**Simpsons rule**

In [numerical analysis](https://en.wikipedia.org/wiki/Numerical_analysis), **Simpson's rule** is a method for [numerical integration](https://en.wikipedia.org/wiki/Numerical_integration), the numerical approximation of [definite integrals](https://en.wikipedia.org/wiki/Definite_integral). Specifically, it is the following approximation for {\displaystyle n} equally spaced subdivisions (where {\displaystyle n} is even): (General Form)

n

n

















% Ask for user input

% Lower bound (a)

a = input('What is your lower bound (a)?')

% Upper bound (b)

b = input('What is your upper bound (b)?')

% Subintervals

N = input('How many subintervals (N)?')

% Defining function

f = @(x) (2\*x)/((x.^2)+1)

% Finding h

h=(b-a)/N;

% Finding the values of x for each interval

x=linspace(a,b,N);

% Calculating the integral

for i = 1:N-1

I(i)= (h/3)\*(f(x(i))+(4\*f((x(i)+x(i+1))/2))+f(x(i+1)));

end

answer1 = sum(I)

References

* *Atkinson, Kendall E. (1989). An Introduction to Numerical Analysis (2nd ed.). John Wiley & Sons.*[*ISBN*](https://en.wikipedia.org/wiki/International_Standard_Book_Number)[*0-471-50023-2*](https://en.wikipedia.org/wiki/Special%3ABookSources/0-471-50023-2)*.*
* *Burden, Richard L.; Faires, J. Douglas (2000). Numerical Analysis (7th ed.). Brooks/Cole.*[*ISBN*](https://en.wikipedia.org/wiki/International_Standard_Book_Number)[*0-534-38216-9*](https://en.wikipedia.org/wiki/Special%3ABookSources/0-534-38216-9)*.*
* *Pate, McCall (1918).*[*The naval artificer's manual: (The naval artificer's handbook revised) text, questions and general information for deck*](https://books.google.com/books?id=bQc9AAAAYAAJ&pg=PA198)*. United States. Bureau of Reconstruction and Repair. p. 198.*