1 Analyzing The Transformer

Sketch $V_{out}$:
What is the maximum voltage you see at $V_{out}$? What is the minimum?

How does the waveform differ from your expectations, and why is it this way?

2 Adding In The Bridge Rectifier

Sketch $V_{out}$:

![Graph of $V_{out}$]

What is the maximum voltage you see at $V_{out}$? What is the minimum?

What is the frequency of $V_{out}$? Why?
3 Analyzing The Bridge Rectifier

Sketch $V_{out}$:

![Graph of voltage (V) vs. time (ms)]

What is the average voltage seen at $V_{out}$?

4 Bridge Rectifier Ripple

Use your oscilloscopes to measure $V_{ripple}$ for this very simple AC to DC converter. What is the frequency of this ripple voltage?

5 Linear Voltage Regulator

Sketch $V_{out}$:
What is the average value (DC component) of $V_{out}$? What is $V_{ripple}$? (just subjectively compare $V_{ripple}$ to part 4)

6 Response To A Changing Load

Sketch $V_{out}$ and $I_L$ on the same axes:

Approximately how long does the v-reg take to stabilize the output voltage?
7  Efficiency

Output power measurement:

Average input power measurement and calculation:

What is the total efficiency including the transformer?

Why is this efficiency so low? Where did all the excess power go? How can we build a better AC to DC
converter?