

Diagram illustrating the polynomial division process:

$$\begin{array}{r}
 x^3 - x^2 - 14x + 24 : (x + 4) = x^2 - 5x + 6 \\
 \underline{-(x^3 + 4x^2)} \phantom{+ 24} \\
 -5x^2 \phantom{- 14x + 24} \\
 \underline{-(-5x^2 - 20x)} \phantom{+ 24} \\
 6x + 24 \\
 \underline{-(6x + 24)} \\
 0
 \end{array}$$

Annotations and steps shown in the diagram:

- $x^3 : x = x^2$  (Blue arrow from  $x^3$  to  $x^2$ )
- $(x^3 - x^2 - 14x + 24) - (x^3 + 4x^2) = -5x^2$  (Green arrow from the subtraction step to the resulting  $-5x^2$ )
- $(-5x^2) : x = -5x$  (Blue arrow from  $-5x^2$  to  $-5x$ )
- $(-5x^2 - 20x) - (-5x^2 - 20x) = 6x$  (Green arrow from the subtraction step to the resulting  $6x$ )
- $6x : x = 6$  (Blue arrow from  $6x$  to  $6$ )
- $(6x + 24) - (6x + 24) = 0$  (Green arrow from the subtraction step to the resulting  $0$ )