M1B/Schoenbrun Section 7.7 Numerical Integration

You may work together in groups of two or three on this.

Part 1)
For each integral calculate the exact value using an anti-derivative and a calculator.
Then for each integral / N option, fill in mid-point and trapezoidal rule estimate.

Note the N's are the number of data points, so the number of intervals is N-1.

Integral	Exact	N	Midpoint	Trapezoid	Simpson
$\int_0^1 \frac{1}{1+x^2}\,dx$		5			
$\int_0^1 \frac{1}{1+x^2}\,dx$		9			
$\int_0^{\pi} \frac{\sin x}{1+x}$		5			

Check the relative accuracy of each estimate.

Using the web integration calculator, find the approximate area under the curve described in this table.

0	6.5
1	6.8
2	5.2
3	4.1
4	3.0
5	2.5
6	5.6
7	7.9
8	12
9	18
10	20
11	10

Midpoint	Trapezoid	Simpson