MATH 2A/5A Prep: Fractions and Linear Equations

Facts to Know:

Suppose a, b, c, d are nonzero real numbers,

1. Fractions:
   - Never divide by 0

     e.g. $\frac{1}{0}, \frac{2}{0}, \frac{x}{0}$ are invalid

     $x(x-1) = x \Rightarrow x-1=1$ so $x=2$ have to consider if $x=0$

     correct answer: $x=0$ or $x=2$

   - $\frac{a+b}{c} = \frac{a}{c} + \frac{b}{c}$
   - $\frac{1}{a} + \frac{1}{b} \neq \frac{1}{a+b}$ e.g. $\frac{1}{1+x^2} \neq \frac{1}{1} + \frac{1}{x^2}$
   - Common denominator: $\frac{a}{b} + \frac{c}{d} = \frac{ad}{bd} + \frac{cb}{db} = \frac{ad+bc}{bd}$
   - $\frac{a}{b} = \frac{c}{d}$ is same as: $ad = bc$

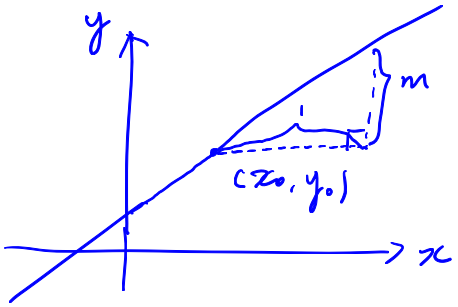
2. Linear equations:
   - Solving linear equations: "isolate variables"

     e.g. $xy + x + y = 1 \Rightarrow xy + x = 1 - y \Rightarrow x(y+1) = 1-y$

     $\Rightarrow x = \frac{1-y}{1+y}$ (if $y \neq -1$)

   - Equation of a line through the point (x_0, y_0) with slope m is:

     $y - y_0 = m(x - x_0)$



Examples:

1. Simplify the expression $\dfrac{4x}{(x+2)^2 + \frac{x^3+x^2}{x+1}}$.

$$= \frac{4x}{x^2+4x+4 + \dfrac{x^2(x+1)}{x+1}}$$

$$= \frac{4x}{x^2+}$$

2. Find the intersection of the line $y = 2x + 3$ with the line $y = -x + 4$.