Homework #1
ECE 248
Spring 2014
Due Apr 08

Unless otherwise noted, all problems from Malvino & Bates (7^{th} ed)

A. Basic Diode Circuits (assume second approximation)

3-9
3-11
3-28 You should get R = 215 ohm
3-29
3-33

B. Half-Wave Rectifier (assume second approximation)

4-3 The AC source is actually 50 V_{RMS} (remember $V_{RMS} = V_{PEAK}/\sqrt{2}$)
Also, DC and average voltages are the same thing.
4-4 The AC source is actually 15 V_{RMS}.
You should get $V_{OUT,P}$ = -20.5V and V_{DC} = -6.5V.
4-17 AC source is actually 120 V_{RMS}.
4-20 You should get V_{RIPPLE} = 14.6V, which is quite large!
4-xx Derive the expression $V_{DC} = V_P/\pi$ for the DC voltage of a half-wave rectifier.

C. Clippers and Limiters (assume second approximation)

4-33 Assume R_S = 1 kΩ and R_L = 10 kΩ
4-34 Same as 4-33
4-35
4-36 Resist the temptation to use Eq. 4-18, since it gives the wrong answer! A good approach to solve this problem is to replace the voltage divider with its Thevenin equivalent.
You should get $V_{OUT,MAX}$ = 10.7V.

D. Clampers and Multipliers (assume second approximation unless otherwise noted)

4-38
4-39
4-40 The ideal diode has zero voltage drop.