Kevin White

11/15/2021

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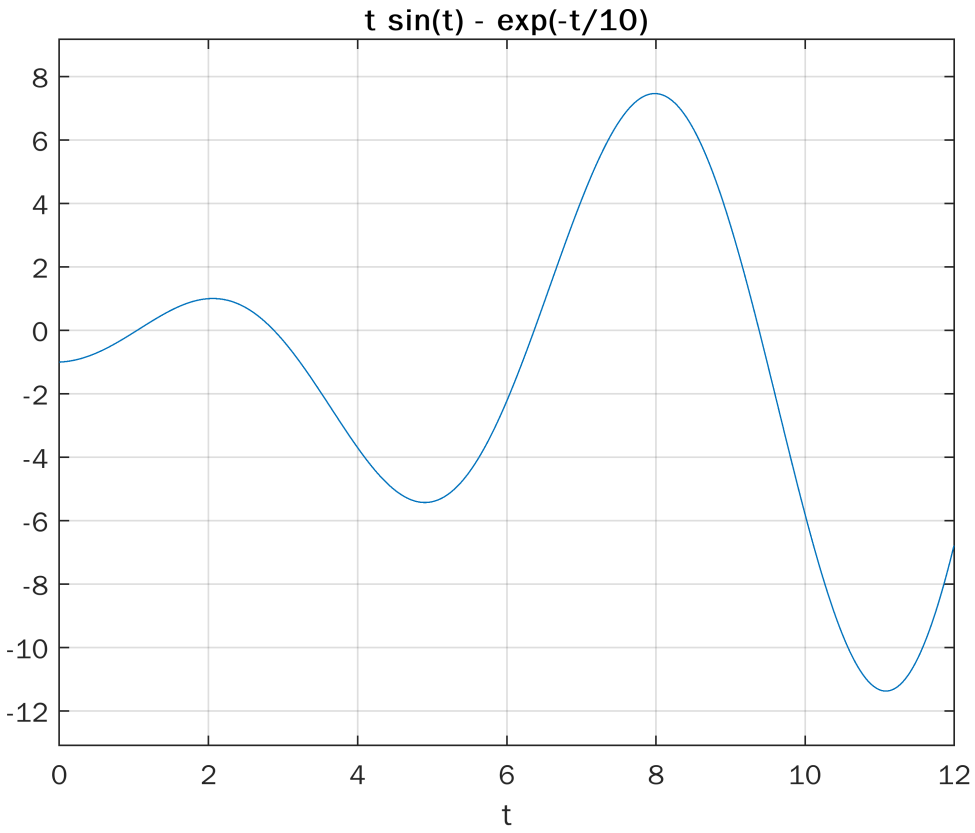
Yeying Chen 9:00AM 11/15/2021

```
%Question 1
syms t C
w2prime(t)=t*sin(t)-exp(-0.1*t)
```

```
w2prime(t) =
```

$$t\sin(t) - \mathrm{e}^{-\frac{t}{10}}$$

```
% a)
%%%Step 1 The graph of the derivative
ezplot(w2prime(t),[0,12])
grid on
```



There will be a lot less water the second year compared to the first year in the class practice

```
% b)
%%% Step 2 Finding the Function
```

```
w2(t)=int(w2prime(t),t)+C
```

w2(t) =

$$C + 10\,\mathrm{e}^{-\frac{t}{10}} + \sin(t) - t\cos(t)$$

```
my_C=solve(w2(0)==39.785, C)
```

my_C =

$$\frac{5957}{200}$$

```
w2(t)=int(w2prime(t),t)+my_C
```

w2(t) =

$$10\,\mathrm{e}^{-\frac{t}{10}} + \sin(t) - t\cos(t) + \frac{5957}{200}$$

```
%%% Step 3 Answe the questions about the functions
% c)
w2(12)
```

ans =

$$10\,\mathrm{e}^{-\frac{6}{5}} - 12\cos(12) + \sin(12) + \frac{5957}{200}$$

```
w2(6)
```

ans =

$$10\,\mathrm{e}^{-\frac{3}{5}} - 6\cos(6) + \sin(6) + \frac{5957}{200}$$

```
vpa(w2(12))
```

