

## **STRAND 5: POWER, POLYNOMIAL, AND RATIONAL FUNCTIONS**

### **TOPIC 5.2: POLYNOMIAL FUNCTIONS**

#### **Topic Notes**

##### **Mathematical focus**

Participants investigate behavior of polynomial functions using a graphing calculator.

##### **Topic overview**

This topic includes 2 tasks:

Task 5.2.1: What's the Long Run? What's the Short Run?

Task 5.2.2: Reflect and Apply

We will explore the long run and short run behavior of polynomials based on their degrees. We will see the connection between the long run behavior of polynomials and the long run behavior of power functions of the same degree.

##### **TE<sub>x</sub>ES standards focus**

**TE<sub>x</sub>ES Standard II.004 Patterns and algebra.** The teacher uses patterns to model and solve problems and formulate conjectures. The beginning teacher:

(A) Recognizes and extends patterns and relationships in data presented in tables, sequences, or graphs.

**TE<sub>x</sub>ES Standard II.005 Patterns and algebra.** The teacher understands attributes of functions, relations, and their graphs. The beginning teacher:

(B) Identifies the mathematical domain and range of functions and relations and determines reasonable domains for given situations.

**TE<sub>x</sub>ES Standard V.018 Mathematical processes and perspectives.** The teacher understands mathematical reasoning and problem solving. The beginning teacher:

(E) Understands the problem-solving process (i.e., recognizing that a mathematical problem can be solved in a variety of ways, selecting an appropriate strategy, evaluating the reasonableness of a solution).

##### **TEKS/TAKS focus**

**TEKS 2A.4 Algebra and geometry.** The student connects algebraic and geometric representations of functions.

**High School TAKS Objective 1:** The student will describe functional relationships in a variety of ways.

**High School TAKS Objective 2:** The student will demonstrate an understanding of the properties and attributes of functions.

**High School TAKS Objective 5:** The student will demonstrate an understanding of quadratic and other nonlinear functions.

### Materials

Task	Task 5.2.1 What's the Long Run?	Task 5.2.2 Reflect and Apply
Graphing calculator	x	x

### Procedure

Start out with a large group discussion on the first problem, and then split up the groups to work on the remaining problems and present their solutions to the class.

### Summary

The long run shape of a polynomial is completely determined by its leading term. The number of roots of a polynomial and the number of maxima and minima will relate to the degree of the polynomial.

### Assessment/Transition to the Classroom

Use the Task 5.2.2 reflect and apply as an assessment that participants should be able to complete after doing this topic.

	Teacher use only	Modify for students	Ready for students
Task 5.2.1	*		
Task 5.2.2			*