Due: February 09, 2006

Use engineering paper. Work only on one side of the paper. Use this sheet as your cover sheet, placed on top of your work and stapled in the top left-hand corner. Number the problems at the top of the page, in the center of the sheet. Do neat work. Underline your answers. Show how you got your equations. Be sure to show how you got your answers. Each problem counts 10 points.

4.9 \( V_o = 7 \, V \)

4.10 \( V_{ab} = 6 \, V \)

4.22 In addition, work by PSpice. Answer: \( i = 0.555 \, A \)

4.27 \( V_x = -48 \, V \)

4.32 In addition, work by Pspice. Answer: \( i_x = 1.6 \, A \)
\[ V_{ab} - 3V_{ab} + 20 + 4 = 0 \]
\[ 4V_{ab} = 24 \]
\[ V_{ab} = 6 \text{V} \]

\[ -V_{ab}'' - 3V_{ab}' + 4 = 0 \]
\[ 4V_{ab}'' = 4 \]
\[ V_{ab}'' = 1 \]
\[ V_{ab} = V_{ab}' + V_{ab}'' = 5 + 1 = 6 \text{V} \]
\[ I = I_1 + I_2, \quad V_0 = 1 \times (I_1 + I_2) \]

**Suppress 6 A source**

\[ V_0' = \frac{(1/3) \times 1}{1 + 1 + 4} = 3V \]

**Suppress 18 V source**

\[ V_0'' = \left(\frac{6 \times 4}{2 + 4}\right) \times 1 = 4V \]

\[ V_0 = V_0' + V_0'' = 3V + 4V \]

\[ V_0 = 7V \]
4.22 Given the following circuit, use source transformations to find $i$. 

Current Division

\[ i = \frac{1 \times 5}{9} = \frac{5}{9} \text{ A} \]

\[ i = 0.555 \text{ A} \]
4.27 Apply source transformation to find $V_x$.

\[ V_x = \frac{-160 \times 12}{12 + 8 + 20} = -48 \text{V} \]
Find $\lambda_x$ using source transformation.

\[-60 + 40\lambda_x - 2.5\lambda_x = 0\]

\[\lambda_x = \frac{60}{37.5} = 1.6 \, A\]

$\lambda_x = 1.6 \, A$