n + 1}$

Guess: $x_1 = 1$

n	x_n
1	1
2	.750
3	.739
4	.739
5	
...	

Estimating an x -intercept to $f(x) = x^3 + 6x^2 + 9x + 1$ with initial guess $x_1 = -2$:

The paper shows the following work:

n	x_n
1	-2
2	-2.333
3	-2.34722
4	-2.347296
5	-2.3472963
6	-2.3472963

$f(x) = (-2.3472963)^3 + 6(-2.3472963)^2 + 9(-2.3472963) + 1$

$f(x) = 0$

Estimating an x -intercept to $f(x) = x^3 + 6x^2 + 9x + 1$ with initial guess $x_1 = 0$. Note: There is a "+1" missing in the numerator of the fraction (see board below). The calculations are correct.

