Name:_____ Date:_____

Class worksheet: Alg2H
Rational expressions: Reduce, Add and subtract
(book chapter 6)

Excluded values

Unacceptable replacements: when denominator is ZERO.

$\frac{x+3}{x}$ $\boxed{x \neq 0}$

$\frac{x^2}{x+5}$ $\boxed{x \neq 5}$

$\frac{(x-2)}{x^2-5x+6} = \frac{(x-2)}{(x-3)(x-2)} = \frac{1}{(x-3)}$ $\boxed{\begin{matrix} x \neq 3 \\ x \neq 2 \end{matrix}}$

Reduce

Integers (numbers)	Polynomials (x)
Find common factors Reduce $\frac{9}{6} = \frac{3}{2}$ $\frac{12}{28} = \frac{2 \cdot 2 \cdot 3}{2 \cdot 2 \cdot 7} = \boxed{\frac{3}{7}}$	$\frac{3a^3}{6a} = \frac{1}{2}a^2$ $\frac{7x+21}{7} = \frac{7(x+3)}{7} = x+3$
$\frac{x^2+5x+4}{x^2+2x+1} = \frac{(x+1)(x+4)}{(x+1)(x+1)} =$ $= \frac{x+4}{x+1}$	$\frac{4x^2+12x+8}{x^2+5x+6} = \frac{4(x+1)(x+2)}{(x+2)(x+3)} =$ $= 4\frac{(x+1)}{x+3}$

Add / Subtract

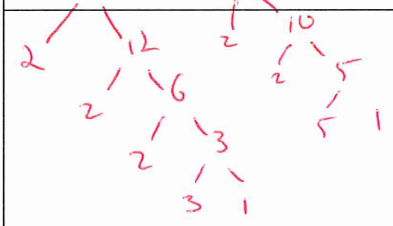
Integers (numbers)

Common factor
Add
Reduce

$$\frac{1}{6}+\frac{3}{6}=\frac{4}{6}=\boxed{\frac{2}{3}}$$

$$\frac{1}{6}+\frac{3}{12}=\frac{2+3}{12}=\boxed{\frac{5}{12}}$$

$$\frac{1}{24}+\frac{1}{20}=\frac{1}{2^3\cdot 3}+\frac{1}{2^2\cdot 5}=$$



$$=\frac{5+6}{2^3\cdot 3\cdot 5}=\boxed{\frac{11}{120}}$$

$2^3\cdot 3\cdot 5 = 120$

$$\frac{a}{a+3}-\frac{a-4}{a}=\frac{a+12}{a(a+3)}$$

Polynomials (x)

$$\frac{1}{x+3}+\frac{2}{x+3}=\frac{3}{x+3}$$

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

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

$$\frac{7a}{8}+\frac{5b}{12a}=\frac{21a^2+10b}{2^3\cdot 3\cdot a}$$

$8 = 2^3$, $12a = 2^2\cdot 3\cdot a$, $24a$

$$=\boxed{\frac{21a^2+10b}{24a}}$$

$$\frac{8x}{x^2-1}+\frac{2}{x-1}-\frac{4}{x+1}=$$

$$=\frac{8x+2(x+1)-4(x-1)}{(x-1)(x+1)}=$$

$$=\frac{8x-2x-2=4x+4}{(x-1)(x+1)}=\frac{2x+2}{(x-1)(x+1)}$$

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