

MATH 1a

HW # 25: § 7.4 # 4, 5, 8, 16, 17, 28 § 7.5 # 3, 20, 21

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$$\textcircled{4} 3 \cdot 1 + 3 \cdot 2 + 3 \cdot 3 + \dots + 3 \cdot 20 = \sum_{k=1}^{20} 3k = 3 \sum_{k=1}^{20} k$$

$$\textcircled{5} 1 \cdot 2 + 2 \cdot 3 + 3 \cdot 4 + \dots + 49 \cdot 50 = \sum_{k=1}^{49} k(k+1)$$

$$\textcircled{8} 1 + 3 + 5 + 7 + \dots + 15 = \sum_{k=1}^8 (2k-1) \text{ or } \sum_{k=0}^7 (2k+1)$$

$$\textcircled{16} \sum_{k=3}^{100} k = \sum_{k=1}^{100} k - \sum_{k=1}^2 k = \frac{100(100+1)}{2} - (1+2) = 5050 - 3 = \boxed{5047}$$

$$\textcircled{17} \sum_{k=1}^{20} k^2 = \frac{20(20+1)(2 \cdot 20 + 1)}{6} = \boxed{2870}$$

$$\begin{aligned} \textcircled{28} \sum_{k=1}^n \left(\frac{5}{n} - \frac{2k}{n} \right) &= \frac{5}{n} \sum_{k=1}^n 1 - \frac{2}{n} \sum_{k=1}^n k \\ &= \frac{5}{n} \cdot (n) - \frac{2}{n} \cdot \left(\frac{n(n+1)}{2} \right) \\ &= 5 - (n+1) \\ &= \boxed{4-n} \end{aligned}$$