Problem 1 (25 Points):

a) Find the output voltage $V_o$ if the input current is 0.375 mA. (17 Points)

b) Add a resistor to the circuit that eliminates the effects of bias currents. This resistor may not change the output of the circuit. (8 Points)
Problem 2: (20 Points)

Assume negative feedback.

a) Under what conditions is the circuit above a differentiator, $V_o \approx K \frac{dV_{IN}(t)}{dt}$, where K is a constant. (7 Points)

b) Design the circuit so that $V_o \approx -0.005 \frac{dV_{IN}(t)}{dt}$ for a frequency of 1 kHz. (13 Points)
Problem 3: (30 Points)

For the circuit above:

a) Find the equation for the output voltage. (15 Points)
b) Add a resistor to the circuit to eliminate the effects of bias currents. (5 Points)
c) Using a TL074 OPAMP, find the bandwidth of this circuit. (10 Points)
Problem 4: (25 Points)

Assume that the output is limited to $\pm 15$ V and $V_{\text{ref}}$ is a DC voltage.
a) Draw the transfer curve. (5 points)
c) Find numerical values for the UTP and LTP. (20 points)