**Exercise A.1.** For a given function , the integral computed using the formula

is approximated by n trapezoids of equal width h.

Write a Python function that takes any , and , and and returns the approximation.

**Solution:** We write a Python function *trapz.py* with variables corresponding to the notation

| 1 | def trapz(f, a, b, n): |
| --- | --- |
| 2 | h = float(b-a)/n |
| 3 | result = 0.5\*f(a) + 0.5\*f(b) # 1st and 3rd term between brackets |
| 4 | for i in range(1, n): |
| 5 | result += f(a + i\*h) # Loop through index i (2nd term) |
| 6 | result \*= h # Final multiplication |
| 7 | return result |

The function can be tested as follows

| 1 | >>> from trapz import trapz |
| --- | --- |
| 2 | >>> from math import exp |
| 3 | >>> v = lambda t: 3\*(t\*\*2)\*exp(t\*\*3) |
| 4 | >>> n = 4 |
| 5 | >>> num\_int = trapz(v, 0, 1, n) |
| 6 | >>> num\_int |
| 7 | 1.9227167504675762 |

**Exercise A.2.** ...

**Solution:** ...