HW_1

January 29, 2020

[2]:

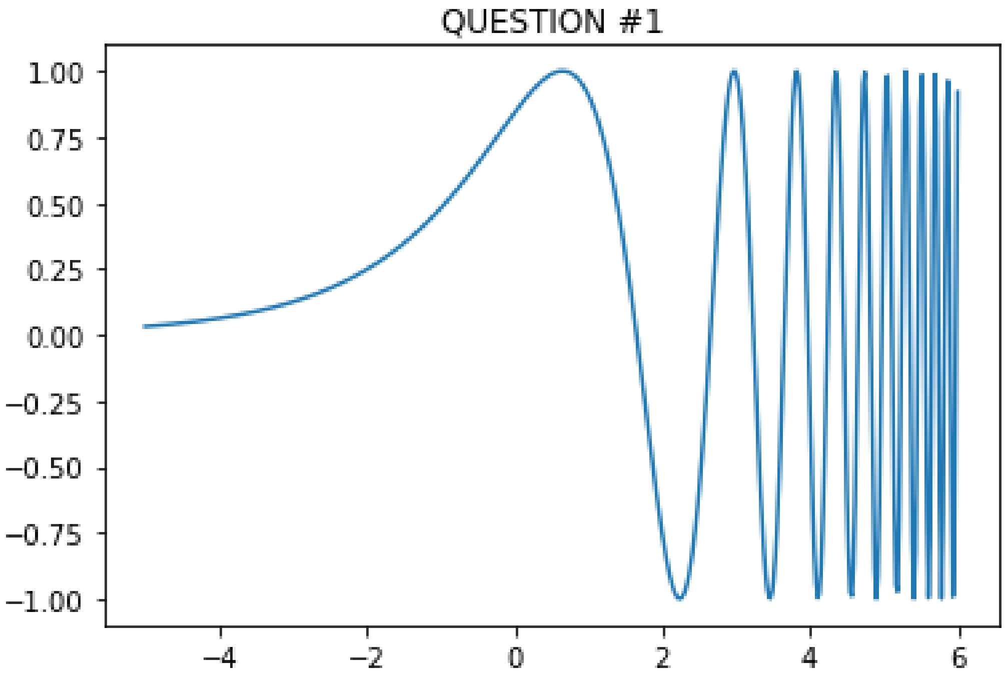
```
import matplotlib
import matplotlib.pyplot as plt
import numpy as np
```

1 QUESTION 1

[17]:

```
x = np.linspace(-5, 6, 500)
y = np.sin(2**x)
plt.plot(x, y)
plt.title("QUESTION #1")

plt.show()
```

