

MATH 252: Elementary Differential Equations

Quiz 9

NAME: \_\_\_\_\_

Date: December 7, 2017

Solve the following problems on this sheet of paper. No calculators or other electronic devices are permitted.

(10 points) Consider the second-order equation

$$\frac{d^2y}{dt^2} + 6\frac{dy}{dt} + 8y = \cos t$$

Find the general solution, where the particular solution  $y_p(t)$  is

- (a) expressed a sum of sines and cosines, and
- (b) expressed as a single sine or cosine. Do not forget to give an expression for the phase-shift  $\theta$ .

*Hint:* You do not have to do parts (a) and (b) individually. They can both be solved simultaneously via **complexification**, with different complex forms used for  $y_p(t)$ .