

MODULE 4.5**ROOTS AND GRAPHS
OF POLYNOMIALS—PRELUDE**

Name: _____ Points: _____

Exercise 1. Sketch the graph of $f(x) = \frac{1}{2}(x-1)(x+2)^2$ using your calculator or Desmos.

- (a) Circle the zeros on the graph.
- (b) How do you recognize the zeros in the formula?

- (c) What is the remainder if you divide $f(x)$ by $x-1$ or by $x+2$ (Hint: do not use long division)?

- (d) What does the graph look like near each zero? Can you recognize why this is by looking at the formula?

- (e) Consider the function $g(x) = -\frac{1}{2}(x-1)(x+2)^2$. What does the graph look like compared to the graph of f ? Check by using your calculator or Desmos.

Exercise 2. Sketch the graph of the function $f(x) = \frac{1}{10}(x-1)^2(x+2)^2$

- (a) What does the graph look like near each zero? Can you recognize this in the formula?

Exercise 3. Sketch the graph of the function $f(x) = \frac{1}{10}(x-1)^2(x+2)^3$

- (a) What does the graph look like near each zero? Can you recognize this in the formula?

Exercise 4. Consider (but do not graph it (yet)) $f(x) = \frac{1}{100}(x-1)^2(x+2)^3(x-2)^2$

- (a) Locate the zeros on the graph (draw that here). Also place the point $(0, f(0))$ on the graph.

- (b) What does the graph look like near each zero?

- (c) What is the remainder if you divide by $x - a$ where $f(a) = 0$ (Hint: Let a be each zero in turn and do not use long division).

- (d) Sketch the graph of f by constructing a graph that has only these characteristics near each zero and passes through $(0, f(0))$.

- (e) Check your answer by using a calculator or Desmos.

Exercise 5. Summarize your conclusions.