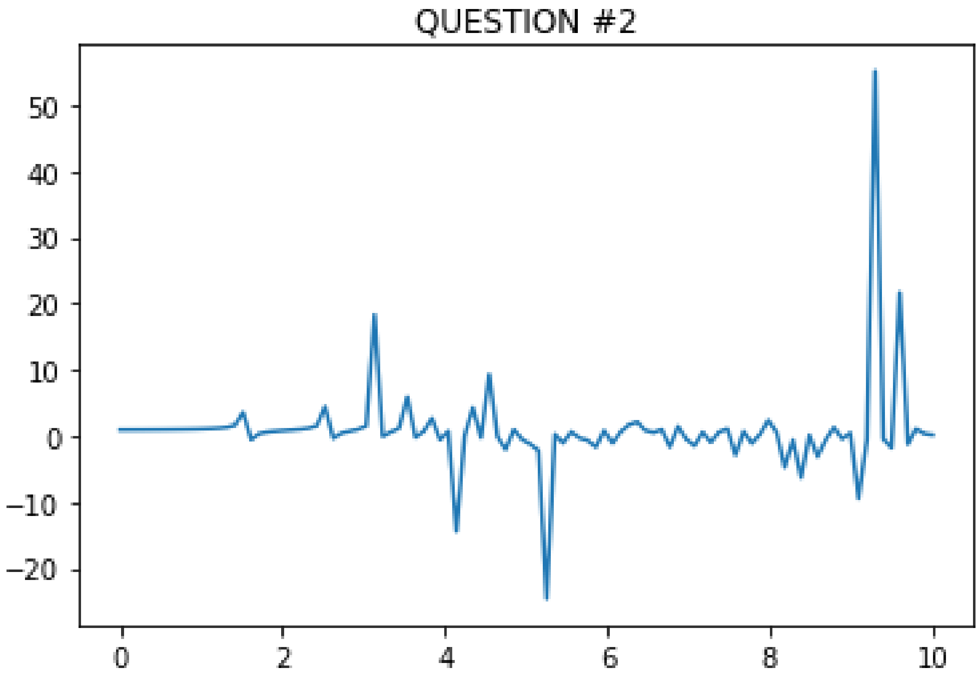


2 QUESTION 2

[4]:

```
x = np.linspace(0, 10, 100)
plt.plot(x, (np.sin(2**x) / np.sin(2**(x + 0.1))))
plt.title("QUESTION #2")

plt.show()
```



3 QUESTION 3A

[70]:

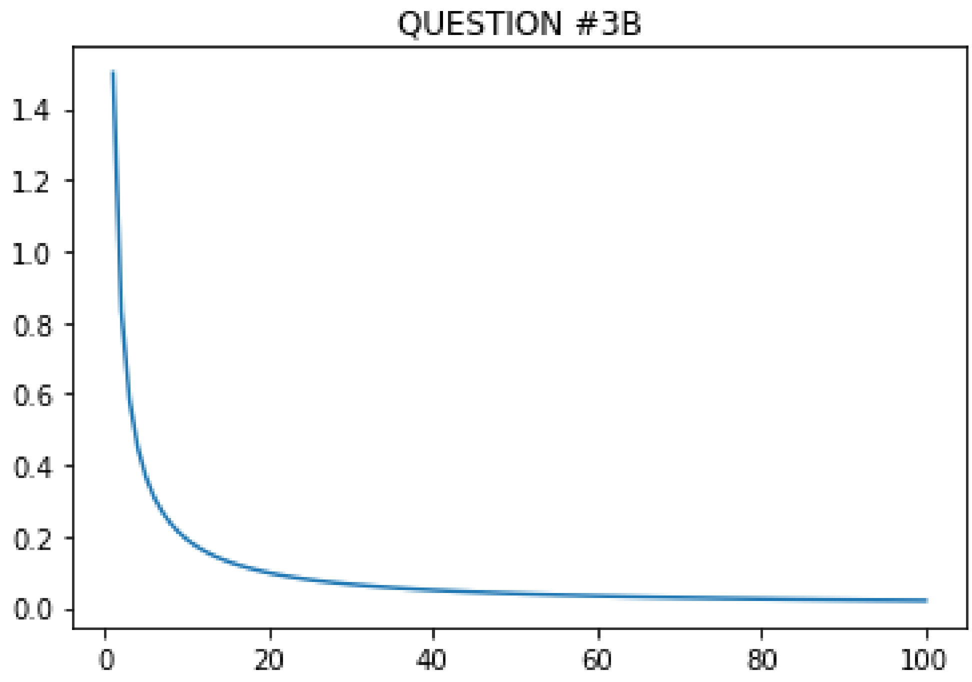
```
def summfunc(n):
    sums = []
    def calc(x):
        return (1 / (x + 1))
    for i in n:
        sums.append(calc(i - 1) + calc(i))
    return sums
```

4 QUESTION 3B

[71]:

```
dat = np.arange(1, 101)
plt.plot(dat, summfunc(dat))
plt.title("QUESTION #3B")

plt.show()
```



