Math 104Q

Fraction Rules

1. Cancellation: $\frac{ac}{bc} = \frac{a}{b}$

2. Multiplication: $\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$

Remark: Any number *a* can be written as a fraction $a = \frac{a}{1}$. You can use this fact and the multiplication rule to multiply any number by a fraction: $a \cdot \frac{c}{d} = \frac{a}{1} \cdot \frac{c}{d} = \frac{ac}{1d} = \frac{ac}{d}$

3. **Division:** $\frac{\frac{a}{b}}{\frac{c}{d}} = \frac{ad}{bc}$

Memory Peg: *a* and *d* are the "outer" symbols, and *b* and *c* are the "inner" symbols in the division of fractions on the left. The resulting fraction on the right is obtained by placing *outer times outer* in the numerator, and *inner times inner* in the denominator.

4. Addition and subtraction: $\frac{a}{c} \pm \frac{b}{c} = \frac{a \pm b}{c}$

$$\frac{a}{b} \pm \frac{c}{d} = \frac{ad \pm bc}{bd}$$

Remark: In the last rule one can use the Least Common Multiple of *b* and *d*, instead of *bd*, as denominator (we will do it in Chapter 6). The result will be the same as applying the last rule, and then using cancellation to simplify the final fraction.

Subtraction is done the same as addition by replacing the + by - .

5. Cross multiplication: If $\frac{a}{b} = \frac{c}{d}$, then $ad = cb$