

1a.

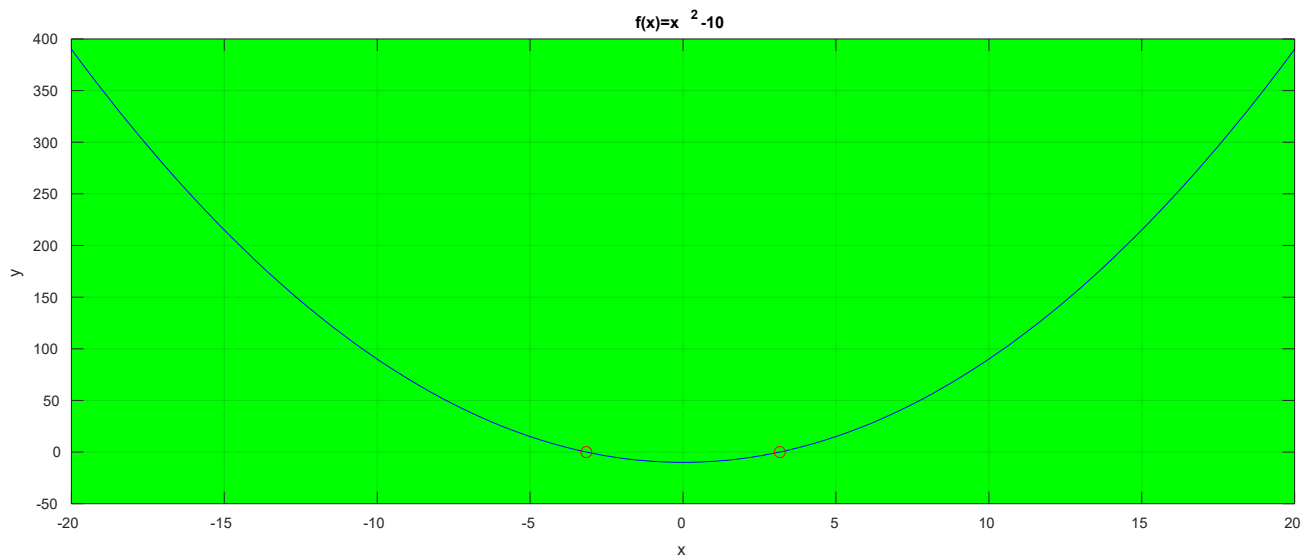
```

16 function [x,z] = bis(f, x1, x2, r)
17
18 X = linspace(x1,x2,100);
19 Y = 1;
20 for n = 1:100
21     Y(n) = f(X(n));
22 end
23
24 c = x1; d = x2;
25 a = f(x1); b = f(x2);
26
27
28 for k = 1:r
29
30     x = (x1 + x2)/2;
31     y = f(x);
32     z = (c + d)/2;
33     y2 = f(z);
34
35     if a*y < 0
36         x2 = x;
37     else
38         x1 = x;
39     end
40     if b*y2 > 0
41         d = z;
42     else
43         c = z;
44     end

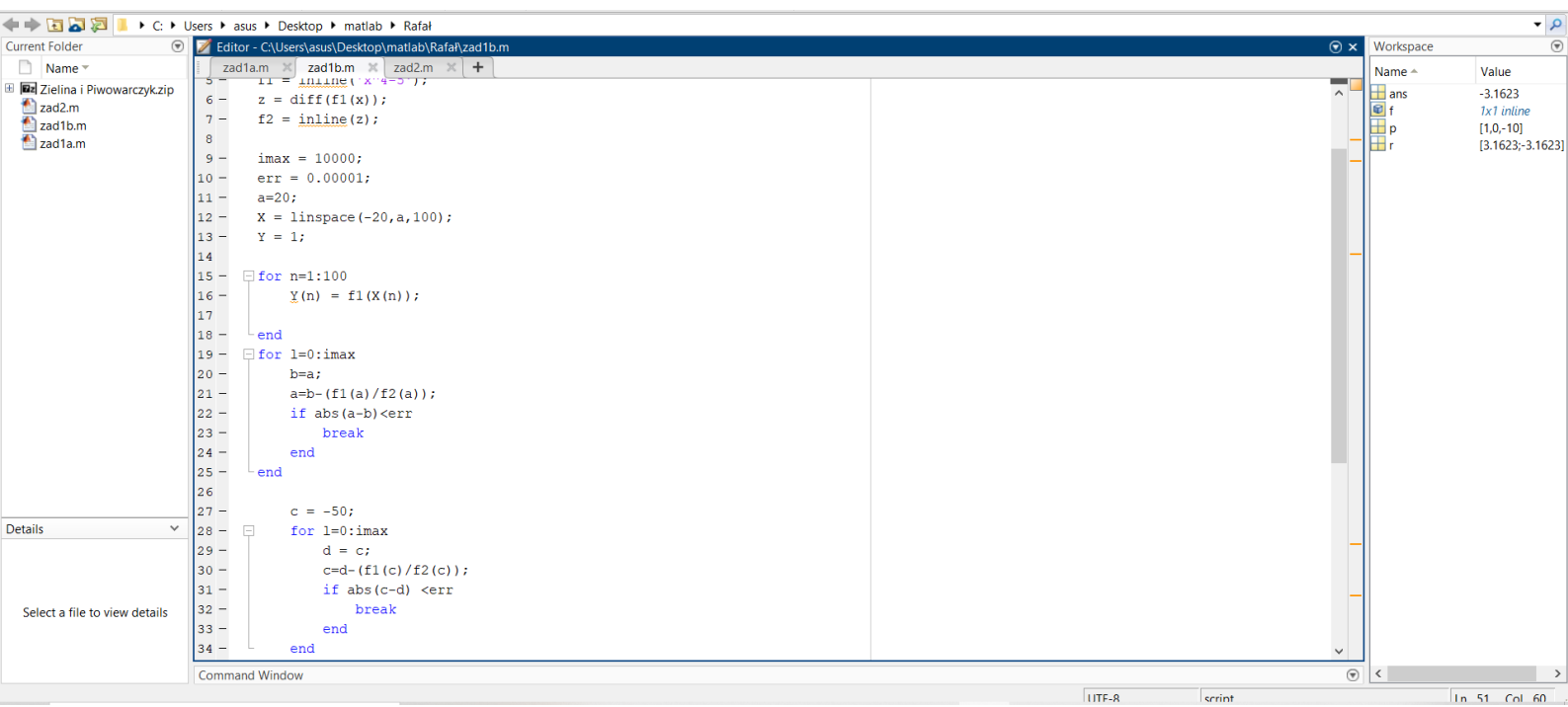
```