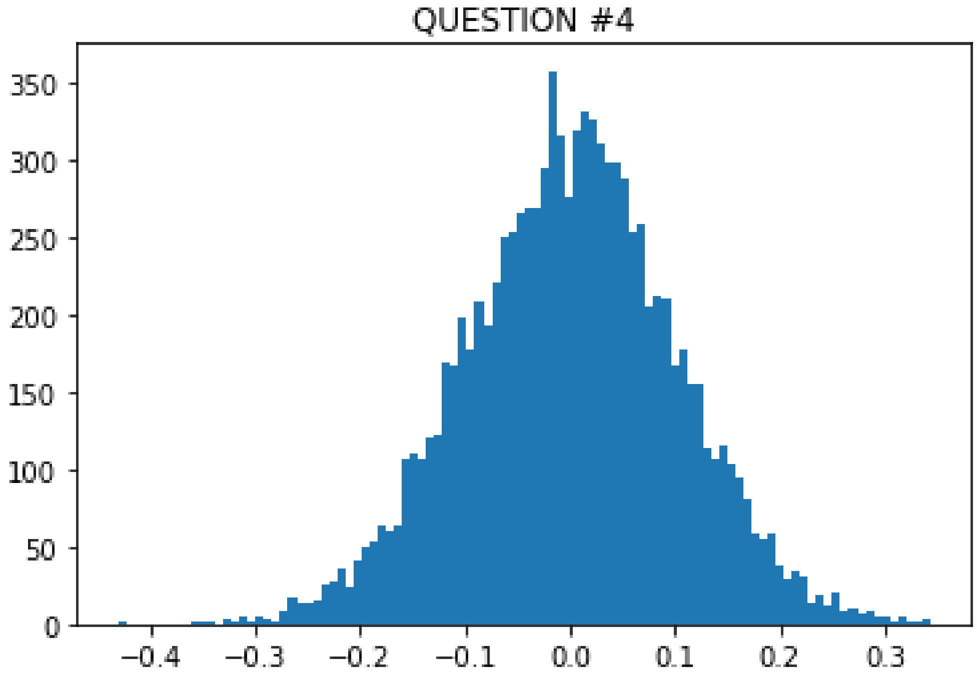
5 QUESTION 4

[51]:

```
x = np.random.normal(0, 0.1, 10000)

plt.hist(np.sin(x), 100)
plt.title("QUESTION #4")

plt.show()
```



