All transistor pairs in Fig.1 are matched. Choose R in the circuit of Fig.1 so that $I_2 = 20\mu a$.

$$20\mu a = 500\mu a \exp(-20\mu aR/27mv)$$

$$R = 1.35K \ln(25) = 4.35K$$

Neglect base currents and find the ratio $I_o/V_s$ if $V_s$ is very small.

$$g_m = 10\mu a/27mv = 0.37E-3$$

The current $I_3$ is not equal to $I_4$ because of the base currents of $Q_5$ and $Q_6$. Find the difference current $(I_{C3}-I_{C4})$. Both $Q_5$ and $Q_6$ have a beta of 120.

$$I_{E5} = I_{E6}$$
$$I_{C3} = I_{E5} + I_{B6}$$
$$I_{C4} = I_{E5} - I_{B5}$$

$$I_{C3}-I_{C4} = 2I_{B5} = (2/121)10\mu a = 164pa$$

$$(I_{C3}-I_{C4}) =$$