417 hw2 2.24 coding

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1 CSE 417 homework 2

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In [1]:
```
a_record = zeros(1,10000);
b_record = zeros(1,10000);


for i = 1:10000
    rng(2*i);
    x1 = 2*rand(1)-1;
    x2 = 2*rand(1)-1;
    y1 = x1*x1;
    y2 = x2*x2;
    a_record(i) = (y1-y2)/(x1-x2);
    b_record(i) = (y2*x1-y1*x2)/(x1-x2);

end

a_bar = mean(a_record)
b_bar = mean(b_record)
```

```
a_bar =

    0.0036


b_bar =

   -0.0010
```

In [2]:
```
rng(5);
x_new = rand(1,10000);
```

```
        E_out = mean(x_new.^4)+(a_record.^2-b_record.*2)*mean(x_new.^2)+2*a_record.*b_record.*
        mean(E_out)
```

```
ans =

    0.5337
```

In [3]:
```
bias = (a_bar* x_new - b_bar - x_new.^2).^2;
mean(bias)
```

```
ans =

    0.1989
```

In [4]:
```
var = mean((a_record-a_bar).^2)*x_new.^2+ 2* mean((a_record-a_bar).*(b_record-b_bar))*
mean(var)
```

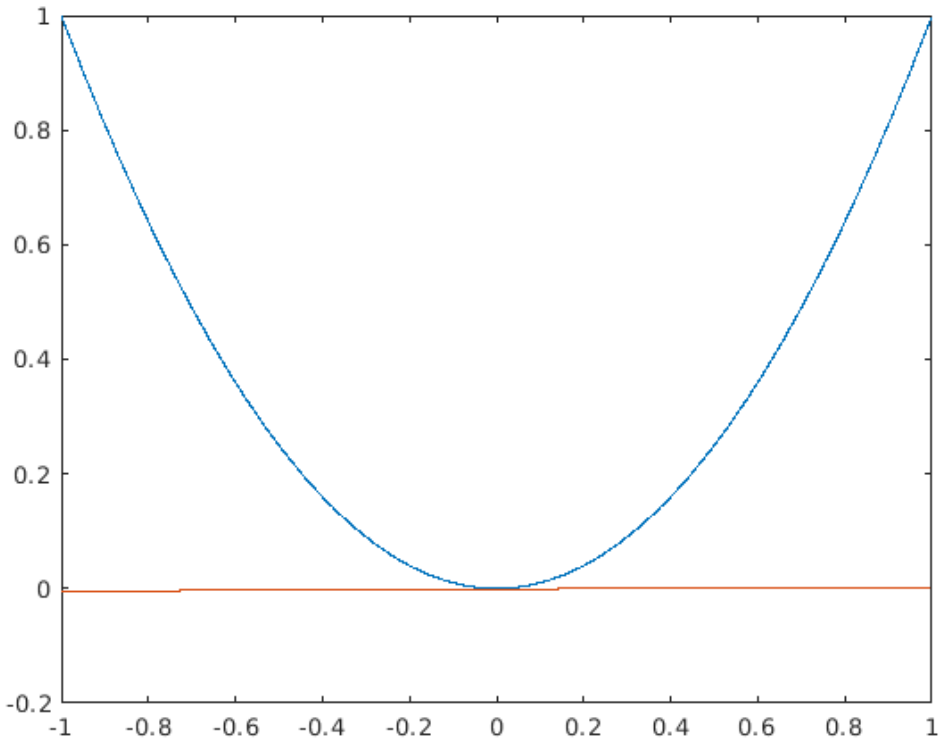
```
ans =

    0.3334
```

In [5]:
```
x = (-1000:1000)/1000;
f_x= x .^ 2;
g_bar_x = a_bar*x +b_bar;

plot(x,f_x,x,g_bar_x)
```

```
Warning: MATLAB has disabled some advanced graphics rendering features by switching to softwar
```


1
0.8
0.6
0.4
0.2
0
-0.2
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1