

12. The synthetic division table for this problem takes the following form.

$$\begin{array}{r|rrrr} 1 & 1 & -5 & 4 & \\ & & 1 & -4 & \\ \hline & 1 & -4 & 0 & \end{array} \quad \text{Thus the quotient is } x - 4, \text{ and the remainder is } 0.$$

14. The synthetic division table for this problem takes the following form.

$$\begin{array}{r|rrrr} -5 & 4 & 0 & -3 & \\ & & -20 & 100 & \\ \hline & 4 & -20 & 97 & \end{array} \quad \text{Thus the quotient is } 4x - 20, \text{ and the remainder is } 97.$$

16. The synthetic division table for this problem takes the following form.

$$\begin{array}{r|rrrrr} 5 & 3 & -12 & -9 & 1 & \\ & & 15 & 15 & 30 & \\ \hline & 3 & 3 & 6 & 31 & \end{array} \quad \text{Thus the quotient is } 3x^2 + 3x + 6, \text{ and the remainder is } 31.$$

18. The synthetic division table for this problem takes the following form.

$$\begin{array}{r|rrrrr} 2 & 1 & -1 & 1 & -1 & 2 \\ & & 2 & 2 & 6 & 10 \\ \hline & 1 & 1 & 3 & 5 & 12 \end{array} \quad \text{Thus the quotient is } x^3 + x^2 + 3x + 5, \\ \text{and the remainder is } 12.$$

20. The synthetic division table for this problem takes the following form.

$$\begin{array}{r|rrrr} 3 & 1 & -9 & 27 & -27 \\ & & 3 & -18 & 27 \\ \hline & 1 & -6 & 9 & 0 \end{array} \quad \text{Thus the quotient is } x^2 - 6x + 9, \text{ and the remainder is } 0.$$