

## Series Extra Practice WS

$$\textcircled{1} \frac{1}{3} + \frac{2}{4} + \frac{3}{5} + \frac{4}{6} + \dots + \frac{99}{100} = \sum_{n=1}^{99} \frac{n}{n+2} = 91.605$$

$$\textcircled{2} \frac{3(3)}{1} - \frac{3(5)}{4} + \frac{3(7)}{9} - \frac{3(9)}{16} + \frac{3(11)}{25} - \dots + \frac{3(33)}{256} = \sum_{n=1}^{16} \frac{(-1)^{n+1} (3)(2n+1)}{n^2} \\ = 6.439$$

$$\textcircled{3} \frac{4}{1} + \frac{8}{2} + \frac{16}{6} + \frac{32}{24} + \frac{64}{120} + \dots = \sum_{n=1}^{\infty} \frac{4(2)^{n-1}}{n!} \\ = 12.778112$$

$$S_5 = 12.533333$$

$$S_{10} = 12.777989$$

$$S_{20} = 12.778112$$

$$S_{50} = 12.778112$$

$$\textcircled{4} \text{ a) } \sum_{n=0}^{\infty} 7\left(-\frac{2}{3}\right)^n = \frac{7}{1 + \frac{2}{3}} = \frac{7}{\left(\frac{5}{3}\right)} = \frac{21}{5}$$

$$\text{ b) } \sum_{k=0}^{\infty} \frac{1}{2} \left(\frac{5}{4}\right)^k \text{ diverges since } r = \frac{5}{4} > 1$$