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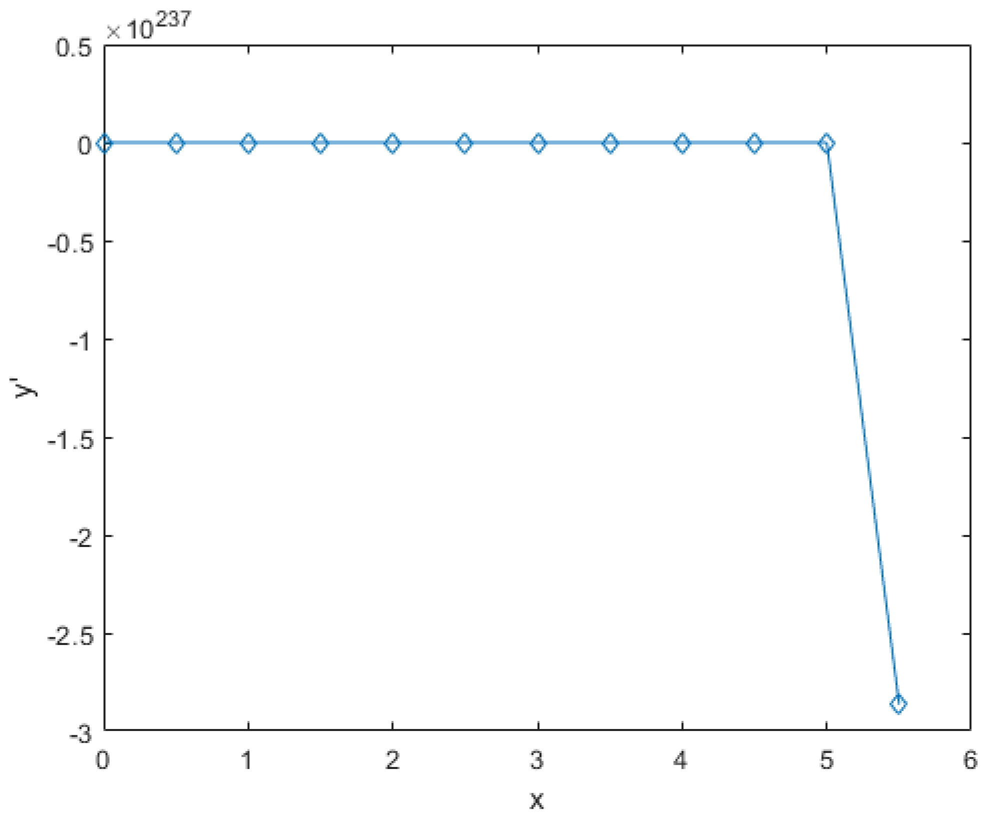
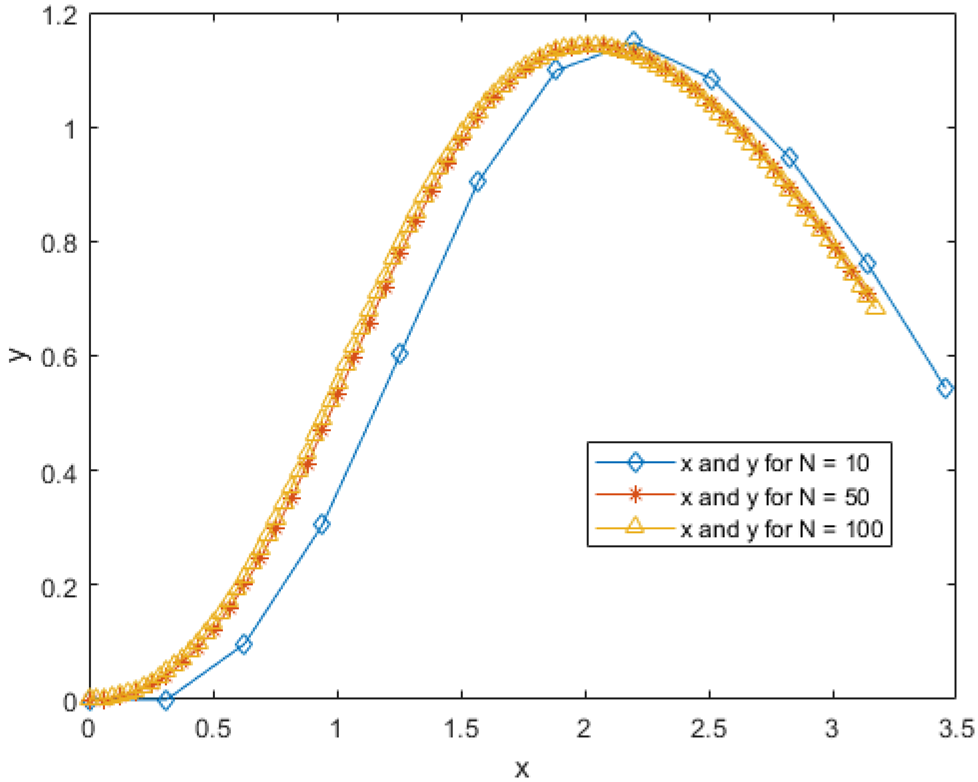
Question 1

