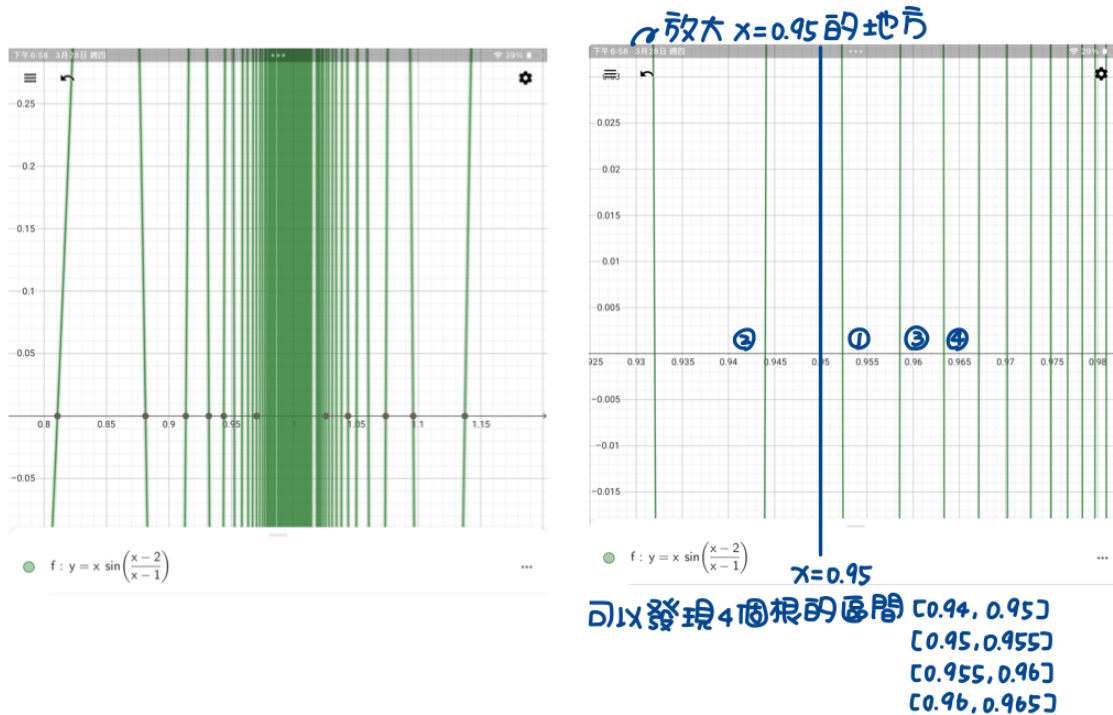


Assignment 1

1. Calculate by Matlab (q1.m)

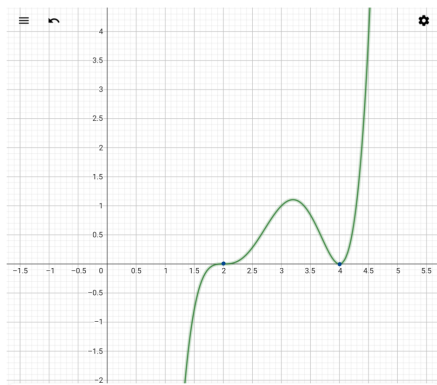


Four zeros nearest to $x=0.95$:	0.94398,	0.95236,	0.95856,	0.96334
Each initial a:	0.940,	0.950,	0.955,	0.960
Each initial b:	0.950,	0.955,	0.960,	0.965
Each iteration:	17,	17,	18,	16

2. Calculate by Matlab (q2.m)

Four zeros nearest to $x=0.95$:	0.94398,	0.95236,	0.95856,	0.96334
Each initial a:	0.940,	0.950,	0.955,	0.960
Each initial b:	0.950,	0.955,	0.960,	0.965
Each iteration:	6,	3,	4,	5
和 1. 相比 iteration 減少:	11,	14,	14,	11

3. (a)bisection



\therefore bisection 是利用 "過 x 軸" ($f(a) \cdot f(b) < 0$) 去判斷是否有根

① $x=2 \rightarrow$ 左邊 < 0
右邊 $> 0 \Rightarrow$ bisection 可找到 #

② $x=4 \rightarrow$ 左右兩數值均 < 0
 \Rightarrow bisection 判斷不出來有根 #

(b) secant -> Calculate by Matlab (q3_b.m)

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Root within interval [1, 3]: 2.0000
Root within interval [5, 6]: 4.0000
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(c) Calculate by Matlab (q3_c.m)

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(1) ans of Bisection Method: 2
(2) ans of Secant Method: 2
(3) ans of False Position: 2
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4. Calculate by Matlab (q4.m)

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(a) Root near 0.6: 0.60583
(b) Root near 1: 1.24114
    Root near -2: -2.21144
```

5. Calculate by Matlab (q5.m)

- (a) Root converge (+) when $x=(1, -1, 0)$: (1.48796, 1.48796, 1.48796)
 Root converge (-) when $x=(1, -1, 0)$: (-0.53984, -0.53984, -0.53984)
 (b) Root converge when $x_0=2.5(+, -)$: (1.48796, -0.53984)
 Root converge when $x_0=2.7(+, -)$: (Inf, -0.53984)
 (c) Root converge when $x_0=(2.6, 1, -1)$ ($g(x)=\ln(2x^2)$): (2.61787, 2.61787, 2.61787)

(a) when positive is used \rightarrow converges to 1.5
 negative \rightarrow -0.5

\checkmark 是 (1, -1, 0)

(b) when $x=2.5$, still converges as above
 $x=2.7$, diverges when positive is used.

(c) $e^x - 2x^2 = 0$
 $\Rightarrow e^x = 2x^2$
 $\Rightarrow x = \ln(2x^2)$
 取 $g(x) = \ln(2x^2)$

6. Calculate by Matlab (q6.m)

Solution 1 (x, y): (1.9908, 0.16624)
 Solution 2 (x, y): (-0.96442, 0.32478)