Method of False Position (Regula Falsi)

It converges faster than the Bisection method.

Instead of finding the midpoint as in the Bisection method, the Regula-Falsi method finds \( x' \) by taking the straight line joining the points \((x_1, f(x_1))\) and \((x_2, f(x_2))\) and selecting the point that intersects the \( x \)-axis.
To find $x'$, we find the slope of the line joining $(x_1, f(x_1))$ and $(x_2, f(x_2))$ and also the slope joining $(x', 0)$ and $(x_2, f(x_2))$, which is the same slope.

Let us call $m = \text{slope}$

\[
m = \frac{f(x_2) - f(x_1)}{x_2 - x_1} \quad \text{and} \quad m = \frac{f(x_2) - 0}{x_2 - x'}
\]

\[
\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{f(x_2)}{x_2 - x'}
\]

\[
(f(x_2) - f(x_1))x_2 = (f(x_2) - f(x_1))x' = f(x_2) \left(\frac{x_2 - x_1}{f(x_2) - f(x_1)}\right)
\]

\[
x' = x_2 - \frac{f(x_2)}{f(x_2) - f(x_1)} (x_2 - x_1)
\]

Apart from this, the method is equivalent to the bisection method.