Name: Key Date: _____

Long Division & Complex Fraction Review

Simplify the following complex expressions

1) $\dfrac{\frac{3}{x-4}}{1-\frac{2}{x-4}}$ $\cdot\dfrac{x-4}{x-4}$ $= \dfrac{x-4-2}{x-4}$ $\dfrac{x-6}{x-4}$

$\dfrac{3}{x-4} \cdot \dfrac{x-4}{x-6}$

$\boxed{\dfrac{3}{x-6}}$

2) $\dfrac{1-\frac{4}{x}}{1-\frac{16}{x^2}}$ $\cdot\dfrac{x}{x}$ $\dfrac{\frac{x-4}{x}}{\frac{x^2-16}{x^2}}$ $\dfrac{x-4}{x} \cdot \dfrac{x^2}{x^2-16}$

$\dfrac{x(x-4)}{x^2-16} = \dfrac{x(x-4)}{(x+4)(x-4)} = \boxed{\dfrac{x}{x+4}}$

3) $\dfrac{1-\frac{4}{x}}{1-\frac{16}{x^2}}$

Same as 2

4) $\dfrac{\frac{3}{x-2}-\frac{5}{1}\cdot\frac{x-2}{x-2}}{\frac{2}{1}\cdot\frac{(x-2)}{x-2}-\frac{4}{x-2}}$ $\dfrac{3-(5x-10)}{x-2}$ $\dfrac{(2x-4)-4}{x-2}$

$\dfrac{-5x+13}{x-2} \cdot \dfrac{x-2}{2x-8} = \boxed{\dfrac{-5x+13}{2x-8}}$

5) $\dfrac{\frac{a}{2}-\frac{8\cdot 2}{a\cdot 2}}{\frac{1}{4}-\frac{1\cdot 4}{a\cdot 4}}$ $\dfrac{\frac{a^2-16}{2a}}{\frac{a-4}{4a}}$ $\dfrac{a^2-16}{2a} \cdot \dfrac{4a}{a-4}$

$\dfrac{2(a+4)(a-4)}{a}$ $\boxed{2(a+4)}$

6) $\dfrac{\frac{2}{x}-\frac{4}{x^2}}{1-\frac{2}{x}}$ $\dfrac{\frac{2x-4}{x^2}}{\frac{x-2}{x}}$

$\dfrac{2(x-2)}{x^2} \cdot \dfrac{x}{x-2} = \boxed{\dfrac{2}{x}}$

7) $\dfrac{\frac{2}{x}-\frac{5}{1}\cdot\frac{x}{x}}{\frac{6}{x}-\frac{3}{1}\cdot\frac{x}{x}}$ $\dfrac{\frac{2-5x}{x}}{\frac{6-3x}{x}}$

$\dfrac{2-5x}{x} \cdot \dfrac{x}{6-3x}$

$\boxed{\dfrac{2-5x}{6-3x}}$

8) $\dfrac{\frac{1}{x}+\frac{3}{1}\cdot\frac{x}{x}}{\frac{4}{y}+\frac{5}{1}\cdot\frac{y}{y}}$ $\dfrac{\frac{1+3x}{x}}{\frac{4y+5}{y}}$

$\dfrac{1+3x}{x} \cdot \dfrac{y}{4y+5}$

$\boxed{\dfrac{y+3xy}{4xy+5x}}$

Divide each of the following polynomials

9) $(12x^3 - 11x^2 + 9x + 18) \div (4x + 3)$

$3x^2 - 5x + 6$

$4x+3 \overline{)12x^3 - 11x^2 + 9x + 18}$

$-(12x^3 + 9x^2)$

$-20x^2 + 9x$

$-(-20x^2 - 15x)$

$24x + 18$

$-(24x + 18)$

0

10) $(2x^3 + 4x^2 - 5) \div (x + 3)$

$2x^2 - 2x + 6 - \frac{23}{x+3}$

$x+3 \overline{)2x^3 + 4x^2 + 0x - 5}$

$-(2x^3 + 6x^2)$

$-2x^2 + 0x$

$-(-2x^2 - 6x)$

$6x - 5$

$-(6x + 18)$

-23

11) $(6xy^2 + 4xy - 8x^4y^3) \div (2xy)$

$\frac{6xy^2}{2xy} + \frac{4xy}{2xy} - \frac{8x^4y^3}{2xy}$

$3y + 2 - 4x^3y^2$

Simplify, Multiply, Divide, Add, & Subtracting Rationals Review

12) What is the product of $\frac{4x^2-1}{2x^2-5x-3}$ and $\frac{x^2-6x+9}{2x^2+5x-3}$

$\frac{(2x+1)(2x-1)}{(2x+1)(x-3)} \cdot \frac{(x-3)(x-3)}{(2x-1)(x+3)}$

$\frac{x-3}{x+3}$

13) $\frac{y^2-25}{(y+5)^2} \div \frac{2y-10}{4y+20}$

$\frac{(y+5)(y-5)}{(y+5)^2} \times \frac{4(y+5)}{2(y-5)} = 2$

14) $\frac{5x+15}{10x-10} \div \frac{x^2+6x+9}{3x^2-3}$

$3(x^2-1)$

$\frac{5(x+3)}{10(x-1)} \times \frac{3(x+1)(x-1)}{(x+3)(x+3)}$

$\frac{3(x+1)}{2(x+3)}$

2

15) $(x-1) \cdot \frac{2x+6}{x^2+2x-3}$

$2(x+3)$

1

$(x+3)(x-1)$

$= 2$

16) $\frac{1}{x^2-2x-3} + \frac{1}{x^2-4x+3}$

$\frac{1(x-1)}{(x-1)(x-3)(x+1)} + \frac{1(x+1)}{(x-3)(x-1)(x+1)}$

$\frac{2x}{(x-1)(x-3)(x+1)}$

17) $\frac{5x}{x^2-9} - \frac{4x}{x^2+5x+6}$

$\frac{5x^{(x+2)}}{(x+2)(x+3)(x-3)} - \frac{4x\ (x-3)}{(x+2)(x+3)(x-3)}$

$\frac{5x^2+10x-4x^2+12x}{(x+2)(x+3)(x-3)}$

$\frac{x^2+22x}{(x+2)(x+3)(x-3)}$

18) $\frac{5x}{2y+4} - \frac{6}{y^2+2y}$

$\frac{5x \cdot y}{y \cdot 2(y+2)} - \frac{6 \cdot 2}{y(y+2) \cdot 2}$

$\frac{5xy-12}{2y(y+2)}$

19) $\frac{3}{5y+25} + \frac{4}{3y+15}$

$\frac{3 \cdot 7}{5(y+5)} + \frac{4 \cdot 5}{3(y+5) \cdot 5}$

$\frac{21+20}{15(y+5)} = \frac{42}{15(y+5)}$