Computational Methods and Modelling

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Solution tutorial 9
Numerical Integration

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Exercise 1: Numerical integration

- The numerical integration of $x^2 + 4x - 12$ in the domain $-10 < x < 10$ can be done with the following code:

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```
import numpy as np
import matplotlib.pyplot as plt

def calculate_dx (a, b, n):
        return (b-a)/float(n)

def rect_rule (f, a, b, n):
        total = 0.0
        dx = calculate_dx(a, b, n)
        for k in range (0, n):
                total = total + f((a + (k*dx)))
        return dx*total

def f(x):
    return x**2+4*x-12

n=1000
print(rect_rule(f, -10, 10, n))
```

Exercise 2-5

- The integral with the other methods can be similarly computed with the code provided.
- The comparison of the different techniques can be achieved by importing the codes used for each of the techniques in a "driver" master code and running them with different number of subinterval N.