

```
%Name: Martins Davis Bernhards  
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%Assignments week 3
```

%Assignment 1

```
x = [1:1:10];  
sum = squaredSum(x)
```

```
sum =  
385
```

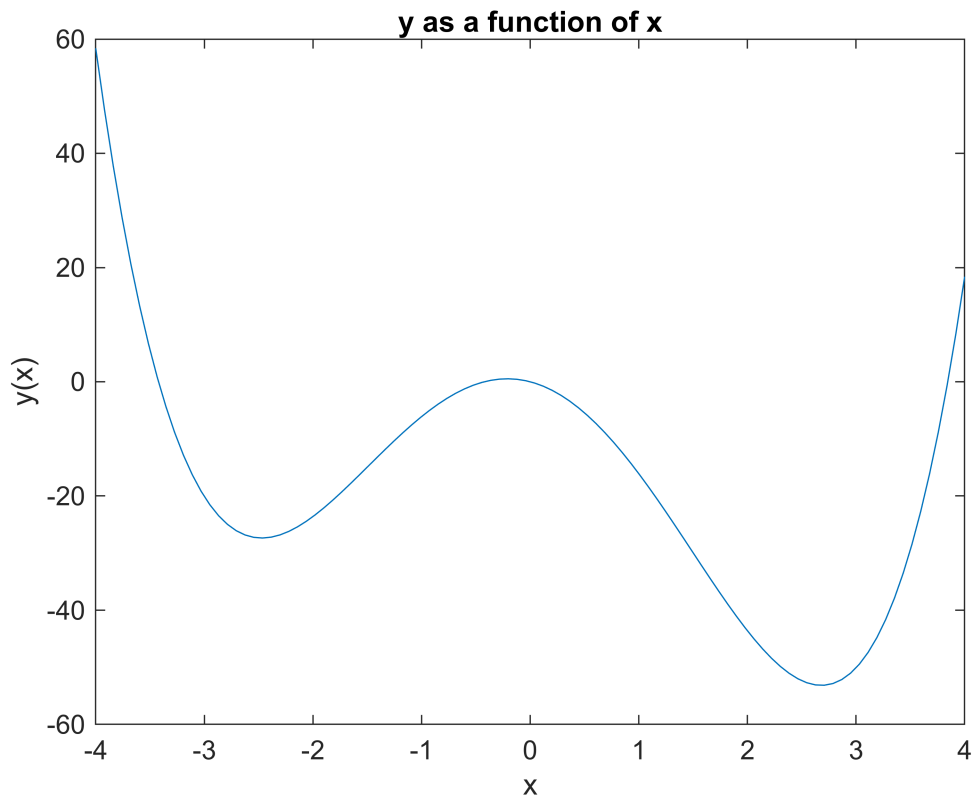
%Assignment 2

```
R = [20, 24, 27, 50, 32];  
Rv = replacementResistance(R)
```

```
Rv =  
5.5570
```

%Assignment 3

```
quadraticEquation(-3);  
quadraticEquation(5);  
  
x = linspace(-4,4,100);  
y = quadraticEquation(x);  
  
figure  
plot(x,y);  
title('y as a function of x');  
xlabel('x');  
ylabel('y(x)');
```



%Assignment 4

```
a = [1, 2, 4];
b = [2, -3, 1];

[y, txt] = calculateAngle(a, b)

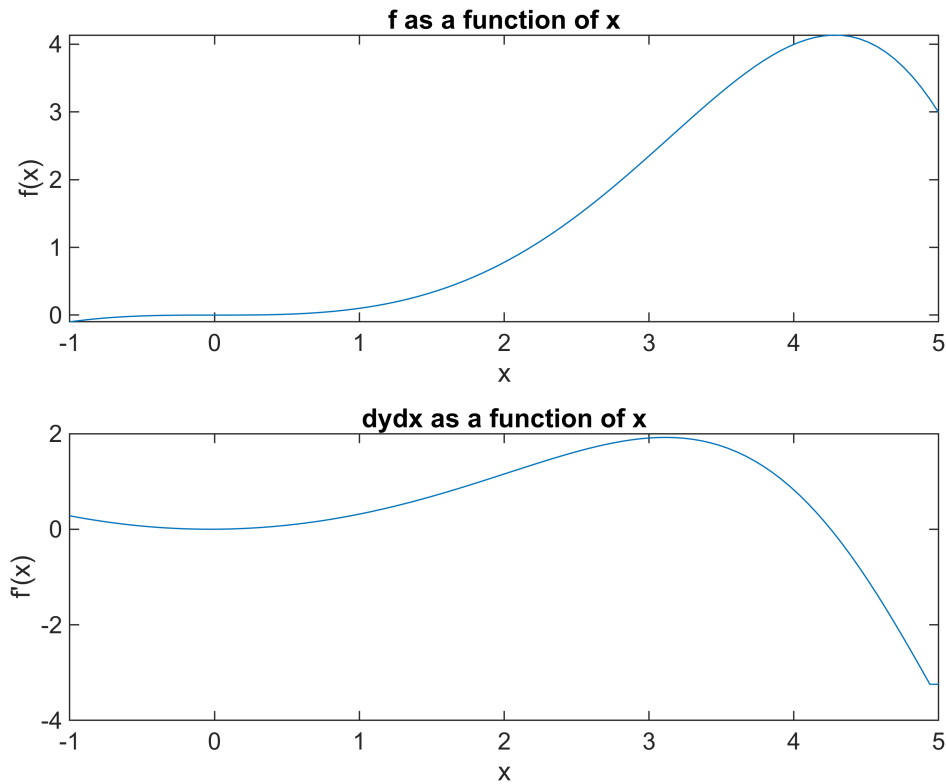
y =
1.5708
txt =
'OK'
```

