



Staple!

Differential Eqns  
MAP2302 4689

B-Class

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31Aug2015

B1: \_\_\_\_\_ 110pts

B2: \_\_\_\_\_ 85pts

B1: Show no work.

**a** Fnc  $x(t) :=$  \_\_\_\_\_ is the general  
soln to  $\frac{dx}{dt} = 4x^2t$ . [Hint: SoV.] The solution  
with  $x(1) = 1/5$  is  $x(t) :=$  \_\_\_\_\_.

Total: \_\_\_\_\_ 195pts

**b** Function  $h()$  satisfies  $2h'' + h' - h = 0$ ,  
and initial conditions  $h(0) = 7$  and  $h'(0) = 2$ . So  
$$h(t) = \alpha e^{At} + \beta e^{Bt}, \text{ for numbers}$$

$\alpha =$  \_\_\_\_\_,  $A =$  \_\_\_\_\_,  $\beta =$  \_\_\_\_\_,  $B =$  \_\_\_\_\_.

**c**  $[\mathbf{D} - 7\mathbf{I}]^3(x^5 \cdot e^{7x}) =$  \_\_\_\_\_.

**d** With  $f(t) := \int_{7t}^{\exp(5t)} \cos(x^2) dx$ , then  $f'(t)$  equals  
\_\_\_\_\_.

Simplified,  $f'(0) =$  \_\_\_\_\_.

[Hint: Chain rule and Fund. Thm of Calculus.]

**e**  $f(x) := |x^3|$  is a  $\mathbf{C}^n$ -fnc for this largest  
 $n =$  \_\_\_\_\_ in  $\mathbb{N} \cup \{\infty\}$ .

Ord: \_\_\_\_\_

**B2:** OYOP: In grammatical English **sentences**, write  
your essay on every **third** line (usually), so that I can  
easily write between the lines. Do not restate the question.

Showing all the steps in the FOLDE algorithm,  
compute the general solution  $y()$  to

$$x^4 \frac{dy}{dx} + x^3 y = 8x^7 + x^6$$

Also write it here, as

$$y_\alpha(x) =$$
  
\_\_\_\_\_.

End of B-Class

**HONOR CODE:** "I have neither requested nor received  
help on this exam other than from my professor."

Signature:

\_\_\_\_\_.