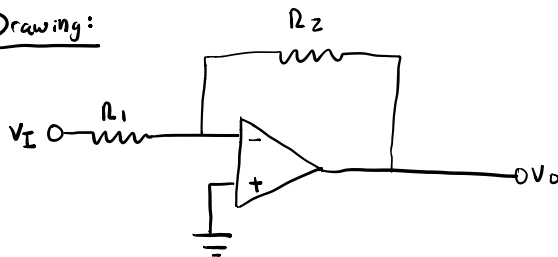1)

a)

Nolan Anderson

Drawing:



Closed loop gain, $G = -100 \text{ v/v}$

$R_1 = R_{in} = 50k\Omega$

$-R_2 = -G \cdot R_1 = \boxed{R_2 = 5,000k\Omega}$

b)   Open loop gain $= 5,000 \text{ v/v}$

Calculate closed loop gain:

$$A_v = \frac{-R_2/R_1}{1 + (1 + R_2/R_1)(1/5,000)} \qquad (5000/50 = 100)$$

$$A_v = \frac{100}{1 + (1 + 100)(1/5,000)} \quad ; \quad \boxed{A_v = 98.02 \text{ v/v}}$$

c)   $A_v = \dfrac{-R_2/R_1}{1 + (1 + R_2/R_1)\frac{1}{A_0}} \Rightarrow -\dfrac{R_2}{R_1}\dfrac{1}{A_v} = 1 + (1 + \dfrac{R_2}{R_1})(\dfrac{1}{A_0})$

$\rightarrow R_1(1 + \frac{1}{A_0}) = -R_2(\frac{1}{A_v} + \frac{1}{A_0})$

$R_1 = -R_2 \dfrac{A_0 + A_v}{A_0 A_v + A_v} = \dfrac{-100 + 5000}{(-100)(5000) - 100}(-5000) = \dfrac{4900}{-500100} \times -5000 =$

$$\boxed{R_{in} = R_1 = 48.99k\Omega}$$

2)