

# Matematisk modellering og numeriske metoder

## Opgaver til Lektion 2

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### Exercise 1

$-7.90$  and  $-8.20$  as opposed to  $-8.336016$ .

### Exercise 2

$x = 0.05000$  and  $x = 39.95$ .

### Exercise 3

$x_0$	5	4	1	-1
$x_1$	4.7228	4.63	2.11	4.13
$x_2$	4.701857...	4.694158...	4.099054...	4.645228...
$x_3$	4.700152...	4.699520...	4.641711...	4.695447...
$x_4$	4.700012...	4.699960...	4.695150...	4.699626...
$x_5$	4.700001...	4.699996...	4.699602...	4.699969...
$x_6$	4.700000...	4.699999...	4.699967...	4.699997...
$x_7$	4.700000...	4.699999...	4.699997...	4.699999...
$x_8$	4.700000...	4.699999...	4.699999...	4.999999...
$x_9$	4.700000...	4.699999...	4.699999...	4.699999...

$x_0$	5	4	1	-1
$x_1$	4.733564...	5.118756...	0.814691...	-0.633832...
$x_2$	4.700494...	4.761300...	0.800107...	-0.515171...
$x_3$	4.700000...	4.701618...	0.800000...	-0.500188...
$x_4$	4.700000...	4.700001...	0.800000...	-0.500000...
$x_5$	4.700000...	4.700000...	0.800000...	-0.500000...

The result of the secant method depends on your choice of  $x_1$ .

## Exercise 4

$$x_0 = 2, x_1 = 2.4444\dots, x_2 = 2.3977\dots, x_3 = 2.3922\dots, x_4 = 2.3916\dots, x_5 = 2.3916\dots$$

$$x_0 = 2, x_1 = 2.3809\dots, x_2 = 2.3916\dots, x_3 = 2.3916\dots, x_4 = 2.3916\dots, x_5 = 2.3916\dots$$

The result of the secant method depends on your choice of  $x_1$ .

## Exercise 5

$$0.747130\dots, 0.777816\dots, 0.714604\dots$$

## Exercise 6

$$n = 4: 0.697023\dots, n = 8: 0.694121\dots, \text{error: } \varepsilon_8^t \approx -0.000967\dots$$