Coreq Support for Section 4.6

Topic 1: Graphing Transformations of the Reciprocal Function

In section 3.4, we learned how to use transformations to graph families of functions by starting with the graph of a basic function. One of the basic functions introduced in section 3.3 was the reciprocal function, $f(x) = \frac{1}{x}$.

Topic 2: Identifying Rational Functions and Their Domains

The reciprocal function is an example of a rational function. Recall the definition of a rational function from section 3.1.

A **rational function** is a function of the form $f(x) = \dfrac{g(x)}{h(x)}$ where *g* and *h* are polynomial functions such that $h(x) \neq 0$. The domain of a rational function is the set of all real numbers such that $h(x) \neq 0$. If $h(x) = c$, where *c* is a real number, then we will consider the function $f(x) = \dfrac{g(x)}{h(x)} = \dfrac{g(x)}{c}$ to be a polynomial.

Topic 3: Simplifying Rational Expressions

Any numeric value of the variable that causes the denominator of a rational expression to equal zero is called a **restricted value**.

One way to simplify a rational expression is to factor the polynomials in the numerator and denominator and cancel any common factors. The restricted values from the original rational expression are still restricted values for the simplified expression.

Topic 4: Finding Intercepts from an Equation

Topic 5: Determining if a Function is Even, Odd, or Neither

Knowing if a function is even, odd, or neither can help us to graph it. In section 3.2, we learned how to determine if a function is even, odd, or neither from its equation.

A function *f* is **even** if for every *x* in the domain, $f(x) = f(-x)$. Even functions are symmetric about the *y*-axis. For each point (x, y) on the graph, the point $(-x, y)$ is also on the graph.

A function *f* is **odd** if for every *x* in the domain, $-f(x) = f(-x)$. Odd functions are symmetric about the origin. For each point (x, y) on the graph, the point $(-x, -y)$ is also on the graph.

Topic 6: Evaluating Rational Functions for Given Inputs