

$f(x) = x^3 + 3x^2 - 2x - 14$ Write the $f(x)$ in the form $f(x) = (x - k)q(x) + r(x)$ for $k = \sqrt{2}$.

Solution:

Use Synthetic Division with a divisor of $x - \sqrt{2}$

$$\begin{array}{r|rrrr} \sqrt{2} & 1 & 3 & -2 & -14 \\ & & \sqrt{2} & 2+3\sqrt{2} & 6 \\ \hline & 1 & 3+\sqrt{2} & 3\sqrt{2} & -8 \end{array}$$

$$f(x) = (x - \sqrt{2})(x^2 + (3 + \sqrt{2})x + 3\sqrt{2}) - 8$$

Recall also that $f(\sqrt{2}) = -8$

Assignment 117: Page 127, #'s 33, 35, 37, 44, 46, 49, 52, 65, 66, 80