Workspace:

Name	Value
ans	-3.1623
f	1x1 inline
p	[1.0,-10]
r	[3.1623;-3.1623]



1b.



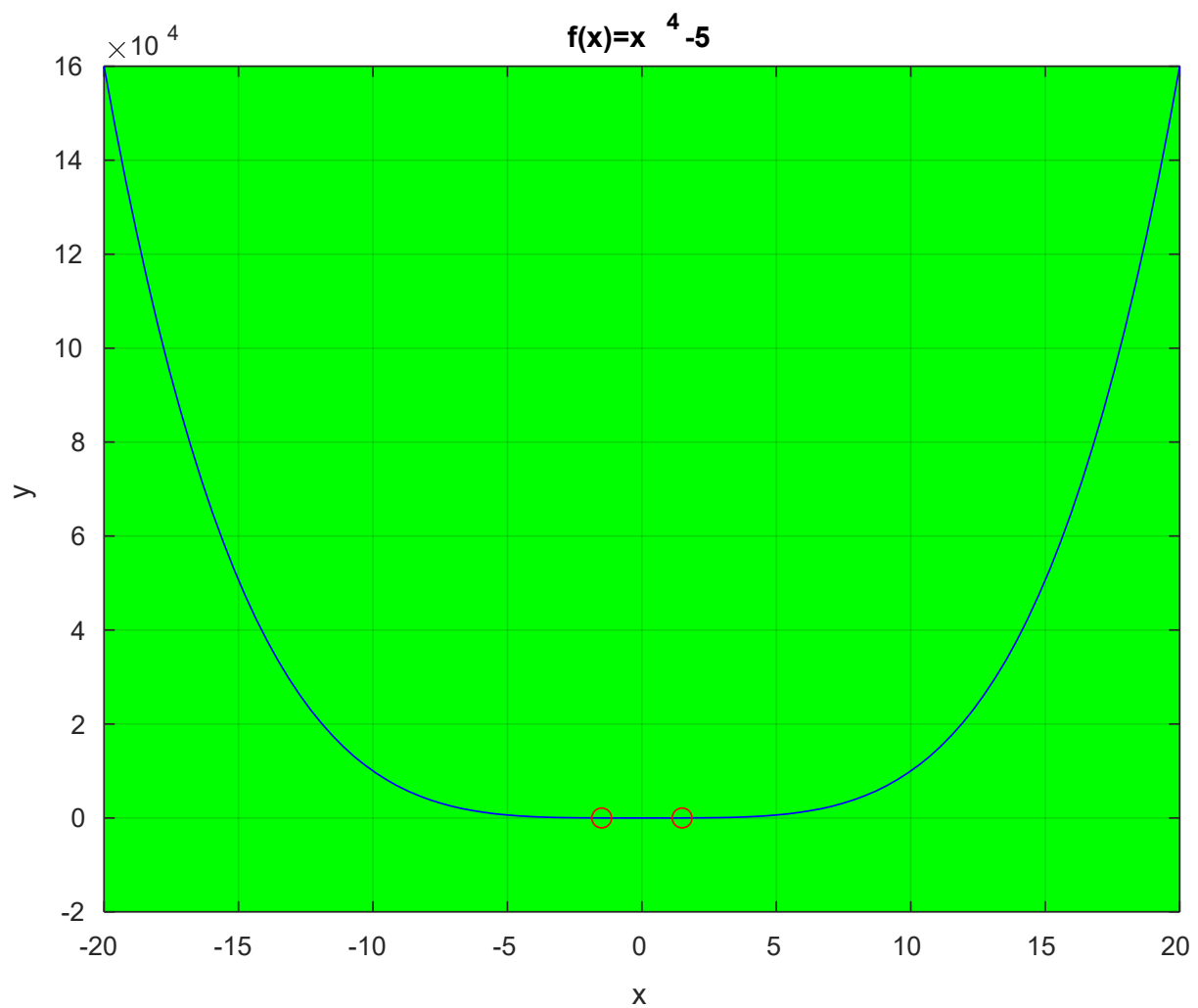
The image shows a MATLAB Editor window with the following code:

```
1 f1 = inline('x^4-5');  
2  
3 z = diff(f1(x));  
4 f2 = inline(z);  
