

Math 229 Quiz 4a

You may use only Julia or `math229.github.io` – no other websites.

NAME: Solutions A

Problem 1. Plot the following functions on the interval $(\pi, 5)$.

$$f(x) = \frac{\sin(9x)}{e^x} \qquad g(x) = \frac{\cos(9x)}{x^3}$$

a. How many times do the two curves intersect for $\pi < x < 5$? 6

b. What is the number of local maxima (peaks) for each function?
(Exclude endpoints)

Number of local maxima for $f(x)$ is 2.

Number of local maxima for $g(x)$ is 3.

Problem 2. Find the minimum point (x -value) for $0 < x < \pi$ for

$$h(x) = 2 \cos(x) + \frac{2.4}{(x - \pi)^2}$$

Exact x -value to three (3) decimal places: 1.792.

Write your precise Julia commands for both problems below:

```
f(x) = sin(9x)/exp(x)
g(x) = cos(9x)/x^3
plot([f,g], pi, 5)
```

```
h(x) = 2cos(x) + 2.4/(x-pi)^2
plot(h, 0, pi)
0.3
etc.
1.7915, 1.7920
```

Math 229 Quiz 4b

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NAME: Solutions A

Problem 1. Plot the following functions on the interval $(\pi, 5)$.

$$f(x) = \frac{\sin(7x)}{e^x}$$

$$g(x) = \frac{\cos(7x)}{x^3}$$

- a. How many times do the two curves intersect for $\pi < x < 5$? 4
- b. What is the number of local maxima (peaks) for each function?
(Exclude endpoints)

Number of local maxima for $f(x)$ is 2.

Number of local maxima for $g(x)$ is 2.

Problem 2. Find the minimum point (x -value) for $0 < x < \pi$ for

$$h(x) = 3 \cos(x) + \frac{3.2}{(x - \pi)^2}$$

Exact x -value to three (3) decimal places: 1.839.

Write your precise Julia commands to both problems below:

$f(x) = \sin(7x) / \exp(x)$
 $g(x) = \cos(7x) / x^3$
 $\text{plot}([f, g], \pi, 5)$

$h(x) = 3 \cos(x) + 3.2 / (x - \pi)^2$
 $\text{plot}(h, 0, \pi)$
 $\text{optimize}(h, 0, \pi)$
 ek
 $1.838, 1.839$