12 CHAPTER SUMMARY

Animated Algebra
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BIG IDEAS *For Your Notebook*

Big Idea 1

TEKS A.5.C

Graphing Rational Functions

The graphs of $y = \frac{a}{x}$ $(a \neq 0)$ and $y = \frac{a}{x - h} + k$ $(a \neq 0)$ are hyperbolas that have two symmetrical branches. The characteristics of the functions and their graphs are given below. To graph a rational function whose numerator and denominator are first-degree polynomials, you can first use long division to rewrite the function so that it has the form $y = \frac{a}{x - h} + k$.

Function	Vertical asymptote	Horizontal asymptote	Domain	Range
$y = \frac{a}{x}$	$x = 0$	$y = 0$	All real numbers except $x = 0$	All real numbers except $y = 0$
$y = \frac{a}{x - h} + k$	$x = h$	$y = k$	All real numbers except $x = h$	All real numbers except $y = k$

Big Idea 2

TEKS A.6.C

Performing Operations on Rational Expressions

Performing operations on rational expressions is similar to performing operations on numerical fractions. Any common factors in the numerator and denominator should be divided out, and the original expression should be used when finding excluded values.

Operation	Rule
Multiplication	$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$ where $b \neq 0$ and $d \neq 0$
Division	$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c}$ where $b \neq 0$, $c \neq 0$, and $d \neq 0$
Addition	Same denominator: $\frac{a}{c} + \frac{b}{c} = \frac{a + b}{c}$ where $c \neq 0$ Different denominators: Use LCD of rational expressions.
Subtraction	Same denominator: $\frac{a}{c} - \frac{b}{c} = \frac{a - b}{c}$ where $c \neq 0$ Different denominators: Use LCD of rational expressions.

Big Idea 3

TEKS A.6.F

Solving Rational Equations

You can use the following steps to solve a rational equation.

1. Rewrite the rational equation by using the cross products property or by multiplying each side by the least common denominator (LCD) of the rational expressions in the equation.
2. Solve the rewritten equation.
3. Check for extraneous solutions.