





want to find the root  $f(x)=0$

looks like  $x \approx 1.4$

Newton's method is the fixed point method

$$x_{n+1} = g(x_n) \quad \text{where} \quad g(x) = x - \frac{f(x)}{f'(x)}$$

```
julia> df(x)=2*x
df (generic function with 1 method)
```

```
julia> g(x)=x-f(x)/df(x)
g (generic function with 1 method)
```

```
julia> xn=1.4
1.4
```

```
julia> xn=g(xn)
1.4142857142857144
```

*← overwrite current approx w/new  
↗ Newton's method*



```
julia> xn=g(xn)
1.41421356237309504999928957890286393934167006969415009821111550
61514737041496

julia> xn=g(xn)
1.41421356237309504880168872420969807907675505054997081814555605
468594543448437

julia> xn=g(xn)
1.41421356237309504880168872420969807856967187537694807317667973
7990732478553006

julia> xn=g(xn)
1.41421356237309504880168872420969807856967187537694807317667973
7990732478462102

julia> xn=g(xn)
1.41421356237309504880168872420969807856967187537694807317667973
7990732478462102
```

The number of correct digits double at each iteration so it only takes a few iterations to obtain 80 correct digits.