

$$① \quad S_{50} = 4 + (44) \cdot 3 = 151$$

$$② \quad \sum_{k=3}^4 (2k+5) = 48$$

$$\begin{array}{cccccc} & -3 & -2 & -1 & 0 & 1 \\ (-1) & +1 & +3 & +5 & +7 & \\ & 2 & 3 & 4 & & \\ & +9 & +11 & +13 & = & \boxed{48} \end{array}$$

$$③ \quad 99 \sum_{i=0}^i \left(-\frac{2}{3}\right)^i$$

$$9 \left(\frac{1-r^n}{1-r} \right) = \frac{1-(-2/3)^{100}}{1-2/3} = \frac{1-(-2/3)^{100}}{5/3}$$

$$\frac{3-3(-2/3)^{100}}{5}$$

4

$$① \quad \boxed{2, 7, 97, 14817}$$

$$2 \cdot 4 - 1 = 7$$

$$7 \cdot (47) - 1 = 97$$

$$2 \cdot (97)^2 - 1 = 14817$$

②

$$1, 5, 19, 65, 211$$

$$u_3 = 5(5) - 6(1) = 19$$

$$u_4 = 5(19) - 6(5) = 65$$

$$u_5 = 5(65) - 6(19) = 211$$

$$u_n = 3^n - 2^n$$

$$(5) \quad a_1 = a \quad a_n = ra_{n-1} \quad \text{for } n \geq 1$$

$$(6) \quad \sum_{x=1}^n \left(\frac{1}{2^x - 1} \right)$$