

Chapter 6 Journal Entry

Due:

1. Examine the zeros of the following polynomial functions.

- $f(x) = x^4 + 5x^2 - 36$
- $f(x) = x^4 - 12x^2 + 27$
- $f(x) = x^3 - 3x^2 + 2$
- $f(x) = x^3 - 3x^2 - 5x + 15$

- a. What does it mean when two zeros of a polynomial function are complex conjugates? Which functions above, if any, have zeros that are complex conjugates?
- b. If you are asked to write a polynomial function of least degree with real coefficients and with zeros of 2 and $i\sqrt{7}$, what would be the degree of the polynomial? Explain.

2. In this exercise, refer to the division problem

$$(4x^4 - 20x^3 + 23x^2 + 5x - 6) \div (x - 3)$$

- a. Find the quotient using long division.
- b. Find the quotient using synthetic division.
- c. Explain why you subtract in the process of long division, but add when using synthetic division.
- d. Under what conditions can you use synthetic division to determine the quotient? Give an example where synthetic division would not be a good option.
- e. What is the remainder for this problem? What information does this provide about $(x - 3)$?
- f. List the other possible zeros of the equation $f(x) = 4x^4 - 20x^3 + 23x^2 + 5x - 6$.

3. Use long division to divide $(2x - 3)$ into $4x^4 - x^2 - 2x - 1$. Then use synthetic division. What do you notice about your solutions? Explain why it is still possible to use synthetic division if the leading coefficient of the linear expression is not 1. Clearly indicate why one must be careful when using this method.