## Part 1

1. If $x_k = 2,\ x_{k+1} = 3.5\ and\ x_{k+2} = 4$ find out the value of $\hat{x}_{k+2}$ using the Aitken Acceleration formula. [1]
   a) 4.52
   b) 4.25
   c) 5.25
   d) 4.30
2. Which of the following statements is not correct. [1]
   a) Newton's Method has a super linear convergence rate.
   b) Aitken Acceleration makes Newton's Method faster.
   c) In some point if $f'(x)$ becomes zero, the procedure doesn't enter in an infinite loop.
   d) Secant method is efficient than Newton's Method
3. for $f(x) = x^2 - 2x + 15$, at which point the graph will turn? [1]
   a) 1 b) -3, c) 5 c) 0

Consider the following equation and answer Question [4-6]

$$f(x) = 2x^2 + 16x - 18$$

4. Which point do you need to avoid in order to stop Newton's method from entering into an infinite loop?
   a) 4, b) -4 ( c) 1 d) -9
5. If $x_* = 1\ and\ x_k = .5$ what will be the $x_{k+1}$ for the equation?
   a) -4 b) 1 c) 0.025 d) 0.075
6. What will be the error for $x_{k+1}$?
   a) 4 b) 0 c) 0.025 d) 0.075
7. What is the condition for a method to be superlinear ?
   a) $0 < \lambda < 1$ b) $\lambda = 0$ c) $\lambda < 0$ d) $\lambda > 1$

## Part 2

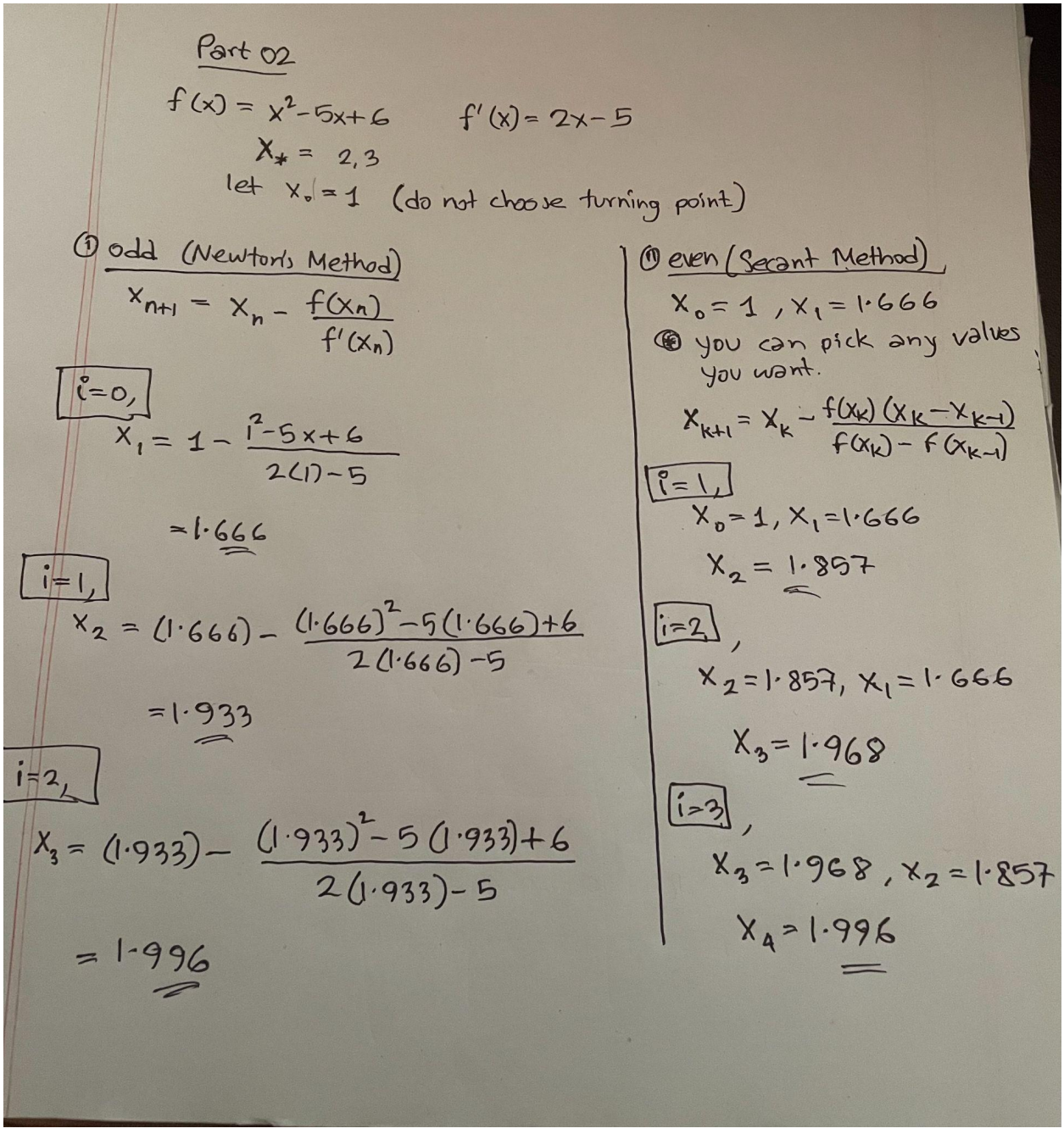
Find the root of the function

$$f(x) = x^2 - 5x + 6$$

up to three iterations according to the following: (3)

- If your student ID number is an odd number, use Newton's method.

- If your student ID number is an even number, use the Secant method.



Part 02

$f(x) = x^2 - 5x + 6 \qquad f'(x) = 2x - 5$

$X_* = 2, 3$

let $X_0 = 1$ (do not choose turning point)

① odd (Newton's Method)

$$X_{n+1} = X_n - \frac{f(X_n)}{f'(X_n)}$$

$i = 0,$

$$X_1 = 1 - \frac{1^2 - 5x + 6}{2(1) - 5}$$

$= 1.666$

$i = 1,$

$$X_2 = (1.666) - \frac{(1.666)^2 - 5(1.666) + 6}{2(1.666) - 5}$$

$= 1.933$

$i = 2,$

$$X_3 = (1.933) - \frac{(1.933)^2 - 5(1.933) + 6}{2(1.933) - 5}$$

$= 1.996$

⑪ even (Secant Method)

$X_0 = 1, X_1 = 1.666$

④ you can pick any values you want.

$$X_{k+1} = X_k - \frac{f(X_k)(X_k - X_{k-1})}{f(X_k) - f(X_{k-1})}$$

$i = 1,$

$X_0 = 1, X_1 = 1.666$

$X_2 = 1.857$

$i = 2,$

$X_2 = 1.857, X_1 = 1.666$

$X_3 = 1.968$

$i = 3,$

$X_3 = 1.968, X_2 = 1.857$

$X_4 = 1.996$