

Exercise 3D.2

$$\begin{aligned}\#1 \quad b. \quad & 3^n \cdot 3^2 + 3^n \\ & = 3^n (3^2 + 1) \\ & = 3^n (10)\end{aligned}$$

$$\begin{aligned}e. \quad & 6^n \cdot 6^2 - 6 \\ & = 6 (6^n \cdot 6 - 1) \\ & = 6 (6^{n+1} - 1)\end{aligned}$$

$$\begin{aligned}\#2 \quad a. \quad & (3^x)^2 - (2)^2 \\ & = (3^x + 2)(3^x - 2)\end{aligned}$$

$$\begin{aligned}g. \quad & (3^x)^2 + 10(3^x) + 25 \\ & = W^2 + 10W + 25 \\ & = (W + 5)(W + 5) \\ & = (3^x + 5)^2\end{aligned}$$

$$\begin{aligned}h. \quad & (2^x)^2 - 14(2^x) + 49 \\ & = W^2 - 14W + 49 \\ & = (W - 7)(W - 7) \\ & = (2^x - 7)^2\end{aligned}$$

$$\begin{aligned}i. \quad & (5^x)^2 - 4(5^x) + 4 \\ & = W^2 - 4W + 4 \\ & = (W - 2)(W - 2) \\ & = (5^x - 2)^2\end{aligned}$$

$$\begin{aligned}\#3 \quad c. \quad & (3^x)^2 + 9(3^x) + 14 \\ & = W^2 + 9W + 14 \\ & = (W + 7)(W + 2) \\ & = (3^x + 7)(3^x + 2)\end{aligned}$$

$$\begin{aligned}d. \quad & (3^x)^2 + 4(3^x) - 5 \\ & = W^2 + 4W - 5 \\ & = (W + 5)(W - 1) \\ & = (3^x + 5)(3^x - 1)\end{aligned}$$

$$\begin{aligned}e. \quad & (5^x)^2 + 5^x - 2 \\ & = W^2 + W - 2 \\ & = (W + 2)(W - 1) \\ & = (5^x + 2)(5^x - 1)\end{aligned}$$

$$\begin{aligned} \#5 \quad b. & \frac{2^n + (2 \cdot 6)^n}{2^n} \\ &= \frac{2^n + 2^n \cdot 6^n}{2^n} \\ &= \frac{\cancel{2^n} (1 + 6^n)}{\cancel{2^n}} \\ &= 1 + 6^n \end{aligned}$$

$$\begin{aligned} e. & \frac{6^n + (6 \cdot 2)^n}{1 + 2^n} \\ &= \frac{6^n + 6^n \cdot 2^n}{1 + 2^n} \\ &= \frac{6^n (\cancel{1 + 2^n})}{\cancel{1 + 2^n}} \\ &= 6^n \end{aligned}$$

$$\begin{aligned} f. & \frac{5^n \cdot 5 - 5^n}{4} \\ &= \frac{5^n (5 - 1)}{4} \\ &= 5^n \end{aligned}$$

$$\begin{aligned} i. & \frac{2^n - 2^n \cdot 2^{-1}}{2^n} \\ &= \frac{\cancel{2^n} (1 - 2^{-1})}{\cancel{2^n}} \\ &= 1 - 2^{-1} = 1 - \frac{1}{2} = \frac{1}{2} \end{aligned}$$