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# AMSC 460 - HW21

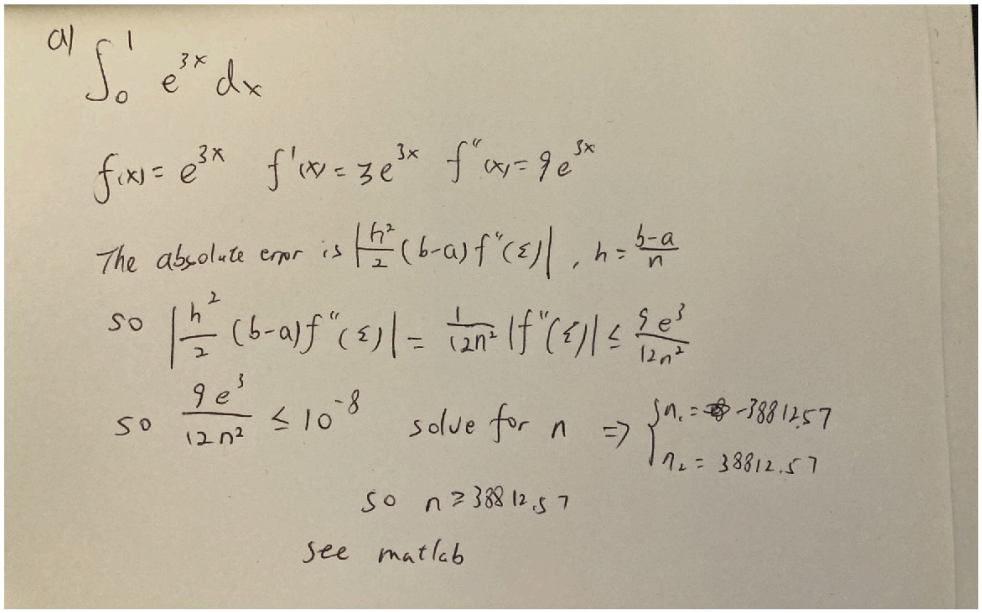
```
clear all; format compact; close all; syms f(x) x y z
```

# Problem 1

If using the composite trapezoid rule, how many subintervals are needed to approximate the integral to within an absolute error of $10^{-8}$?

```
img = imread('amsc460p1.jpg'); imshow(img)
syms n
vpasolve(9*exp(3)/(12*n^2)== 10^(-8))
```

```
ans =
-38812.565867758281377226918861775
 38812.565867758281377226918861775
```




# Problem 2

Implement the composite trapezoid rule in MATLAB. For $n = 10^p$, with $p = 1, 2, 3, 4$, keep track of the error $E_T(n) = |I - T(f, n)|$, where $T(f, n)$ denotes the trapezoid rule with $n$ subintervals. Plot

$E_T$ for the given values of $n$ on the same plot (use logarithmic axes for better scaling). Does your plot agree with the analysis performed in part (a)? \\

```
I = int(f,0,1)
p=1:4;
for i=1:length(p)
    n(i)=10^p(i);
    T = trapz(f,n(i));
    E(i) = abs(I - T);
    fprintf('\n 10^%g T = %f, the error is %.9f',p(i),T,E(i));
end
```

```
I =
int(f(x), x, 0, 1)
```

```
Error using trapz (line 47)
Dimension argument must be a positive integer scalar within indexing
 range.
Error in hw21 (line 22)
    T = trapz(f,n(i));
```

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