%Assignment 5

```
x = linspace(-1,5,100);
y = x .* sin(x.^2/10);
dydx = derivative(x, y);

figure
subplot(2,1,1);
plot(x, y);
title('f as a function of x');
xlabel('x');
ylabel('f(x)');
```

```
subplot(2,1,2);
plot(x, dydx);
title('dydx as a function of x');
xlabel('x');
ylabel('f''(x)');
```



%Assignment 6

```
% Manual calculation for Integral (x^2 + 4x)dx in range 5 to 2
% x^3/3 + 2*x^2 find the anti-derivative
```

```
% f(5) = 125/3 + 50 = 275/3
```

```
% f(2) = 8/3 + 8 = 32/3
```

```
% f(5) - f(2) = (273-32)/3 = 243/3 = 81
```

```
% answer is: 81
```

```
x_min = 2;
```

```
x_max = 5;
```

```
number_of_trapeziums = 1;
```

```
delta_x = (x_max-x_min)/number_of_trapeziums;
```

```
x = x_min:delta_x:x_max;
```

```
f_x = x.^2 + 4*x;
```

```
total_area1 = trapz(x,f_x) % 85.5 too big
```

```
total_area1 =  
85.5000
```

```
number_of_trapeziums = 2;
```

```
delta_x = (x_max-x_min)/number_of_trapeziums;
```

```
x = x_min:delta_x:x_max;
```

```
f_x = x.^2 + 4*x;
```

```
total_area2 = trapz(x,f_x) % 82.1250 closer but also too big
```

```
total_area2 =  
82.1250
```

```
number_of_trapeziums = 99;
```

```
delta_x = (x_max-x_min)/number_of_trapeziums;
```

```
x = x_min:delta_x:x_max;
```

```
f_x = x.^2 + 4*x;
```

```
total_area99 = trapz(x,f_x) % 81.0005 Basically the correct value, but differs a  
little bit
```

```
total_area99 =  
81.0005
```

```
number_of_trapeziums = 999;
```

```
delta_x = (x_max-x_min)/number_of_trapeziums;
```

```
x = x_min:delta_x:x_max;
```

```
f_x = x.^2 + 4*x;
```

```
total_area999 = trapz(x,f_x) % 81 the correct answer, at least for first 4 decimal  
digits
```

```
total_area999 =  
81.0000
```

%Assignment 7

```
x_min = 0;
```

```
x_max = 2;
```

```
number_of_trapeziums = 9;
```

```
delta_x = (x_max-x_min)/number_of_trapeziums;
```

```
x = x_min:delta_x:x_max;
```

```
f_x = 1 + cos(x.^2+1);
```

```
total_area10 = trapz(x,f_x) % 1.5882
```

```
total_area10 =
```

1.5882

```
number_of_trapeziums = 19;  
  
delta_x = (x_max-x_min)/number_of_trapeziums;  
x = x_min:delta_x:x_max;  
f_x = 1 + cos(x.^2+1);  
total_area20 = trapz(x,f_x) % 1.5757
```

```
total_area20 =  
1.5757
```

```
number_of_trapeziums = 39;  
  
delta_x = (x_max-x_min)/number_of_trapeziums;  
x = x_min:delta_x:x_max;  
f_x = 1 + cos(x.^2+1);  
total_area40 = trapz(x,f_x) % 1.58730
```

```
total_area40 =  
1.5730
```

```
number_of_trapeziums = 79;  
  
delta_x = (x_max-x_min)/number_of_trapeziums;  
x = x_min:delta_x:x_max;  
f_x = 1 + cos(x.^2+1);  
total_area80 = trapz(x,f_x) % 1.5723
```

```
total_area80 =  
1.5723
```

```
number_of_trapeziums = 159;  
  
delta_x = (x_max-x_min)/number_of_trapeziums;  
x = x_min:delta_x:x_max;  
f_x = 1 + cos(x.^2+1);  
total_area160 = trapz(x,f_x) % 1.5722
```

```
total_area160 =  
1.5722
```

```
number_of_trapeziums = 319;  
  
delta_x = (x_max-x_min)/number_of_trapeziums;  
x = x_min:delta_x:x_max;  
f_x = 1 + cos(x.^2+1);  
total_area320 = trapz(x,f_x) % 1.5721
```

```
total_area320 =  
1.5721
```

```
number_of_trapeziums = 639;  
  
delta_x = (x_max-x_min)/number_of_trapeziums;  
x = x_min:delta_x:x_max;  
f_x = 1 + cos(x.^2+1);  
total_area639 = trapz(x,f_x) % 1.5721 With 640 the value for first 4 decimal digits  
doesn't change anymore
```

```
total_area639 =  
1.5721
```

%Assignment 8

```
x_min = 0;  
x_max = 2;  
f_x = @(x) exp(1-x.^2);  
  
result10 = simpson(f_x,x_min,x_max, 10) % 2.3977
```

```
result10 =  
2.3977
```

```
result20 = simpson(f_x,x_min,x_max, 20) % 2.3977 Matches the previous value
```

```
result20 =  
2.3977
```

%Assignment 9

```
f_x = @(x) exp(1-x.^2);  
integral(f_x,0,2) % 2.3977
```

```
ans =  
2.3977
```

%Assignment 10

```
f_x = @(x) x.^2+4*x;  
integral(f_x,2,5) % 81
```

```
ans =  
81.0000
```