

21. $\sum_{n=1}^{\infty} [2(0.1)^n + (0.2)^n] = 2 \sum_{n=1}^{\infty} (0.1)^n + \sum_{n=1}^{\infty} (0.2)^n$. These are convergent geometric series and so by Theorem 8, their sum is also convergent. $2\left(\frac{0.1}{1-0.1}\right) + \frac{0.2}{1-0.2} = \frac{2}{9} + \frac{1}{4} = \frac{17}{36}$

$$24. \sum_{n=1}^{\infty} \left(\frac{1}{2^{n-1}} + \frac{2}{3^{n-1}} \right) = \sum_{n=1}^{\infty} \frac{1}{2^{n-1}} + 2 \sum_{n=1}^{\infty} \frac{1}{3^{n-1}} = \frac{1}{1-1/2} + 2\left(\frac{1}{1-1/3}\right) = 5$$

$$25. \text{Converges. } \sum_{n=1}^{\infty} \frac{3^n + 2^n}{6^n} = \sum_{n=1}^{\infty} \left(\frac{3^n}{6^n} + \frac{2^n}{6^n} \right) = \sum_{n=1}^{\infty} \left[\left(\frac{1}{2}\right)^n + \left(\frac{1}{3}\right)^n \right] = \frac{1/2}{1-1/2} + \frac{1/3}{1-1/3} = 1 + \frac{1}{2} = \frac{3}{2}$$