Example

$$
\begin{array}{r}
x^2 - x + 5 \\
\hline
x^2+2x-3 \;\big|\; x^4 + x^3 + 0x^2 + x - 10 \\
x^4 + 2x^3 - 3x^2 \\
\hline
-x^3 + 3x^2 + x \\
-x^3 - 2x^2 + 3x \\
\hline
+5x^2 - 2x - 10 \\
+5x^2 + 10x - 15 \\
\hline
-12x + 5
\end{array}
$$

$$x^4 + x^3 + x - 10 = (x^2+2x-3)(x^2 - x + 5) - 12x + 5$$

Exercise 1F Question 6

$$
\begin{array}{r}
4x - 13 \\
\hline
x^2+2x-1 \;\big|\; 4x^3 - 5x^2 + 3x - 14 \\
4x^3 + 8x^2 - 4x \\
\hline
-13x^2 + 7x - 14 \\
-13x^2 - 26x + 13 \\
\hline
+33x - 27
\end{array}
$$

$$= 4x - 13 + \frac{33x - 27}{x^2 + 2x - 1}$$