EE232-INTRODUCTION TO ELECTRONICS
EXERCISE-2.3

P-1 The opamp in Figure-1 is fed from DC sources V_{CC}=13V and -V_{EE}=-13V.
a) Find the gain (Vo/Vin) of the circuit given in Figure-5. (5Points)
b) For Vin=1V find the current flowing through R_F. (5Points)
c) Find the output voltage Vo for Vin=2V.(5Points)
d) Find the current flowing through R_1 for Vin=2V.(5Points)

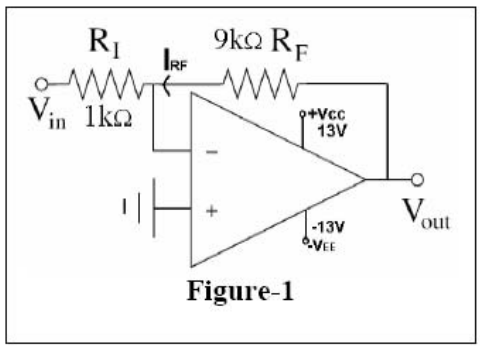

Figure-1

A-5a) $\frac{Vo}{Vin} = -\frac{R_F}{R_I} = -9$ (remember inverting amplifier)

b) If Vin=1V, Vo=-9V.
From the negative feedback configuration of the circuit the inputs of the opamp is approximately equal to each other. Thus,
V- = V+ = 0V
and
V_{RF}=-9V⇒ I_{RF}= V_{RF}/R_F = -1mA

c) The opamp output voltage is -12V, since -9x2V=-18V exceeds the supply voltage $-V_{EE}$=-12V. (remember saturation).

d) In that case, $V_{R1}+V_{RF}$= Vin -Vo=2V-(-12V)=14V=Ix(R_1+R_F)=Ix10k⇒I=I_{R1}= -I_{RF}=1.4mA