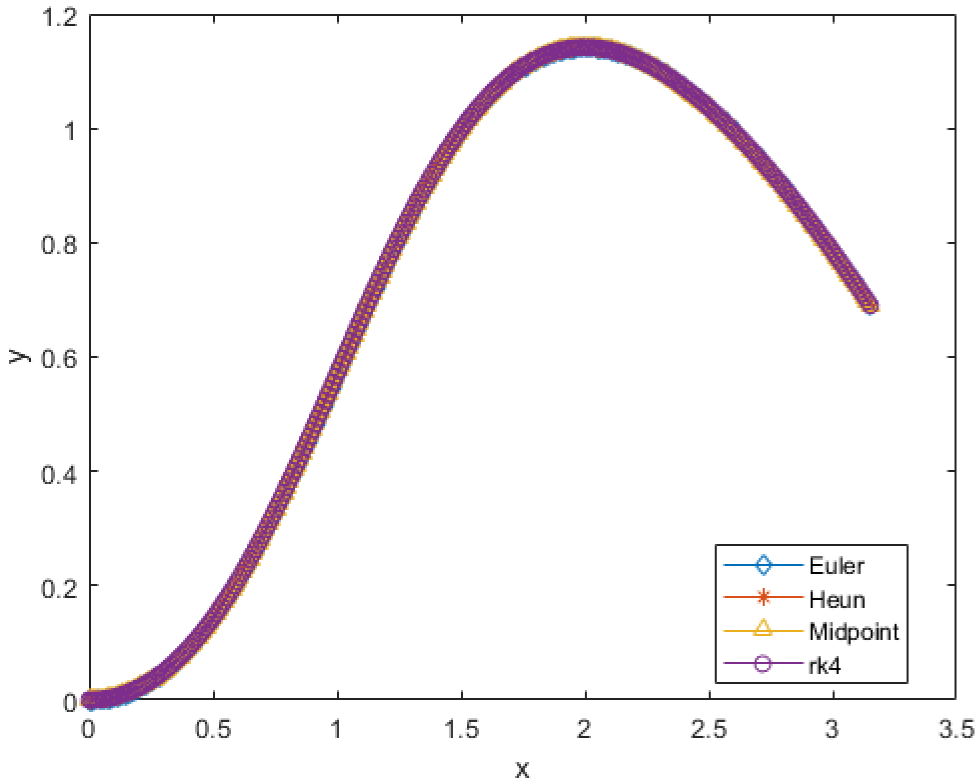


Question 2a



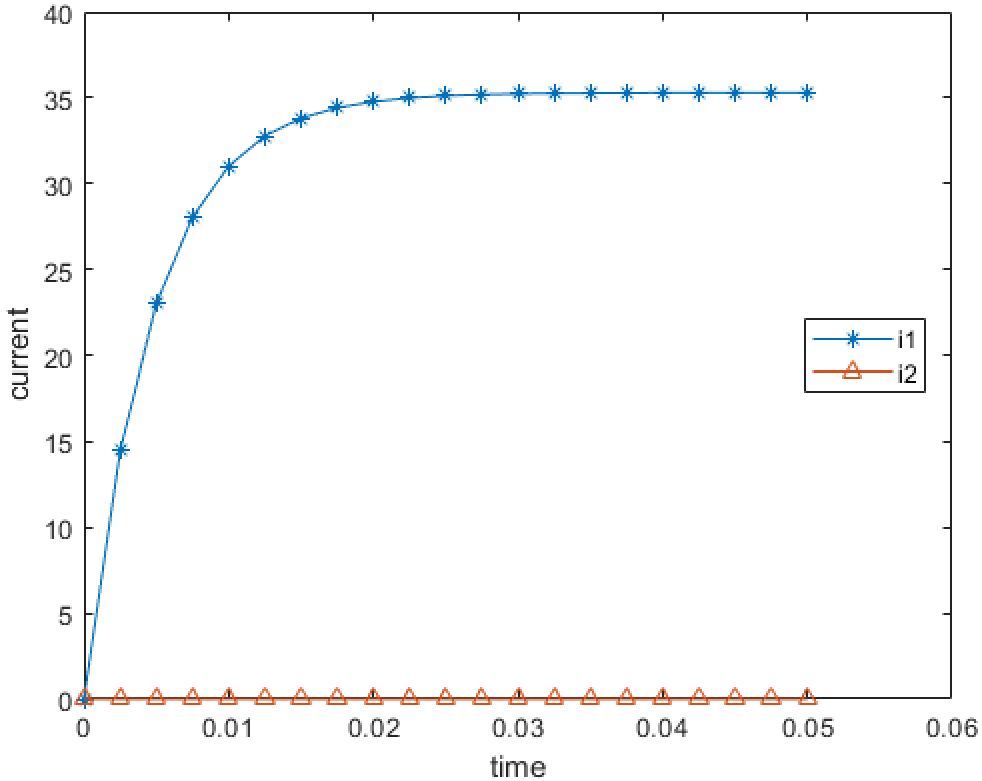
Question 2b

When zooming in on the graph in Matlab the Euler method is seperated from the other graphs showing that the other methods are better.



