MATH 046 020-QUIZ 4, SPRING 2018

Name: KEY

1 (5 pts). Determine if the ODE is exact and compute the solution if it's exact:

$$(t^2 - x)dt - tdx = 0, \; x(1) = 5$$

* See other version for solution

2 (5 pts). Determine if the ODE is exact and compute the general solution if it's exact:

$$(y + 2xy^3)dx + (1 + 3x^2y^2 + x)dy = 0.$$

$\frac{\partial M}{\partial y} = 1 + 6xy^2$ and $\frac{\partial N}{\partial x} = 1 + 6xy^2 \Rightarrow$ Exact

$\frac{\partial g}{\partial x} = y + 2xy^3 \Rightarrow g(x,y) = xy + x^2y^3 + h(y)$

$\Rightarrow \frac{\partial g}{\partial y} = x + 3x^2y^2 + h'(y)$

$\Rightarrow h'(y) = 1 \Rightarrow h(y) = y$

So $g(x,y) = \boxed{xy + x^2y^3 + y = C}$