



$$(a) \quad V_{out} = \frac{-R_2}{R_1 + R_2} A_1 A_2 V_{test}$$

$$\text{Loop gain} = -\frac{V_{out}}{V_{test}} = \frac{R_2}{R_1 + R_2} A_1 A_2$$

$$(b) \quad \text{Open loop gain} = (-A_1)(-A_2) = A_1 A_2.$$

$$\text{Closed loop gain} = \frac{A_1 A_2}{1 + \left(\frac{A_1 A_2 R_2}{R_1 + R_2} \right)}$$

$$(c) \quad A_v = \frac{A_1 A_2}{1 + A_1 A_2 \left(\frac{R_2}{R_1 + R_2} \right)}$$

$$\sim \frac{A_1 A_2}{A_1 A_2 \left(\frac{R_2}{R_1 + R_2} \right)}$$

$$= \frac{R_1 + R_2}{R_2}$$

$$= 1 + \frac{R_1}{R_2}.$$