

Computer Exercise 5.4.3

The following program will use the modified version of formula (8) from computer exercise 5.4.1 to approximate

$$\int_0^1 \frac{\sin(x)}{x} dx$$

```
%initiate function
f = @(x) sin(x)./x;
%initiate parameters
a=0;
b=1;
%execute algorithm
sum1 = formula8(f, a, b);
%display approximation
fprintf('integral approximation = %9.9f', sum1)
```

```
integral approximation = 0.946083134
```

We can compare this to Matlab's 'integral' function to check for consistency:

```
int1 = integral(f, a, b);
fprintf('Matlab integral = %9.9f', int1)
```

```
Matlab integral = 0.946083070
```

We see that the approximation made here is mostly consistent with the value given by Matlab's integral function.

```
function sum = formula8(f, a, b)
    x1 = (-(b-a)/2)*(sqrt(3/5)) + (b+a)/2;
    x2 = (b+a)/2;
    x3 = ((b-a)/2)*(sqrt(3/5)) + (b+a)/2;
    sum = ((5/9)*f(x1) + (8/9)*f(x2) + (5/9)*f(x3))*((1/2)*(b-a));
end
```