

# Math 2250 HW #11

Due 1:25 PM Friday, October 28

**Reading:** Hass §4.3–4.4

**Problems:** Do the assignment “HW11” on WebWork. In addition, write up solutions to the following problems and hand in your solutions by Friday at 1:25. Since we don’t have class on Friday, you should either give your homework to me or slide it under my office door.

1. Show that the function  $f(x) = x^4 + 3x + 1$  has exactly one zero in the interval  $[-2, -1]$ . (*Hint: to show that  $f$  has at least one zero, use the Intermediate Value Theorem as in Section 2.5*)
2. Suppose the acceleration of an oscillating particle is given by

$$a(t) = -4 \sin(2t)$$

at that the particle’s position at time  $t = 0$  is  $-3$  and its velocity at time  $t = 0$  is  $2$ . Find the particle’s position as a function of  $t$ .

3. A trucker handed in a ticket at a toll booth showing that in 2 hours he had covered 159 miles on a toll road with a speed limit of 65 mph. He was immediately cited for speeding and, when he asked for an explanation, the only response was “Mean Value Theorem, son.” Explain.