

$$40^{-1} \pmod{51}$$

$$\begin{array}{r} 40 \overline{) 51} (1 \\ \underline{40} \\ 11 \end{array}$$

$$1 = 4 - (1)(3)$$

$$= 4 - (1)(7 - 4(1))$$

$$= 11 - 7(1) - 7 + 11 - 7(1)$$

$$= 2(11) + (-3)7$$

$$= 2(51 - 40(1)) + (-3)(40 - 3(11))$$

$$= 51(2) + 40(-2) + 40(-3) + 11(9)$$

$$= 51(2) + 40(-5) + (51 - 40(1))(9)$$

$$= 51(11) + 40(-14)$$

$$\begin{array}{r} 561 \\ - 560 \\ \hline 1 \end{array} \checkmark$$