TEXAS @HomeTutor
classzone.com
Chapter Review Practice

5.6 Find Rational Zeros

pp. 370–377

EXAMPLE

Find all real zeros of $f(x) = x^3 + 6x^2 + 5x - 12$.

The leading coefficient is 1 and the constant term is −12.

Possible rational zeros: $x = \pm\frac{1}{1}, \pm\frac{2}{1}, \pm\frac{3}{1}, \pm\frac{4}{1}, \pm\frac{6}{1}, \pm\frac{12}{1}$

Test these zeros using synthetic division. Test $x = 1$:

$$\begin{array}{r|rrrr} 1 & 1 & 6 & 5 & -12 \\ & & 1 & 7 & 12 \\ \hline & 1 & 7 & 12 & 0 \end{array}$$

← **1 is a zero.**

You can write $f(x) = (x - 1)(x^2 + 7x + 12)$. Factor the trinomial.

$$f(x) = (x - 1)(x^2 + 7x + 12) = (x - 1)(x + 3)(x + 4)$$

The zeros of f are 1, −3, and −4.

EXAMPLES 2 and 3 on pp. 371–372 for Exs. 33–34

EXERCISES

Find all real zeros of the function.

33. $f(x) = x^3 - 4x^2 - 11x + 30$

34. $f(x) = 2x^4 - x^3 - 42x^2 + 16x + 160$

5.7 Apply the Fundamental Theorem of Algebra

pp. 379–386

EXAMPLE

Write a polynomial function f of least degree that has rational coefficients, a leading coefficient of 1, and −4 and $5 + \sqrt{2}$ as zeros.

Because $5 + \sqrt{2}$ is a zero, $5 - \sqrt{2}$ must also be a zero.

$f(x) = (x + 4)[x - (5 + \sqrt{2})][x - (5 - \sqrt{2})]$ **Write f(x) in factored form.**

$= (x + 4)[(x - 5) - \sqrt{2}][(x - 5) + \sqrt{2}]$ **Regroup terms.**

$= (x + 4)[(x - 5)^2 - 2]$ **Multiply.**

$= x^3 - 6x^2 - 17x + 92$ **Multiply.**

EXAMPLES 3 and 6 on pp. 381–383 for Exs. 35–38

EXERCISES

Write a polynomial function f of least degree that has rational coefficients, a leading coefficient of 1, and the given zeros.

35. −4, 1, 5

36. −1, −1, 6, $3i$

37. 2, 7, $3 - \sqrt{5}$

38. **ECONOMICS** For the 15 years that a computer store has been open, its annual revenue R (in millions of dollars) can be modeled by

$$R = -0.0040t^4 + 0.088t^3 - 0.36t^2 - 0.55t + 5.8$$

where t is the number of years since the store opened. In what year was the revenue first greater than \$7 million?