

Math 3280 Worksheet 1: Calculus review and Separable equations.

Group members (2 to 4): \_\_\_\_\_  
Only hand in 1 sheet per group.

Part I: Calculus review

(1) Calculate the second derivative of  $f(t) = t^2 \cos(3t)$ .

(2) Find the antiderivative of  $te^t$  by integrating by parts.

(3) Compute the integral  $\int_0^1 \frac{2}{x^2+x} dx$  by decomposing the integrand into partial fractions.

Part II: Separable differential equations

- (4) Solve the separable differential equation  $\frac{dy}{dx} = xy^2$ . Find the particular solution for which  $y(0) = 2$ .