```
% Number 1; n = 20
% Summation of incrementing alternating numbers
result = 0;
input = 20;
for i = 1:input
    result = result + i*((-1)^i);
end
result
```

```
result = 10
```

```
% Number 2; n = 100
% Summation of incrementing alternating numbers
result = 0;
input = 100;
for i = 1:input
    result = result + i*((-1)^i);
end
result
```

```
result = 50
```

```
% Number 2; long format
f = @(x) 0.5*(x-1).^2;
format long;

f(sqrt(3))
```

```
ans =
   0.267949192431123
```

```
% Longs hold more places (15)
% 0.267949192431123
```

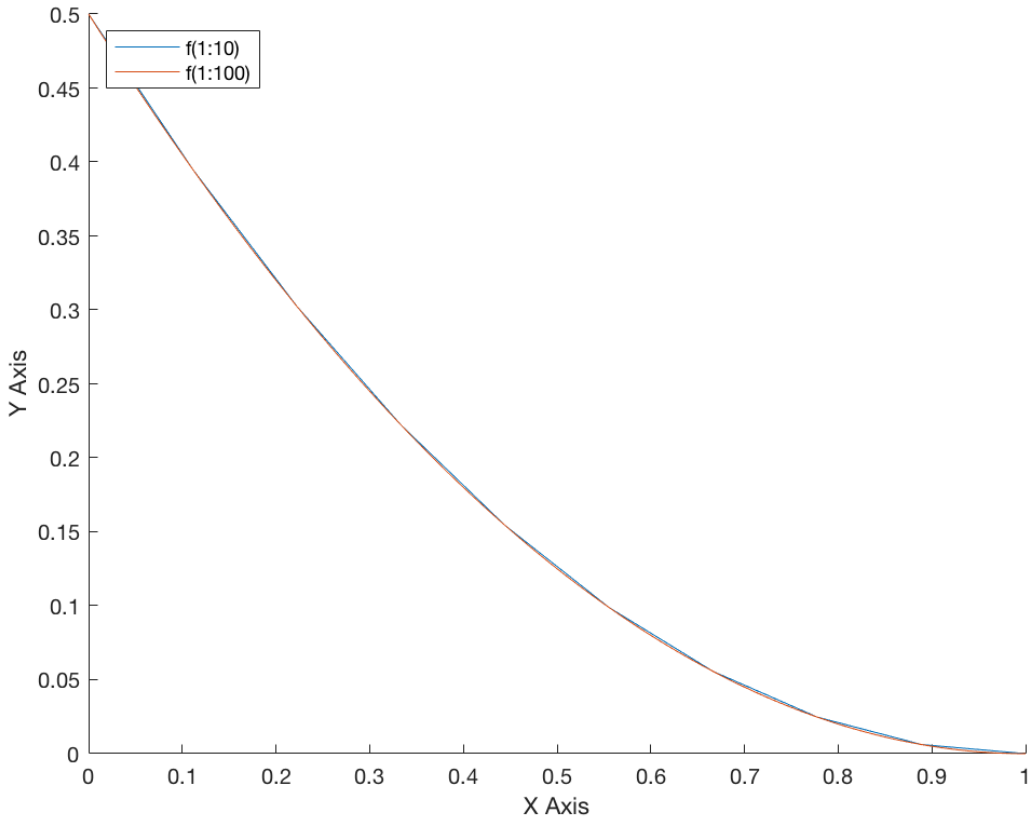
```
%Number 2; short format
format short;

f(sqrt(3))
```

```
ans = 0.2679
```

```
% Shorts hold 4 places
% 0.2679
```

```
%Number 3 Plotting both functions on same graph
%The line with fewer elements will look more jagged
```

```
f = @(x) 0.5*(x-1).^2;
t = linspace(0,1,10);
t2 = linspace(0,1,100);
hold on
plot(t,f(t))
plot(t2,f(t2))
legend({'f(1:10)','f(1:100)'},'Location','northwest');
xlabel("X Axis");
ylabel("Y Axis");
hold off
```




```
% Number 4
% differential equation as
% an anonymous function
h = @(x,h)(f(x+h)-f(x))/h;

h(1.1,0.1)
```

```
ans = 0.1500
```

```
h(1.1,0.01)
```

```
ans = 0.1050
```

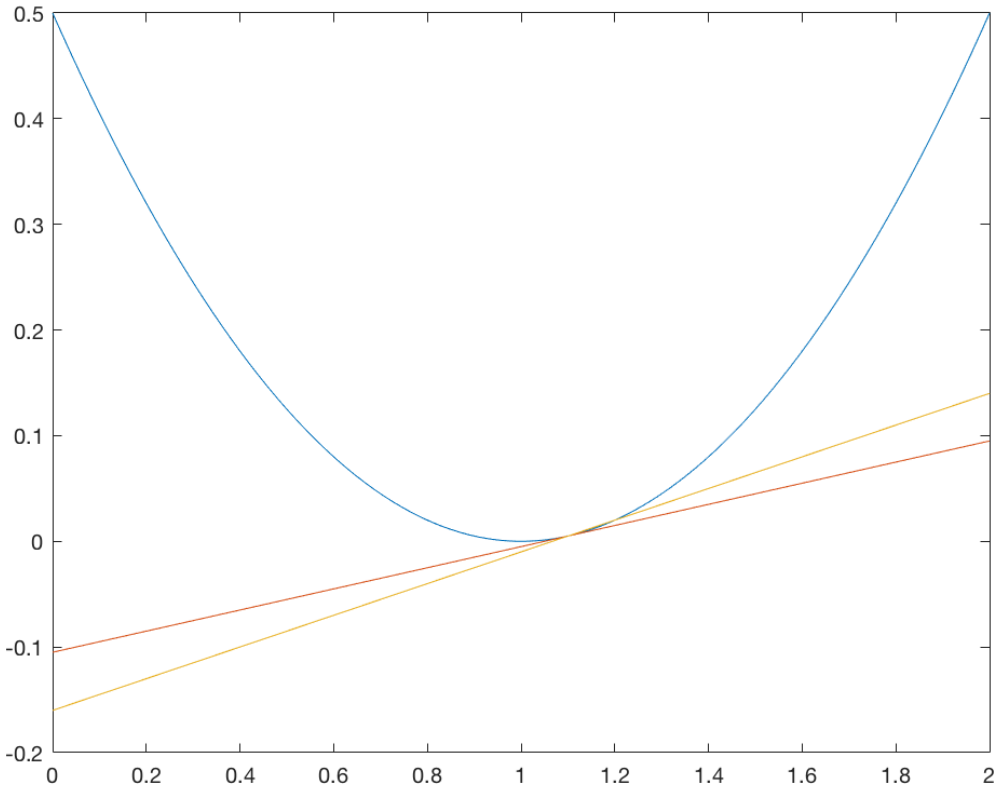
```
h(1.1,0.001)
```

```
ans = 0.1005
```

```
%Number 5
t = linspace(0,2,100);
line = @(m,x) m*(x-1.1) + 0.005
```

```
line = function_handle with value:
    @(m,x)m*(x-1.1)+0.005
```

```
%Plots all 3 functions
plot(t,f(t),t,line(.1,t),t,line(h(1.1,0.1),t))
```




```
%Functions used
f = @(x) 0.5*(x-1).^2; % Original Equation
h = @(x,h)(f(x+h)-f(x))/h; % Differential Equation
```