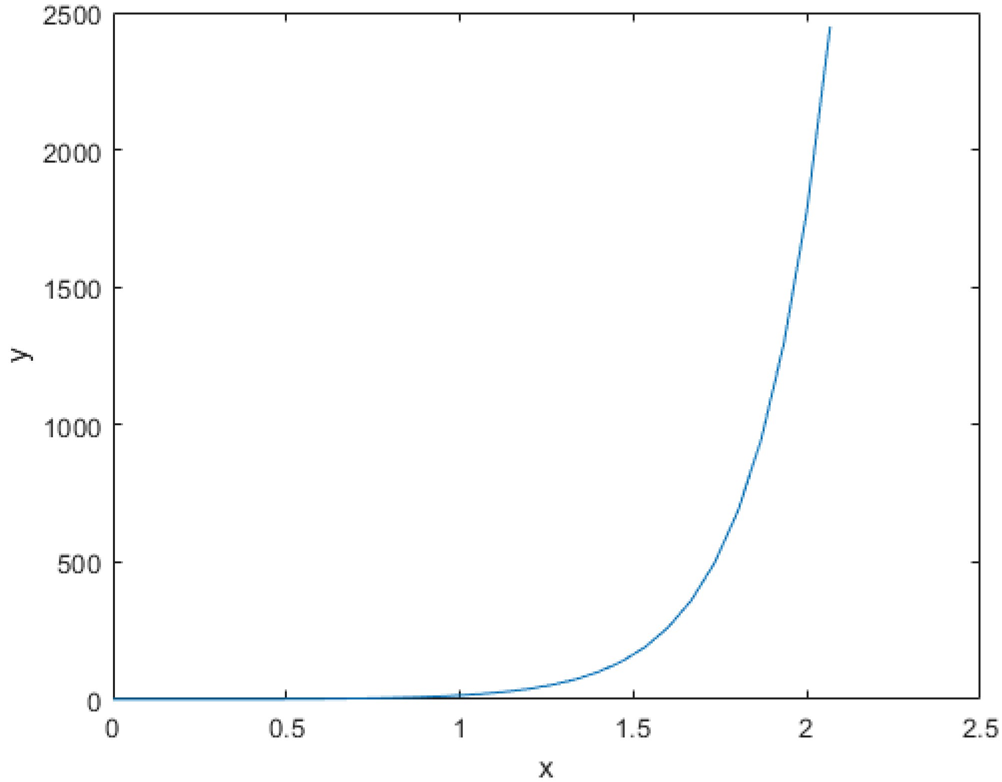
1.2
1
0.8
0.6
0.4
0.2
0
y
0
0.5
1
1.5
2
2.5
3
3.5
x
Euler
Heun
Midpoint
rk4

