Differential Eqns
MAP2302

**W-Class**

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**W1:** Show no work.

[z] One of the authors of our text is (Circle):
**Archimedes DNE Euler Fuchs Gauss Mendez Sanders**
**Stirling Trump Tillman Williams Wright York Ziv**

[a] Fnc $y_\beta(t) :=$ ......................................
is the general soln to $\frac{dy}{dt} = 8t^3 \cdot [y - 5]$. [*Hint:* SoV.]
   The *particular* $y()$ with $y(0) = 8$ is
$y(t) :=$ .......................................... . And this
function has $y(1) =$ ..................... .

[b] *A* particular soln $y = y(t)$ to
$*:$ $\qquad \left[\mathbf{D} - 5\mathbf{I}\right]^3 (y) \quad = \quad e^{5t} + e^{3t}$
is $y(t) =$ .............................................. .
So the general soln is
$y_{\alpha,\beta,\gamma}(t) =$ ............................................. .

[c] Function $h()$ satisfies $2h'' + h' - 6h = 0$,
and initial conditions $\boxed{h(0) = 5}$ and $\boxed{h'(0) = \text{-}3}$. So
$\qquad h(t) \quad = \quad \alpha e^{At} + \beta e^{Bt}, \quad$ for numbers
$\alpha =$ ........ , $A =$ ........ , $\beta =$ ........ , $B =$ ........ .

[d] Fnc $y_\alpha(t) :=$ ...................................
is the gen.soln to $y' + \left[\frac{2}{t} \cdot y\right] = t^3$. [*Hint:* FOLDE.]

**W2:** Show no work.

[e] DiffOperators $\mathbf{P}, \mathbf{Q}, \mathbf{R}, \mathbf{S}$ are defined as
$$\mathbf{P}(f) := f(3) \cdot f', \qquad \mathbf{Q}(f) := \cos(3) \cdot f^{(3)},$$
$$\mathbf{R}(f) := [\cos(3) \cdot f] + f'', \quad \mathbf{S}(f) := \cos(3) + [3f'].$$
Then... $\mathbf{P}$ is linear: T F. $\qquad$ $\mathbf{Q}$ is linear: T F.
$\mathbf{R}$ is linear: T F. $\qquad\qquad$ $\mathbf{S}$ is linear: T F.

[f] The discriminant of polynomial
$f(x) := 3x^2 + 3x + 1$ is $\text{Discr}(f) =$ .............. .

[g] Let $f(t) := 3e^{5t}$ and $g(t) := e^{5t}$. Translating,
then, $\mathbf{T_r}(f) = g$, where $\mathbf{r} =$ ................. $\in \mathbb{R}$.

$\boxed{\text{End of W-Class}}$

| W1: | __ __ __ | 145pts |
|---|---|---|
| W2: | __ __ | 50pts |

**Total:** __ __ __ 195pts

*Please PRINT your* name *and* ordinal. *Ta:*

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

Signature: ................................................

**Hello.** Please write **DNE** in a blank <u>if</u> the described object does not exist or if the indicated operation cannot be performed. **Write expressions unambiguously e.g, "$1/a + b$" should be bracketed either $[1/a] + b$ or $1/[a + b]$. (Be careful with negative signs!)**
   Do **not** approx.: If your result is "$\sin(\sqrt{\pi})$" then write that rather than $.9797\cdots$.
   **Use "$f(x)$ notation" when writing fncs; in particular, for trig and log fncs. E.g, write "$\sin(x)$" rather than the horrible** $\sin x$ **or** $[\sin x]$.
   Write *rational numbers* as fractions: E.g $\frac{1}{2}$ and $1/3$, but not $0.51$ nor $0.3333\ldots$; **use fractions**.