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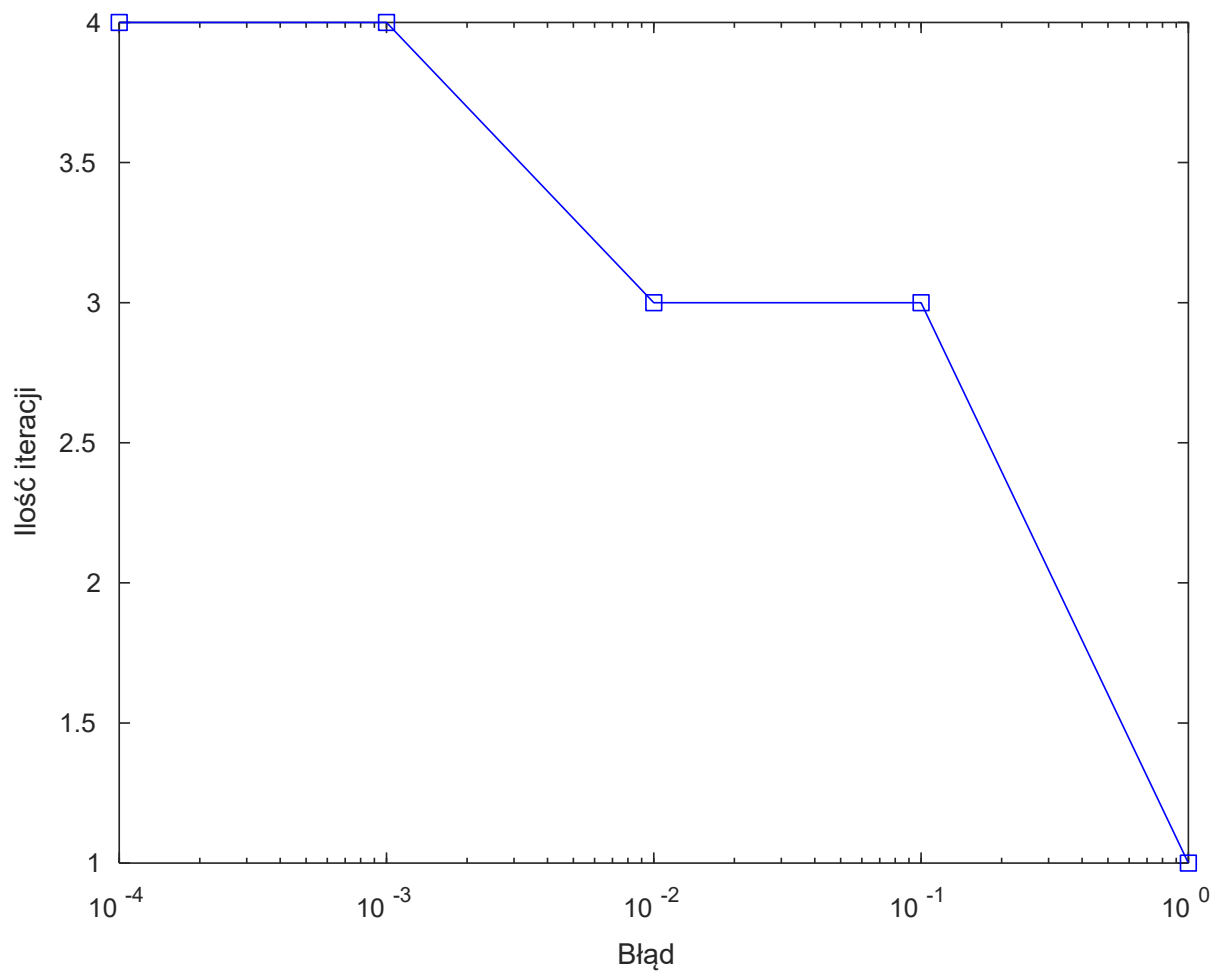
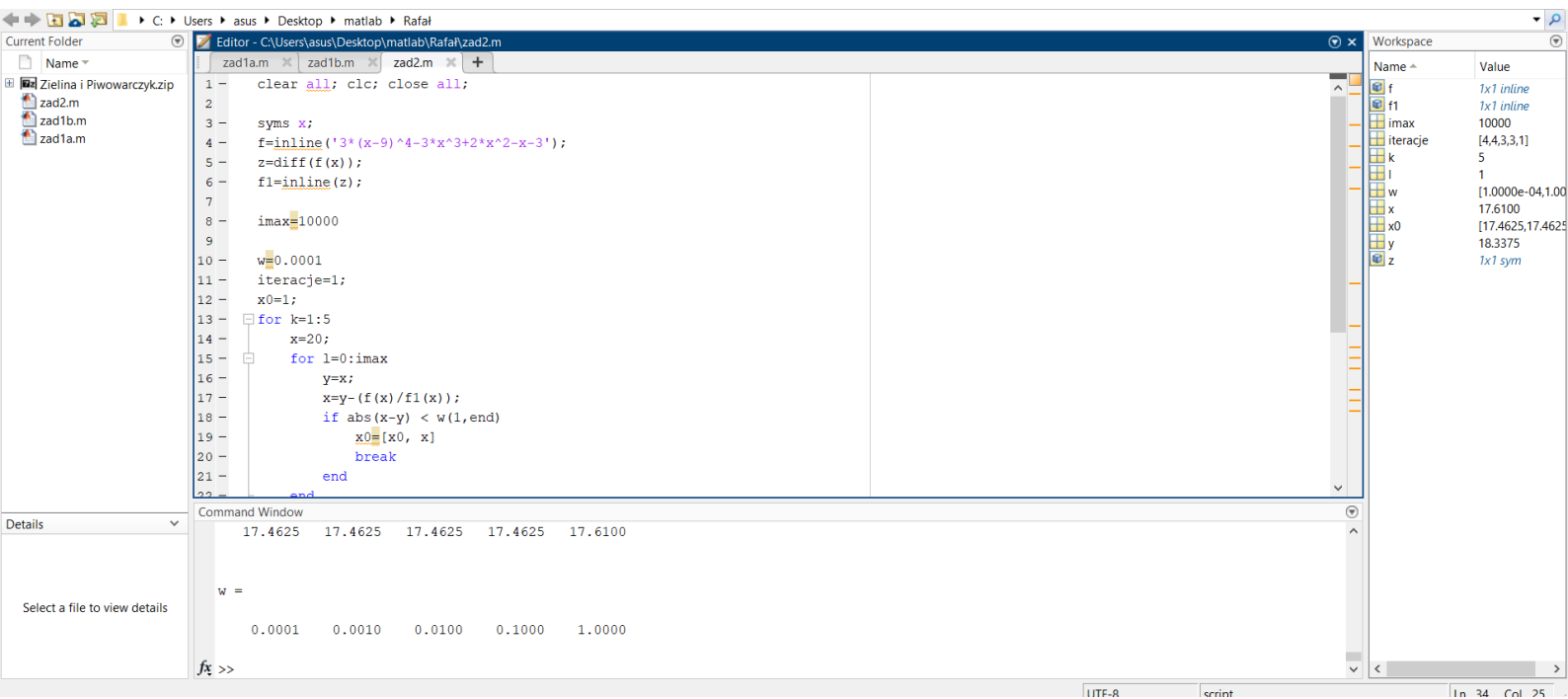
The code defines a function $f(x) = x^4 - 5$ and its derivative $f'(x) = 4x^3$. It uses the Newton-Raphson method to find the roots of the function. The initial guess is $a = 20$, and the tolerance is $err = 0.00001$. The function is evaluated at $x = -20$ to $x = 20$ with 100 points. The roots are found to be approximately ± 1.5874 .

The Workspace window shows the following variables:

Name	Value
ans	-3.1623
f	1x1 inline
p	[1,0;10]
r	[3.1623;-3.1623]



2.



3a.

Current Folder: C:\Users\asus\Desktop\matlab\Rafa\zad1a.m