ans = 22.134121696331680738936938324506

```
vpa(w2(6))
```

ans = 29.232679142839142330199119938176

```
vpasolve(w2(t)==-5,t)
```

ans = 44.633245144335274503868018917636

```
round(vpasolve(w2(t)==-5,t))
```

ans = 45

```
%Question 2
clear all
syms x C
f(x)=(1+x)^3*cos(3*x)+x^2
```

f(x) =

$$\cos(3\,x)\,(x+1)^3+x^2$$

```
F(x)=int(f(x),x)+C
```

F(x) =

$$C+\frac{7\cos(3\,x)}{27}+\frac{\sin(3\,x)}{9}+\frac{2\,x\cos(3\,x)}{3}+\frac{7\,x\sin(3\,x)}{9}+\frac{x^2\cos(3\,x)}{3}+x^2\sin(3\,x)+\frac{x^3\sin(3\,x)}{3}+\frac{x^3}{3}$$

```
my_c=solve(F(2)==-20,C)
```

my_c =

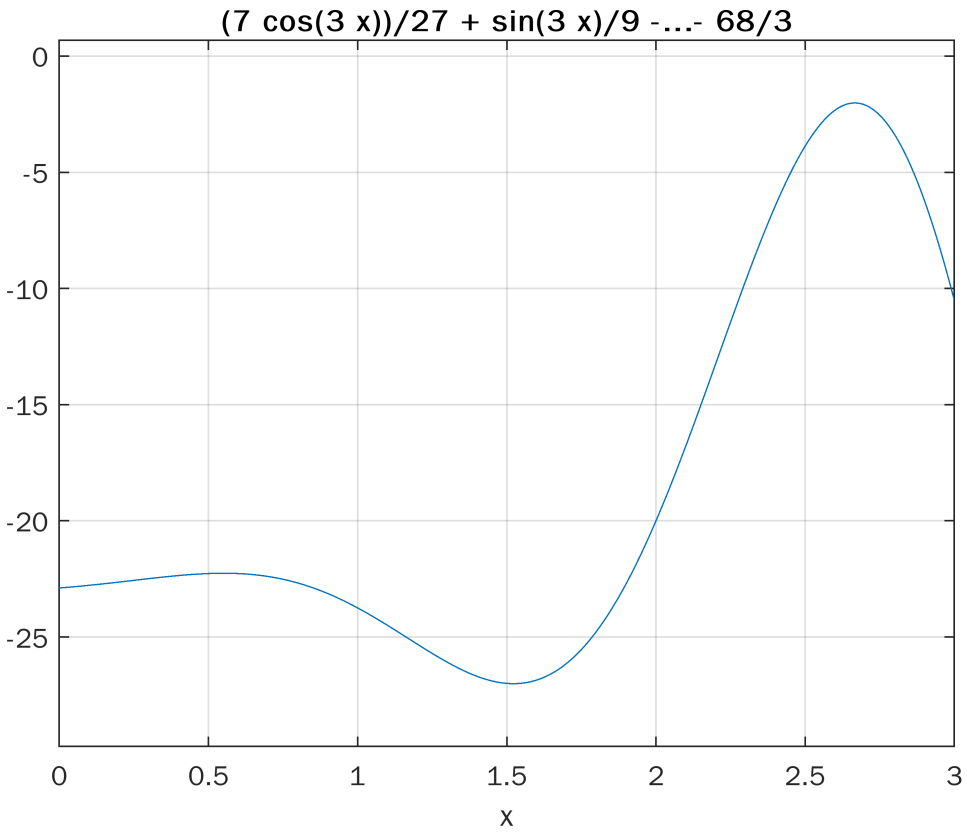
$$-\frac{79\cos(6)}{27}-\frac{25\sin(6)}{3}-\frac{68}{3}$$

```
F(x)=int(f(x),x)+my_c
```

F(x) =

$$\frac{7\cos(3\,x)}{27}+\frac{\sin(3\,x)}{9}-\frac{79\cos(6)}{27}-\frac{25\sin(6)}{3}+\frac{2\,x\cos(3\,x)}{3}+\frac{7\,x\sin(3\,x)}{9}+\frac{x^2\cos(3\,x)}{3}+x^2\sin(3\,x)+\frac{x^3}{}$$

```
ezplot(F(x),[0, 3])
grid on
```




```
ezplot(f(x),[0,3]) %blue line
hold on
grid on
ezplot(F(x),[0,3]) %red line
```

```
hold off
```