Numerical Analysis Homework - Derivatives

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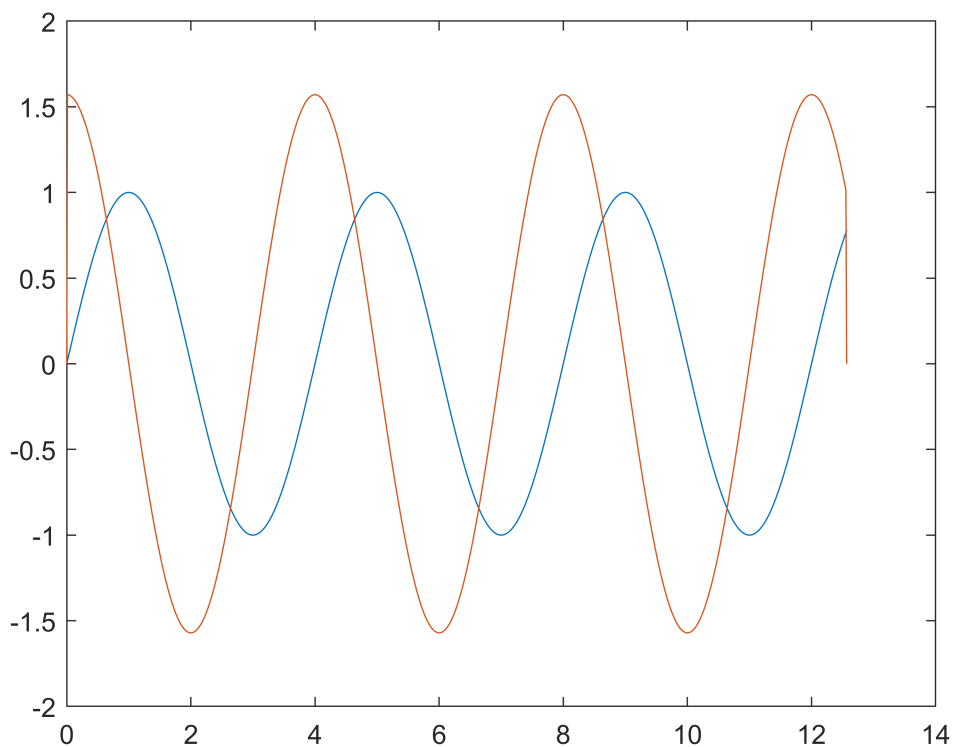Using the segmentation method to find the derivative.

Question #1:

Write a program to find $f'(x)$ at x and plot.

```
len = 1001;
x = linspace(0,4*pi,len);
h = x(2)-x(1);
f = @(x) sin(pi/2*x)
```

```
f = function_handle with value:
    @(x)sin(pi/2*x)
```

```
y = f(x);
yP = zeros(1,len);
for i = 2:(len-1)
    yP(i) = (y(i+1)-y(i-1))/(2*h);
end
plot(x,y,x,yP)
```

Question #2:

Find f'' for the following:

```
clear all
len = 1001;
x = linspace(0,4*pi,len);
h = x(2)-x(1);
f = @(x) sin(pi/2*x)./sqrt(x+1);
y = f(x);
yP = zeros(1,len);
for i = 2:(len-1)
    yP(i) = (y(i+1)-y(i-1))/(2*h);
end
yPP = zeros(1,len);
for i = 2:(len-1)
    yPP(i) = (yP(i+1)-yP(i-1))/(2*h);
end
for i = 1:len
    if (abs(yPP(i))>10) yPP(i)=0; end
end

plot(x,y,x,yP,x,yPP)
```