Question 1

Calculates the alternating sum of 20 and 100.

```
n = 20;
x = myalternatesum(n)
```

```
x = 10
```

```
n = 100;
x = myalternatesum(n)
```

```
x = 50
```

Question 2

Calculates the value for 0.5((sqrt(3) - 1)^2 depending on the format (long or short).

```
f = @(x) 0.5*((x-1).^2);
format long;
f(sqrt(3))
```

```
ans =
   0.267949192431123
```

```
format short;
f(sqrt(3))
```

```
ans = 0.2679
```

Question 3

Samples 10 and 100 equally spaced values between 0 and 1 using the previously defined function in question 2.

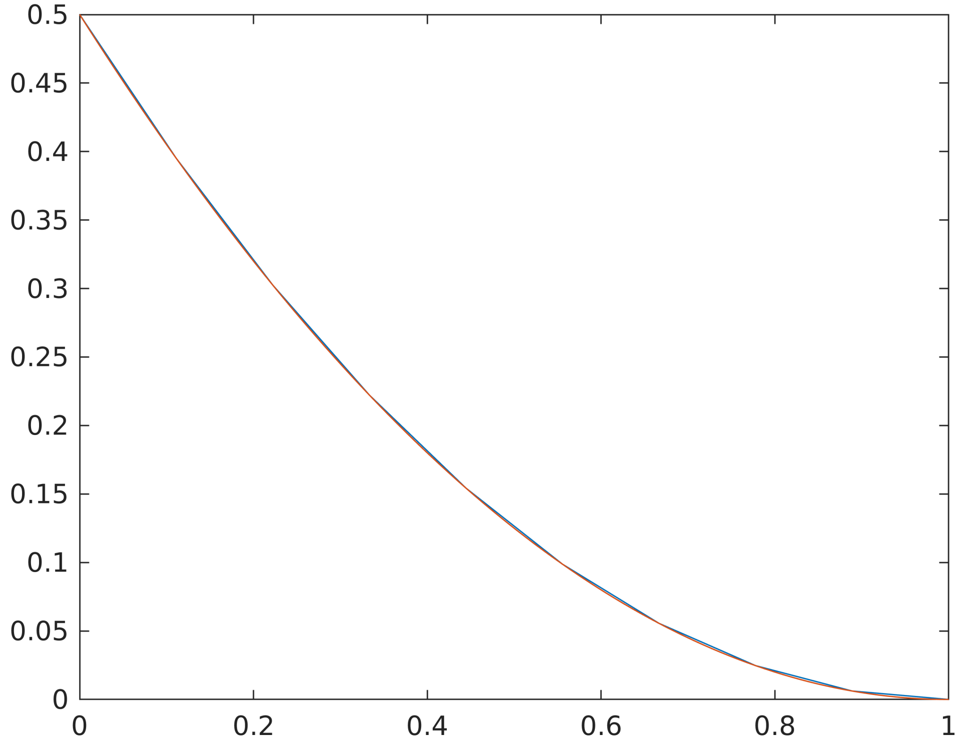
```
x10 = linspace(0,1,10);
y10 = f(x10)
```

```
y10 = 1×10
    0.5000    0.3951    0.3025    0.2222    0.1543    0.0988    0.0556    0.0247 ···
```

```
x100 = linspace(0,1,100);
y100 = f(x100)
```

```
y100 = 1×100
    0.5000    0.4900    0.4800    0.4702    0.4604    0.4508    0.4412    0.4318 ···
```

```
plot(x10, y10, x100, y100)
```



Question 4

Different approximations for the forward difference formula.

```
fPrime = @(x, h) (f(x + h) - f(x))/h
```

```
fPrime = function_handle with value:
    @(x,h)(f(x+h)-f(x))/h
```

```
x = 1.1;
h = 0.1
```

```
h = 0.1000
```

```
ans = abs(0.1 - fPrime(x, h))
```

```
ans = 0.0500
```

```
h = 0.01
```

```
h = 0.0100
```

```
ans = abs(0.1 - fPrime(x, h))
```

```
ans = 0.0050
```

```
h = 0.001
```

```
h = 1.0000e-03
```

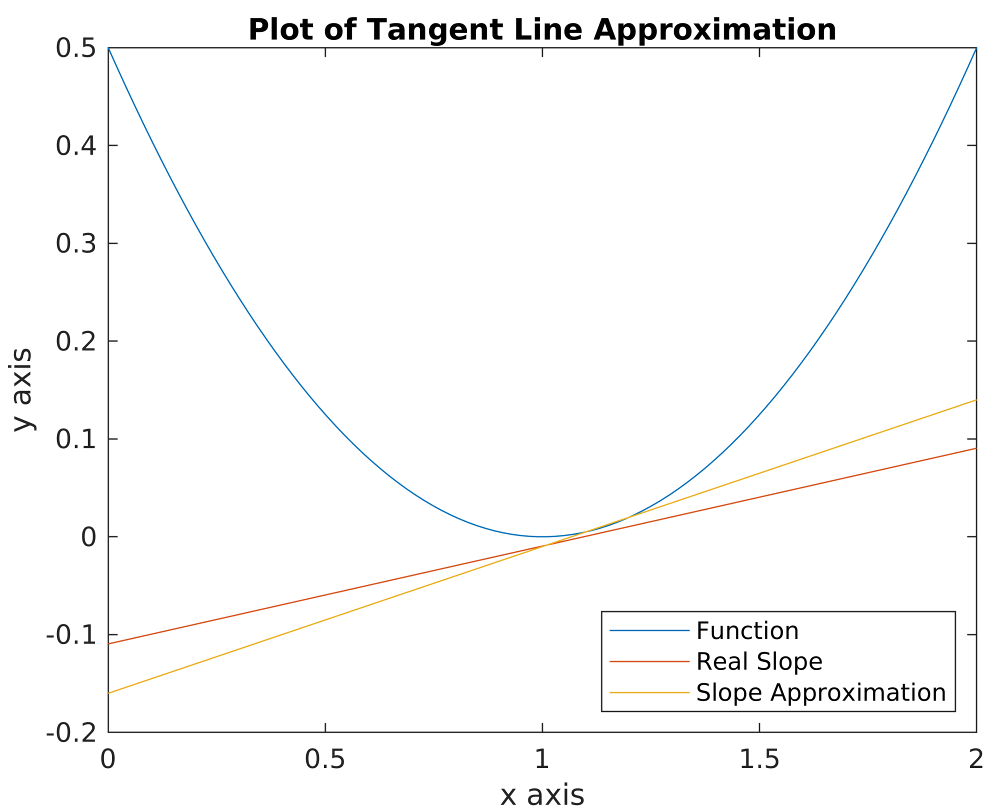
```
ans = abs(0.1 - fPrime(x, h))
```

```
ans = 5.0000e-04
```

Question 5

```
x100 = linspace(0,2,100);
y100f = f(x100);
tangent = @(x) (0.1*x - 0.1095);
y100t = tangent(x100);
approx = @(x) (fPrime(1.1, 0.1)*(x - 1.1) + f(1.1));
y100approx = approx(x100);

plot(x100, y100f, x100, y100t, x100, y100approx)
title('Plot of Tangent Line Approximation')
legend({'Function','Real Slope','Slope Approximation'},'Location','southeast')
xlabel('x axis')
ylabel('y axis')
```




```
function s = myalternatesum(n)
```

```
    s = 0;
    for i = 1:n
        s = s + ((-1).^i * i);
    end
end
```