

## Exercises 5.2

2. 
$$\begin{array}{r} x^2 + x \\ x - 2 \overline{) x^3 - x^2 - 2x + 6} \\ \underline{x^3 - 2x^2} \phantom{+ 6} \\ x^2 - 2x \phantom{+ 6} \\ \underline{x^2 - 2x} \phantom{+ 6} \\ 0 + 6 \end{array}$$
 Thus the quotient is  $x^2 + x$ , and the remainder is 6.

4. 
$$\begin{array}{r} \frac{1}{3}x^2 + \frac{1}{3}x + \frac{2}{3} \\ 3x + 6 \overline{) x^3 + 3x^2 + 4x + 3} \\ \underline{x^3 + 2x^2} \phantom{+ 3} \\ x^2 + 4x \phantom{+ 3} \\ \underline{x^2 + 2x} \phantom{+ 3} \\ 2x + 3 \phantom{+ 3} \\ \underline{2x + 4} \phantom{+ 3} \\ -1 \end{array}$$
 Thus the quotient is  $\frac{1}{3}x^2 + \frac{1}{3}x + \frac{2}{3}$ , and the remainder is  $-1$ .

6. 
$$\begin{array}{r} 3x^2 - 8x - 1 \\ x^2 + x + 3 \overline{) 3x^4 - 5x^3 + 0x^2 - 20x - 5} \\ \underline{3x^4 + 3x^3 + 9x^2} \phantom{- 20x - 5} \\ -8x^3 - 9x^2 - 20x \phantom{- 5} \\ \underline{-8x^3 - 8x^2 - 24x} \phantom{- 5} \\ -x^2 + 4x - 5 \phantom{- 5} \\ \underline{-x^2 - x - 3} \phantom{- 5} \\ 5x - 2 \end{array}$$
 Thus the quotient is  $3x^2 - 8x - 1$ , and the remainder is  $5x - 2$ .

8. 
$$\begin{array}{r} 3 \\ 3x^2 - 7x \overline{) 9x^2 - x + 5} \\ \underline{9x^2 - 21x} \phantom{+ 5} \\ 20x + 5 \end{array}$$
 Thus the quotient is 3, and the remainder is  $20x + 5$ .

10. 
$$\begin{array}{r} \frac{1}{2}x^3 - x^2 - \frac{5}{2}x - \frac{7}{4} \\ 4x^2 - 6x + 8 \overline{) 2x^5 - 7x^4 + 0x^3 + 0x^2 + 0x - 13} \\ \underline{2x^5 - 3x^4 + 4x^3} \phantom{+ 0x^2 + 0x - 13} \\ -4x^4 - 4x^3 + 0x^2 \phantom{+ 0x - 13} \\ \underline{-4x^4 + 6x^3 - 8x^2} \phantom{+ 0x - 13} \\ -10x^3 + 8x^2 + 0x \phantom{- 13} \\ \underline{-10x^3 + 15x^2 - 20x} \phantom{- 13} \\ -7x^2 + 20x - 13 \phantom{- 13} \\ \underline{-7x^2 + \frac{21}{2}x - 14} \phantom{- 13} \\ \frac{19}{2}x + 1 \end{array}$$
 Thus the quotient is  $\frac{1}{2}x^3 - x^2 - \frac{5}{2}x - \frac{7}{4}$ , and the remainder is  $\frac{19}{2}x + 1$ .