

Q1 a) $a + \frac{b}{b-1}$ b) $\frac{1}{2}x \cos^2\left(\frac{1}{2x}\right)$ c) $\frac{y-x}{2z} + 3$

Q2 $f(x) = 1/x + \exp(x/3)$ } local min at $x=1.38$
 $\text{plot}(f, 0, 10)$ etc.

Q3 $f(x) = 11 \sin(2x) + 5x - 200$
 $\text{plot}(f, -100, 100)$ etc. $\leftarrow$ replot graph till you can see there are three roots
 then: $\text{roots}(f, 38, 42)$: 38.184, 39.046, 40.683

Q4 $f(x) = x^2 - 4x + 4$

a) $\text{roots}(f)$ 2.0, 2.0

b) $\text{fzeros}(f)$ 2

c) $\text{fzero}(f, 1, 3) \leftarrow f(x) = (x-2)^2$ so does not cross x -axis, so cannot find interval for bisection method with one endpoint positive and one negative.

Q5 $f(x) = \sin(1/x)$

a) $\text{fzeros}(f, 0.05, 1) \leftarrow$ finds 6 solutions

b) $\sin(y) = 0 \Leftrightarrow y = n\pi$, so $f(x) = 0$ has sol's $x = \frac{1}{n\pi}$ $n \in \mathbb{Z}$.
 $\text{map}(x \rightarrow 1/(pi*x), \text{collect}(1:10))$ shows fzeros finds them all.

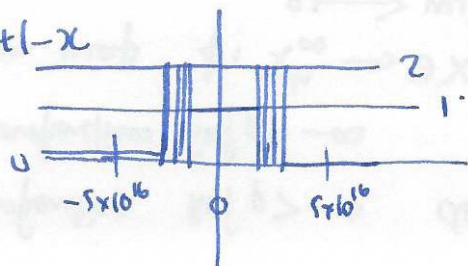
Q6 $f(x) = \exp(x/2)$ $h(x) = f(x) - g(x)$.

$g(x) = 3/x$

a) $\text{plot}([f, g], -10, 10)$ etc.

b) $\text{fzeros}(h, 1, 4)$ $x = 1.45171$

Q7 $f(x) = x + 1 - x$



get ~~the~~ correct answer for $|x| \leq \text{approx } 10^{16}$
 get rounding errors for other x . (either 0 or 2).

Q8 $f(x) = \sin(3x) / (x \cos(x))$
 $xs = \text{map}(x \rightarrow 10.0^1 - x, \text{collect}(1:10))$
 $\text{map}(f, xs)$
answer is 9.

Q9 $f(x) = (\cos(34x) - \exp(x^2/2)) / (x^2)$
 $xs = \text{map}(x \rightarrow 10.0^1 - x, \text{collect}(1:10))$
 $\text{map}(f, xs)$ output: -4.9676
-4.99268
-5.0
-5.0
-5.0
-5.00711
-4.44089
0.0
0.0
answer: -5
muddy ends.