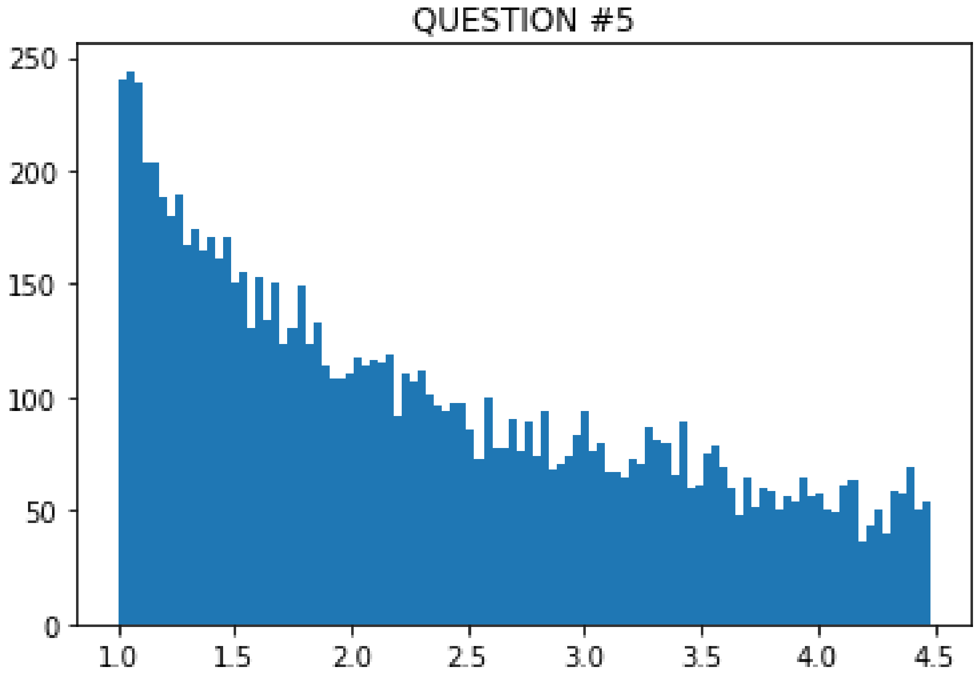
6 QUESTION 5

[123]:

```
y = np.random.uniform(0, 1.5, 10000)

plt.hist(np.exp(y), 100)
plt.title("QUESTION #5")

plt.show()
```



7 QUESTION 6A

[145]:

```
samples = np.random.normal(0, 1, 1000)

new_samples = np.sort(samples)

def diff_calc(n):
    diffs = []
    i = 0
    j = 1
    diffs.append(n[0])
    while j < 1000:
        diffs.append(abs(n[j] - n[i]))
        i += 1
        j += 1
    return(diffs)

len(diff_calc(new_samples))
```

[145]:

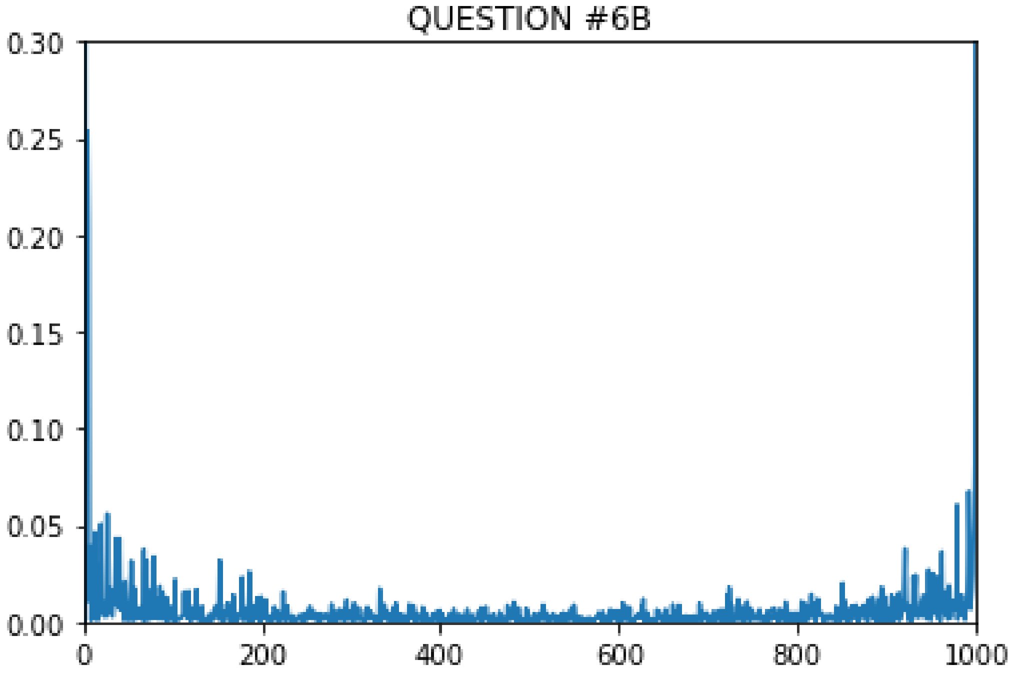
```
1000
```

8 QUESTION 6B

[157]:

```
x_val = np.arange(1, 1001)
plt.plot(x_val, diff_calc(new_samples))
plt.axis([0, 1000, 0, 0.3])
plt.title("QUESTION #6B")

plt.show()
```



[ ]:

```
```