MAT 212, Quiz #10, Summer 2016 Name KEY

Instructions: Show all work. Answers without work required to obtain the solution will not receive full credit. Some questions may contain multiple parts: be sure to answer all of them. Give exact answers unless specifically asked to estimate.

1. A spring-mass system stretches 6 cm when a 3N force is applied. A viscous damper is attached that applies a force of 2N when the velocity is 5 cm/sec. A 10 kg mass is hung from the spring and is set in motion from equilibrium with an initial velocity upward of 1 cm/sec. Set up the second order ODE that describes the motion.

$F = kx$ $\quad \gamma v = F$ $\quad m = 10\ kg$ $\quad y(0) = 0$

$3 = k(.06)$ $\quad \gamma(.05) = 2$ $\quad y'(0) = .01$

$k = 50$ $\quad \gamma = 40$

$10y'' + 40y' + 50y = 0$

or $y'' + 4y' + 5y = 0$

$y(0) = 0,\ y'(0) = .01$