

**Quiz 6, Math 246, Professor David Levermore**  
**Tuesday, 15 October 2019**

**Your Name:**

**Discussion Instructor (circle one):**      Sam Potter      Nathan Yu      David Russell  
**Discussion Time (circle one):**          9:00              11:00              12:00

**No books, notes, calculators, or any electronic devices.**  
**Show your reasoning for full credit. Good luck!**

- (1) [3] Find the amplitude and phase of the simple harmonic motion

$$h(t) = 5 \cos(2t) - 5\sqrt{3} \sin(2t).$$

- (2) [2] The displacement  $h(t)$  of a spring-mass system is governed by

$$\ddot{h} + 2\eta\dot{h} + 49h = f(t),$$

where  $\eta \geq 0$  is the damping rate and  $f(t)$  is a forcing. For what values of  $\eta$  is the system over damped?

- (3) [5] Compute the Green function for the differential operator  $L = D^2 + 6D + 13$ .