## Topic 4.1: Dividing Polynomials

Essential Question:
How do you calculate with functions defined as quotients of polynomials, and what are the key features of their graphs?

## Model and Discuss

Complete online.

## CONCEPT

## CONCEPT Inverse Variation

When a relation between $x$ and $y$ is an inverse variation, we say that $x$ varies inversely as $y$. Inverse variation is modeled by the equation $y=\frac{k}{x^{\prime}}$
or with an equivalent form $x=\frac{k}{y}$ or $x y=k$, where $k \neq 0$. The variable $k$ represents the constant of variation, the number that relates the two variables in an inverse variation.

In this table, the constant of variation is 24.

... the value of $y$ is halved from 24 to 12 to 6 to 3 .

## Concept Summary

| CONCEPT SUMMARY Inverse Variation and the Reciprocal Function |  |  |  |
| :---: | :---: | :---: | :---: |
| CONCEPT SUMMARY Inverse Variation and the Reciprocal Function |  |  |  |
|  | Inverse Varia |  | Transformations of the Reciprocal Function |
| WORDS | An inverse va two variables increases, the | on is a relation between h that as one variable decreases proportionally | The reciprocal function models the inverse variation, $y=\frac{1}{x}$. Like other functions, it can be transformed. |
| ALGEBRA | $y=\frac{k}{x}$, where $k$ |  | $y=\frac{a}{x-h}+k$ |
| EXAMPLES | $y=\frac{1}{x}$ <br> asymptotes: $\begin{aligned} & x=0 \\ & y=0 \end{aligned}$ |  | $\begin{aligned} & y=\frac{1}{x-4}-2 \\ & h=4 \\ & k=-2 \end{aligned}$ <br> Parent is transformed down 2 and right 4. asymptotes: $\begin{aligned} & x=4 \\ & y=-2 \end{aligned}$ |

Q: How does an inverse variation relate to the concept of reciprocal function?

## Notes

## Examples \& Questions

Examples 1
Q: What do you notice about the pattern?
Q: How can you confirm that a table of values represents an inverse variation using multiplication?
Q: What does it mean if the product of $x y$ is not constant within a table?

## Examples 2

Q: How does the constant of variation $k$ help determine the values of $x$ and $y$ ?
Q : What are two more pairs of values for x and y that would fit the relationship?
Examples 3
Q: What information about the inverse variation model is given that will be used to set up an equation?
Q: Using the inverse variation model, can you find the frequency for any string length?
Examples 4
Q: What do you notice about the relationship between the $x$ - and $y$-values?
Q: How does the reciprocal function relate to inverse variations?
Q: Why is the domain and range of the inverse function restricted?
Examples 5
Q: How can you recognize and describe a translation on a coordinate plane?
Q: What is a good point of reference when graphing a translation?
Practice and Problem Solving
Complete MathXL for School: Additional Practice (online)
Complete MathXL for School: Mixed Enrichment (online)

Challenge: \#20, 21, 22, 25 - key will be posted in Power School Learning.

Lesson Quiz 4.1

