

Adding and Subtracting Unlike Fractions – Extended

In working with traditional rational numbers, we add and subtract unlike fractions by

$$\frac{1}{3} + \frac{4}{5} =$$

1st --- creating a common denominator

$$\frac{1}{3} * \frac{5}{5} + \frac{4}{5} * \frac{3}{3} \Rightarrow \frac{5}{15} + \frac{12}{15} =$$

2nd --- adding or subtracting across the top (the numerators)

$$\frac{5}{15} + \frac{12}{15} = \frac{17}{15}$$

3rd --- reducing if possible

for high school $\frac{17}{15}$ is fine, or $1\frac{2}{15}$

This same skill is used when the numerator and/or denominator contain variables....

EXAMPLE

Problem	like denominators	add on top	answer
$\frac{1}{3} + \frac{4}{x}$	$= \frac{1}{3} * \frac{x}{x} + \frac{4}{x} * \frac{3}{3}$	$= \frac{x}{3x} + \frac{12}{3x}$	$= \frac{x+12}{3x}$

$$x \neq 0$$

(this tells the value that x can not be, because it would create a "0" denominator)

The "short hand way to do this looks like this:

$$\frac{1}{3} + \frac{4}{x} = \frac{\overset{x}{1} + \overset{12}{4}}{\underset{3x}{3x}} = \frac{x+12}{3x} \quad x \neq 0$$

multiply the diagonal values, put the operation in between,
and multiply across the bottom

PS $4 * (x + 3)$ This means take the 4 times all the things inside the parentheses

$$= 4 * x + 4 * 3 = 4x + 12$$

If you have the problem: $c(3 - 2c)$ you would get

$$c * 3 - c * 2c = 3c - 2c^2$$

(numbers can multiply each other, and variables are "tacked on" as multiplication problems you can't complete yet)

And finally

$$(3x + 4y)2j = 3x * 2j + 4y * 2j = 6xj + 8yj$$

Name: _____ Teacher: _____ Date: _____

PROBLEMS

Add or subtract these problems as indicated. Make sure you declare any values that the variable(s) CAN NOT be.

$$1) \frac{3}{5} + \frac{2}{x} =$$

$$2) \frac{5}{y} + \frac{3}{4} =$$

$$3) \frac{c}{2} - \frac{1}{8} =$$

$$4) \frac{w}{k} - \frac{3}{c} =$$

$$5) \frac{x}{3} - \frac{8}{x} =$$

$$6) \frac{1}{x+1} + \frac{4}{5} =$$

$$7) \frac{4}{5} - \frac{a}{9} =$$

$$8) \frac{4}{5} - \frac{2}{c+5} =$$

$$9) \frac{3}{x} + \frac{3}{x+1} =$$

$$10) \frac{2}{3} + \frac{c}{c+1} =$$

$$11) \frac{a-2}{a} + \frac{5}{8} =$$

$$12) \frac{1}{4} - \frac{5c}{c+3} =$$

Can you work backwards, and decide what the missing value is?

$$13) \frac{4}{5} + \frac{?}{3} = \frac{22}{15}$$

$$14) \frac{?}{?} + \frac{2}{5} = \frac{1}{2}$$

$$15) \frac{x}{9} + \frac{2}{?} = \frac{5x+18}{45}$$

16) Now, you make up a problem and solve it!