

Assignment: Homework Six Name: Cody Strange

Disclaimer: This is my work, not that of others

Total Score: 40 (in points, not percentage)

Problem 1 score: 10

Problem 2 score: 20

Problem 3 score: 20

Problem 3 score: 10

1.

```
from math import *  
x = 0  
for i in range(100):  
    x = cos(x)
```

**0.7390851332151607**

2. A.

```
x = 1  
a = 3  
for i in range(10):  
    f = (x**2) - a  
    fp = (2*x)  
    x1 = x - f / fp  
    x = x1
```

**2.0**

**1.75**

**1.7321428571428572**

**1.7320508100147276**

**Four iterations, not counting the initial x = 1**

B.

```
x = 1  
a = 3  
for i in range(10):  
    f = (x**3) - a  
    fp = (3*x**2)  
    x1 = x - f / fp  
    x = x1  
    print(x)
```

**1.6666666666666665**

**1.4711111111111111**

**1.4428120982493433**

**1.4422497895989996**

**Four iterations, not counting the initial x = 1**

3. A.

$$X^2 - 3x + 2 = 0$$

+3x                      +3x

$$\frac{X^2 + 2}{3} = \frac{3x}{3}$$

$$x = \frac{X^2 + 2}{3}$$

$$g(x) = \frac{X^2 + 2}{3}$$

$$g'(x) = \frac{2}{3}x$$

Interval  $[-3/2, 3/2]$

$$X^2 - 3x + 2 = 0$$

+x                      +x

$$X^2 - 2x + 2 = X$$

$$g(x) = X^2 - 2x + 2$$

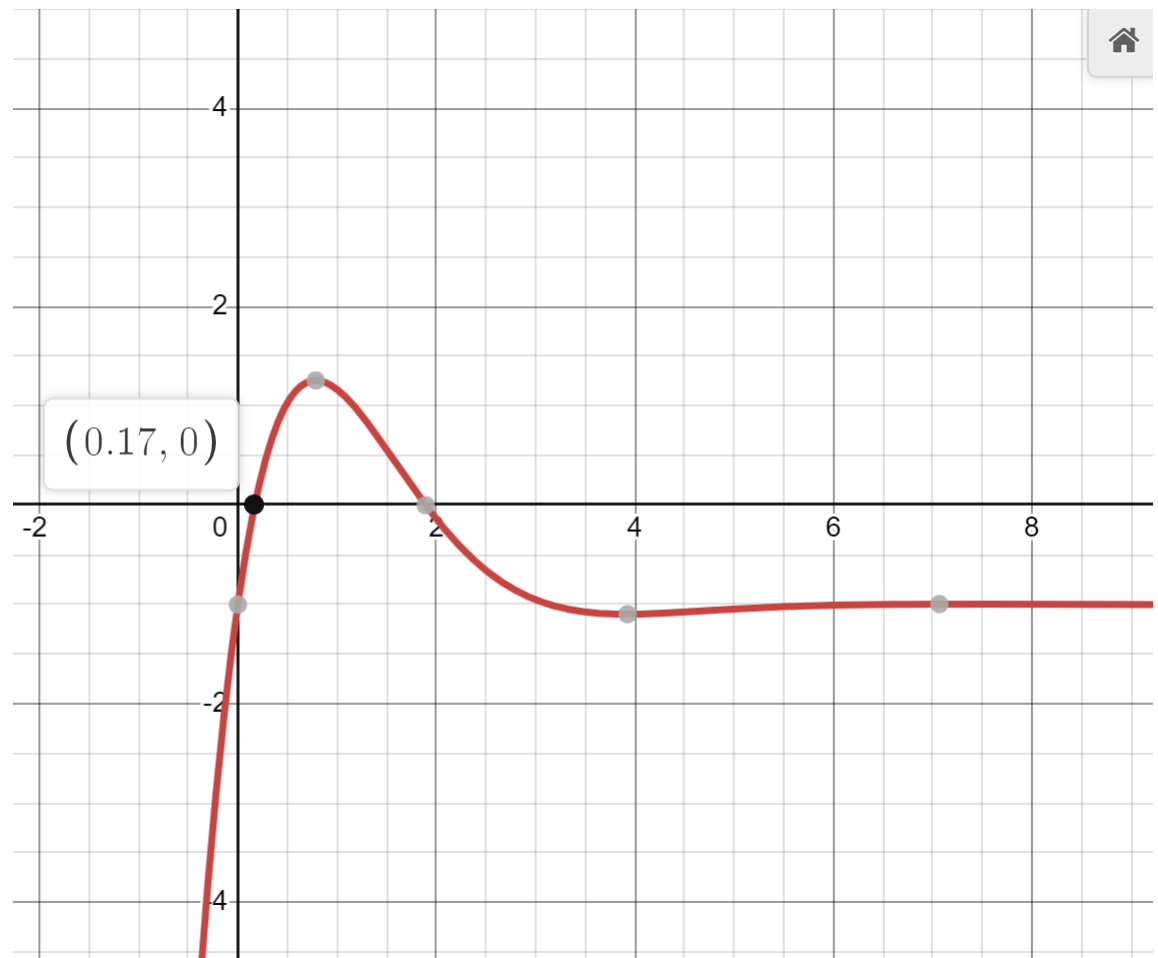
$$g'(x) = 2x - 2$$

Interval  $[1/2, 3/2]$

B. When  $g'(x) = 2/3x$  then convergence is linear because  $2/3(1) = 2/3 \neq 1$

When  $g'(x) = 2x-2$  then convergence is quadratic because  $2(1) - 2 = 2$

4. A.



D.

```
x = 0.3
s = 0.001
def func(x):
    return ((7*sin(x))*(e**(-x))) - 1
for i in range(3):
    f = func(x)
    x1 = x - ((func(x)*s*x)/(func(x+s*x)-func(x)))
    x = x1
```

**Iterations**

**(0.3)**

**(0.14430840463168013+0j)**

**(0.16940880912446213+0j)**

**(0.17017943400507535+0j)**