Fixed Point Method.

A fixed point for a function $f(x)$ is
defined as ,

Ex,) $f(x) =$, $x =$ is a fixed point
$=$ $=$ $\Rightarrow$

Let $f(x)$ be a function with a
linear part ( ) and nonlinear part ( ):

$f(x) =$

Root: $f(x^*) =$ $= 0$

$\Rightarrow x^* =$

Use this to create an iteration:

$x_{n+1} =$

Convergence occurs when on

When does convergence occur?

Let x^* be the root such that $f(x^*)=0$

and let $\quad (\quad)$

Define $e_n =$

$e_{n+1} = \quad - \quad = \quad -$

Then $\dfrac{e_{n+1}}{e_n} = \quad =$

Mean-Value Theorem of Calculus: If $g(x)$ is continuous over $[x^*, x_n]$ there exists a such that

$\Rightarrow \dfrac{e_{n+1}}{e_n} = \quad = \quad \Rightarrow e_{n+1} =$

Convergence if

A more strict measure: Convergence if

What if you can not split $f(x) = ax + g(x)$?

$f(x) =$

$\Rightarrow \quad =$

$x_{n+1} =$

At x^*: