Alg 4 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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 WS Assessment

 Target 17:

Rational expression and simplification

**I can:**

* Factor trinomial
* Factor polynomial using the identities
* Simplify rational expression
* Graph rational function

**Unit 7: Rational Expression and Their Operations**

* [**HSA.APR.D.6**](http://www.corestandards.org/Math/Content/HSA/APR/D/6/): Rewrite simple rational expressions in different forms; write *a*(*x*)/*b*(*x*) in the form *q*(*x*) + *r*(*x*)/*b*(*x*), where *a*(*x*), *b*(*x*), *q*(*x*), and *r*(*x*) are polynomials with the degree of *r*(*x*) less than the degree of *b*(*x*), using inspection, long division, or, for the more complicated examples, a computer algebra system.
* **H**[**SA.SSE.A.2**](http://www.corestandards.org/Math/Content/HSA/SSE/A/2/): Use the structure of an expression to identify ways to rewrite it. *For example, see x4 - y4 as (x2)2 - (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 - y2)(x2 + y2)*.
* [**HSA.SSE.B.3.A**](http://www.corestandards.org/Math/Content/HSA/SSE/B/3/a/): Factor a quadratic expression to reveal the zeros of the function it defines.
* [**HSN.RN.B.3**](http://www.corestandards.org/Math/Content/HSN/RN/B/3/): Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

HW# 17 Rational Simplification www.deltamath.com

Review factor trinomial, check your work

x2 – x – 20 x2 – 3x – 10 x2 + 4x + 3

x2 – 6x + 9 x2 + x – 6 x2 + 6x + 5

x2 +8x +15 x2 + 9x +20 x2 + 3x + 2

x4 – x2 – 12 x4 + 3x2 +2 x4 + 2x2 – 15

3x6 – 7x3 – 6 2x6 + x3 – 15 2x6 – 13x3 + 15

5x6 + 8x3 – 4 3x8 + 8x4 + 5 3x8 +19x4 + 20

Factoring by grouping

12x3+15x2+16x+20 5x3 – 10x2 + 3x – 6 3x3 + 15x2 + 2x+ 10

20x3 – 25x2+ 4x – 5 20x3 + 15x2 + 16x + 12 12x3 – 9x2 + 8x – 6

56x3 – 14x2+ 16x – 4 72x4 – 24x3 – 84x2 + 28x

Difficult trinomial

20x4 + 11x2 – 42 25x8 + 25x4 – 14 10x6 – 27x3 + 5

Algebra identities

 $a^{2}\pm 2ab+b^{2}=(a\pm b)^{2}$ Square of sum/difference

 $a^{3}\pm 3a^{2}b+3ab^{2}\pm b^{3}=(a\pm b)^{3}$ Cube of sum/difference

 $\left(a-b\right)\left(a+b\right)=a^{2}-b^{2}$ Difference of squares

$\left(a-b\right)\left(a^{2}+ab+b^{2}\right)=a^{3}-b^{3}$ Difference of cubes (\*)

$\left(a+b\right)\left(a^{2}-ab+b^{2}\right)=a^{3}+b^{3}$ Sum of cubes (\*)

Use a suitable identity to get the result

(x + 3)(x – 3) (x + 3)(x + 3) (x – 3)(x – 3)

(6x – 7)(6x + 7) $\left(x+\frac{1}{x}\right)\left(x-\frac{1}{x}\right)$ (2x + 3y)(2x – 3y)

x4 – y4 1 – x281 – 25a2

(2x + 7)2 (2x – 5)2 (3x + 4y)2

x2 – 2x + 1 x2 + 4x + 4 49x2 – 126xy + 81y2

$\left(\frac{x}{2}+\frac{y}{3}\right)^{2}$ $\left(x+\frac{1}{x}\right)^{2}$ $\left(2x-\frac{1}{x}\right)^{2}$

Find $\left(x-\frac{1}{x}\right)\left(x+\frac{1}{x}\right)\left(x^{2}+\frac{1}{x^{2}}\right)\left(x^{4}+\frac{1}{x^{4}}\right)$

If x + y = 12 and xy = 32, find the value of x2 + y2

Simplify rational expression and state the excluded values

$\frac{2x}{x^{2}}$ $\frac{(x+3)(x+4)}{(x+3)(x+2)}$ $\frac{x+2}{x^{2}}$ $\frac{x+2}{(x+2)^{2}}$ $\frac{x+3}{3-x}$

$\frac{3x^{2}-3x}{x^{2}-2x+1}$ $\frac{5x^{2}+5x}{5x^{2}+10x+5}$ $\frac{x^{2}+3x}{x^{2}+6x+9}$ $\frac{x^{2}+4x+4}{x^{2}-4}$ $\frac{2-x}{x^{2}-4}$

$\frac{3x^{2}-27}{3x^{2}-18x+27}$ $\frac{x+3}{x^{2}-x-12}$ $\frac{x^{2}+2x-15}{9-x^{2}}$ $\frac{x^{2}-9x+14}{x^{2}+2x-8}$ $\frac{x^{2}-3xy-4y^{2}}{x^{2}-y^{2}}$

Now you do

$\frac{2x^{2}-6x}{x^{2}-9}$ $\frac{25x^{2}-50x}{15x^{2}-60}$ $\frac{x^{2}-2x+1}{x^{2}-1}$ $\frac{x^{2}+12x+36}{x+6}$

$\frac{x+5}{5-x}$ $\frac{x^{2}-5x+4}{x^{2}-9x+8}$ $\frac{x^{2}+9x+8}{x^{2}+11x+10}$ $\frac{x^{2}+3x-18}{x^{2}-4x-60}$

$\frac{56x^{2}-40x}{16x^{3}+72x^{2}+56x}$ $\frac{10x^{4}-90x^{3}-100x^{2}}{x^{3}-14x^{2}+40x}$

 $\frac{x^{3}+13x^{2}+36x}{x^{2}+8x-9}$ $\frac{20x^{3}+129x^{2}-8x}{28x^{2}+32x}$

Graph the following function (show table) and describe the end behavior

$f\left(x\right)=\frac{2x+5}{x-1}$ $f\left(x\right)=\frac{x+2}{x^{2}-1}$

$f\left(x\right)=\frac{x^{3}-8}{x^{2}+5x+6}$ $f\left(x\right)=\frac{x^{2}-x-2}{x-2}$

**Assessment Target 17**

**I can…** simplify and graph rational function

Factoring x8 – 5x4 + 4 into four different pair of binomials

Factoring x6 – x4 – 16x2 + 16 into five different pair of binomials

Simplify rational expression and state the excluded values

 $\frac{4x^{3}-36x^{2}-40x}{4x^{2}-24x-160}$ $\frac{6x^{2}+42x+60}{5x^{3}+17x^{2}-40x}$

Graph the following function (show table) describe the end behavior $f\left(x\right)=\frac{x^{2}-2x}{-3x+3}$