Question 3



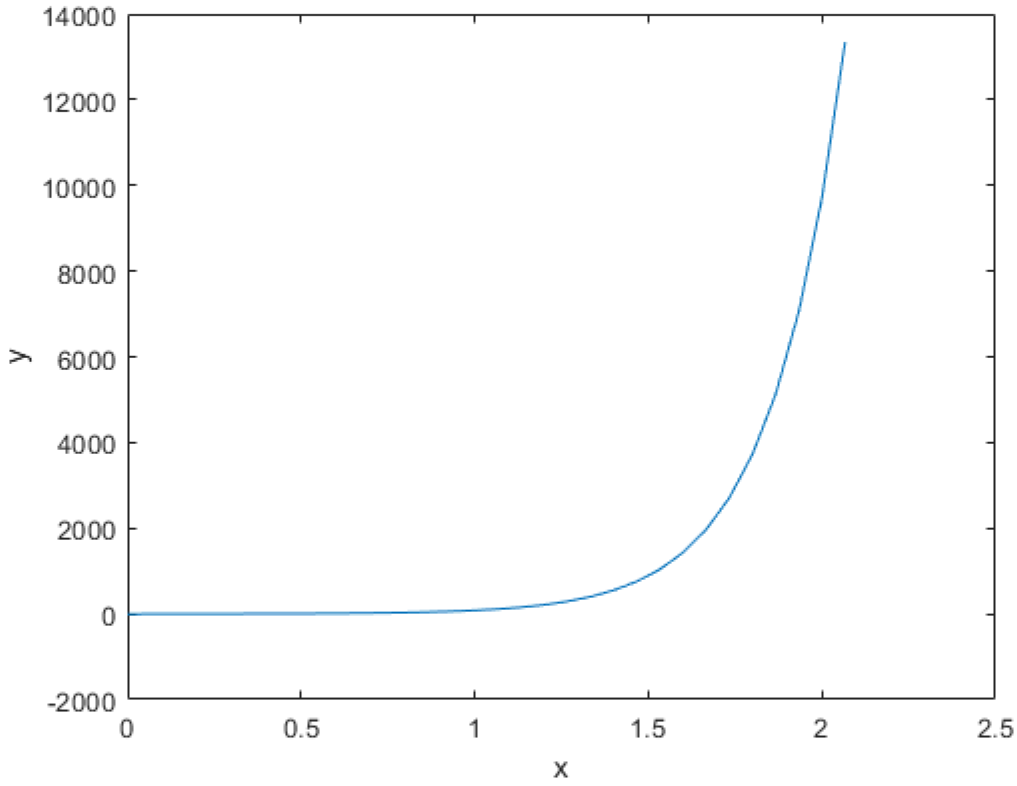
current
time
i1
i2
0
5
10
15
20
25
30
35
40
0
0.01
0.02
0.03
0.04
0.05
0.06

