

Sec 5.5+6

Soln

①

$$\begin{aligned}
 1) \sum_{k=0}^{19} \frac{k-3}{4} &= \frac{1}{4} \left( \sum_{k=0}^{19} k - \sum_{k=0}^{19} 3 \right) \\
 &= \frac{1}{4} \left( \frac{1}{2}(19)(19+1) - (19-0+1)(3) \right) \\
 &= \frac{1}{4} (190 - 60) \\
 &= \frac{130}{4} \\
 &= \frac{65}{2}
 \end{aligned}$$

$$\begin{aligned}
 2) \sum_{k=2}^{50} (2,000 - 3k) &= \sum_{k=2}^{50} 2 \times 10^3 - 3 \sum_{k=2}^{50} k \\
 &= (50-2+1) 2 \times 10^3 - 3 \left( \frac{1}{2}(50)(51) - 1 \right) \\
 &= 98 \times 10^3 - 3,822 \\
 &= \underline{94,178}
 \end{aligned}$$

$\begin{aligned} &\text{50-2+1} \\ &\text{1st 50} \quad \text{1st value} \end{aligned}$   
 $\sum = 1994 + \dots + 1850$   
 $S_{49} = \frac{49}{2} (1850 + 1994)$

$$\begin{aligned}
 3) \sum_{k=20}^{50} 8 &= 8(50-20+1) \\
 &= 8(31) \\
 &= \underline{248}
 \end{aligned}$$

$$\begin{aligned}
 4) \sum_{n=1}^{\infty} 5 \left( \frac{1}{2} \right)^{n-1} &= \frac{5}{1 - \frac{1}{2}} \\
 &= \underline{10}
 \end{aligned}$$

$$|r| = \frac{1}{2} < 1$$

$$5) \sum_{n=1}^{\infty} 5 \left( \frac{3}{2} \right)^{n-1} = \infty$$

$$|r| = \frac{3}{2} \geq 1$$



$$6) .787878\ldots = .78 + .0078 + \ldots$$

$$= 78(.01 + .0001 + \ldots)$$

$$r = \frac{.0001}{.01} = \frac{1}{100} < 1$$

$$S = 78 \frac{.01}{1 - .01}$$

$$= 78 \frac{.01}{.99}$$

$$= \frac{78}{99}$$

$$.78 = \frac{26}{33}$$

$$7) a_{20}: a_2 = 8 \quad a_2 = -7$$

$$d = \frac{-7 - 8}{2 - 2} = -3$$

$$a_2 = 8 = a_1 + (-3) \Rightarrow a_1 = 11$$

$$a_{20} = 11 + 19(-3)$$

$$= -46$$

$$8) a_{15}: a_3 = 13 \quad a_8 = 33$$

$$d = \frac{33 - 13}{8 - 3} = 4$$

$$a_3 = a_1 + 2(4) = 13 \Rightarrow a_1 = 5$$

$$a_{15} = 5 + 14(4)$$

$$= 61$$



$$9/ a_9: a_2=4 \quad a_5=32$$

$$r = \left( \frac{32}{4} \right)^{\frac{1}{5-2}} = 8^{\frac{1}{3}} \\ = \underline{2}]$$

$$a_2 = a_1 r^{n-1}$$

$$4 = a_1 \cdot 2 \Rightarrow \underline{a_1 = 2}]$$

$$a_9 = 2 \cdot 2^8 \\ = \underline{2^9}]$$

$$10/ a_9: a_2 = 2\sqrt{3} \quad a_5 = 18$$

$$r = \left( \frac{18}{2\sqrt{3}} \right)^{\frac{1}{5-2}}$$

$$= \left( \frac{9}{\sqrt{3}} \right)^{\frac{1}{3}}$$

$$= \left( \frac{3^2}{3^{\frac{1}{2}}} \right)^{\frac{1}{3}}$$

$$= \left( 3^{\frac{3}{2}} \right)^{\frac{1}{3}}$$

$$= \underline{\sqrt{3}}$$

$$a_2 = 2\sqrt{3} = a_1 \sqrt{3}$$

$$\underline{a_1 = 2}]$$

$$a_9 = 2 (\sqrt{3})^8$$

$$= 2(3^4) \sqrt{3}$$

$$= \underline{182\sqrt{3}]}$$