

Math 407, Assignment 1, Fall 2007

due Friday 5 September

1. Give a definition of an equation that makes sense mathematically and would be understandable to high school students. Your definition should allow each of the following to be an equation:

$$\begin{aligned}3x + 6 &= 8 \\3 &= 1 + 2 \\3 &= 4 \\(2x + 1) &= x + (x + 1)\end{aligned}$$

- (a) Show how your definition applies to the examples above.
 - (b) What difficulties and misunderstandings might students have with your definition. Discuss how you would try to get around these difficulties.
2. In class we talked about the logical processes behind the following procedure for solving a quadratic equation:

$$\begin{aligned}x^2 - 3x - 4 &= 0 \\(x + 1)(x - 4) &= 0 \\x + 1 = 0 &\quad \text{or} \quad x - 4 = 0 \\x = -1 &\quad \text{or} \quad x = 4\end{aligned}$$

Give an explanation of this solution method that both respects the underlying mathematical ideas but that is also comprehensible to high school students.

3. Describe approaches (other than “telling” and “justify your solution”) that you could use with high school students that would push them to think about the logical, mathematical processes inherent in solving problems such as this one.