Question 4a



Question 4b

*When determining the analytical solution I used D operators. This gave y = Ae^(4.1*x) + Be^(-4.1*x). Using the initial conditions in 4a, A = 0 and B = 1. So when solving using the analytical method*
*The A term is not there for 4a. Hence only the Be^(-4.1*x) contributes.*
*When using initial conditions from 4b, A = 0.034 and B = 0.966. Now that A is there, the Ae^(4.1*x) contributes to solution and causes it to be different from the solutions of y for initial conditions 4a*

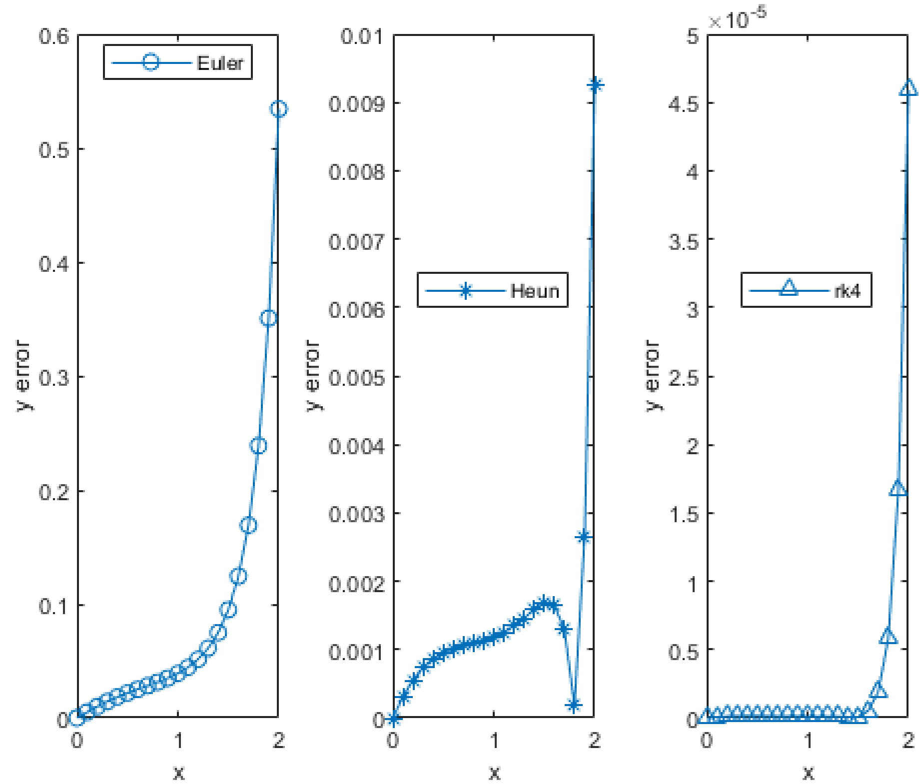


Question 5

```
ytrue =

   1.000000000000000
   0.905139080782970
   0.820916948718187
   0.747515678018091
   0.684773832571705
   0.632336662186250
   0.589783357612850
   0.556734581678095
   0.532946980587607
   0.518404216653756
   0.513417119032592
   0.518749934691400
   0.535796957667456
   0.566846538740496
   0.615491998566963
   0.687289278790972
   0.790834417170762
   0.939569644705407
   1.154884108524915
   1.471575114107691
```

```
1.947734041054678
```



Question 5

Question 7

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