Chapter 3 : Fractions.

Try this : http://www.ricksmath.com/fractions.html
Or this: http://www.helpwithfractions.com/index.html

I. Definition, fundamental properties.

We will use in this chapter numbers written as fractions.

The line that divides the fraction (called a vinculum) stands for a (for example $\frac{5}{7}=5\div 7$), but you shall NEVER calculate it, unless the result is a whole number.

Definition 1 : If you look at a fraction, you have :

…… ← numerator

_____

…… ← denominator

It's called a fraction only if the numerator and denominator are whole numbers ; otherwise, it's just a fractional writing.

Reminder : You can always write a whole number as a fraction, for example 12 = $\frac{12}{1}$.

Attention, When you'll write operations on fractions on your notebook, the vinculum shall be drawn on the writing line, and the = symbol should overlap the writing line.

Example : $\frac{2}{3}+\frac{1}{2}-\frac{5}{6}=\frac{1}{3}$; ÷ ; × . otherwise – 0,5 pt

Property 1 : You can multiply or divide the numerator and the denominator of a fraction by the same number (except zero), it doesn't change the value of the fraction (you get what's called an "equivalent fraction").

Example : $\frac{1}{2}=0,5$; I multiply its numerator and denominator by 8 :.

$\frac{1}{2}=\frac{1\times 8}{2\times 8}=\frac{8}{16}$; $\frac{1}{2}=\frac{3}{6}=\ldots\ldots\ldots=\frac{50}{100}$.

0,5 0,5 0,5

There's an infinity of writings of the fraction $\frac{1}{2}$.

Implementation :

1) Changing a fractional writing (any numbers) to a fraction (whole numbers) :

$\frac{1,9}{2,72}=\frac{1,90}{2,72}=\frac{1,90\times 100}{2,72\times 100}=\frac{190}{272}$

This is a tip to perform divisions between decimal numbers : instead of calculating 1,9÷2,72 you can calculate 190÷272, which will have the same result.

2) Simplifying fractions: $\frac{70}{98}=\frac{70:2}{98:2}=\frac{35}{49}=\frac{35:7}{49:7}=\frac{5}{7}$.

$\frac{5}{7}$ is called « simplified form » or « reduced form » of $\frac{70}{98}$.

II. Comparing, adding and subtracting fractions.

Attention !!! You can only add, subtract or compare fractions that have the same denominator.
(To get the same denominator, use Pty1).

Property 2 : Comparing two fractions that have the same denominator.
If two fractions have the same denominator, the biggest is the one that has the biggest numerator.

Example : $\frac{5}{7} \geq \frac{3}{7}$ because $5 \geq 3$.

> : "bigger than " ; < : "smaller than " ; ≥ : "bigger or equal to" ; ≤ : "smaller or equal to".

Property 3 : Adding or subtracting two fractions that have the same denominator.
To add two fractions that have the same denominator, add only their numerators, and keep the denominator they had : $\frac{a}{d} + \frac{b}{d} = \frac{a+b}{d}$.
To subtract two fractions that have the same denominator, subtract only their numerators, and keep the denominator they had : $\frac{a}{d} - \frac{b}{d} = \frac{a-b}{d}$.

Remember : for + and - , you only perform the operation « above »

Examples :
$\frac{4}{17} + \frac{6}{17} = \frac{4+6}{17} = \frac{10}{17}$.
$\frac{54}{8} - \frac{26}{8} = \frac{54-26}{8} = \frac{28}{8}$.

III. Multiplying fractions.

Fortunately, multiplication is a lot easier on fractions than addition or subtraction: the fractions don't need to have the same denominator

Property 4 : To multiply two fractions, just multiply their numerators together, and their denominator together : $\frac{a}{b} \times \frac{c}{d} = \frac{a \times c}{b \times d}$.

Example : $\frac{12}{5} \times \frac{7}{41} = \frac{12 \times 7}{5 \times 41} = \frac{84}{205}$.

NB: inverse d'une fraction: "reciprocal"