```

1 clear; clc; close all;
2
3 disp('nasz algorytm');
4 tic
5 f = inline('x^2-10');
6 bis(f, -20, 20, 100);
7 toc
8
9 disp('algorytm matlaba ');
10 tic
11 p=[1 0 -10];
12 r=roots(p)
13 toc
14 disp('nasz algorytm jest wolniejszy o 3 rzędy wielkości');
15
16 function [x,z] = bis(f, x1, x2, r)
17
18 X = linspace(x1,x2,100);
19 Y = 1;

```

Command Window

```

Elapsed time is 0.219175 seconds.
algorytm matlaba

r =

    3.1623
   -3.1623

Elapsed time is 0.004083 seconds.
nasz algorytm jest wolniejszy o 3 rzędy wielkości
fx >>

```

Workspace

Name	Value
ans	-3.1623
f	1x1 inline
p	[1.0 -10]
r	[3.1623; -3.1623]

3b.

Current Folder: C:\Users\asus\Desktop\matlab\Rafa\zad1b.m

```

33 end
34 end
35 plot(X,Y,'b')
36 title('f(x)=x^4-5')
37 set(gca, 'Color', 'g')
38 xlabel('x')
39 ylabel('y')
40 grid on
41 hold on
42 plot(a,f1(a),'or')
43 plot(c,f1(c),'or')
44 r=[a;c]
45 toc
46 disp('algorytm matlaba');
47 tic
48 p=[1 0 0 0 -5];
49 r=roots(p)
50 toc
51 disp('nasz algorytm jest wolniejszy o 3 rzędy wielkości')

```

Command Window

```

r =

-1.4953 + 0.0000i
 0.0000 + 1.4953i
 0.0000 - 1.4953i
 1.4953 + 0.0000i

Elapsed time is 0.000651 seconds.
nasz algorytm jest wolniejszy o 3 rzędy wielkości
fx >>

```

Workspace

Name	Value
a	1.4953
b	1.4954
c	-1.4953
d	-1.4954
err	1.0000e-05
f1	1x1 inline
f2	1x1 inline
imax	10000
l	15
n	100
p	[1.0 0.0 -5]
r	[-1.4953 + 0.0000i
x	1x1 sym
X	1x100 double
Y	1x100 double
z	1x1 sym

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