Common Mistakes in Algebra

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After a few years of teaching mathematics courses in high school, teachers know which concepts and manipulations will cause difficulty for students. From year to year, class to class, students often make the same algebraic mistakes over and over. In upper-level mathematics courses, students' indication of mastery of the new concepts may be obscured by common algebraic errors.

Following is a short test covering common errors. I found it very helpful to give the test near the end of the algebra courses, just prior to the final exams. Becoming aware of these commonly made errors, the students were less likely to make them on the final exam.

In the upper-level mathematics courses, such as trigonometry, analytic geometry, math analysis, and even calculus, I used the test on the first day of class. Even at these levels, very few students are able to answer all the questions correctly. Discussing the ones that cause the most difficulty is very beneficial. These mistakes can later be referred to meaningfully as "one of those common mistakes in algebra."

Students might be required to keep the corrected test in their notebooks for referral. Add your own favorites to supplement this list and use it in your class.

**Common Mistakes in Algebra**

**Directions:** All the statements are false. Correct each statement to make it true.

1. $|−3| = −3$  
2. $3^2 \cdot 3^3 = 9^3$  
3. $a^2 \cdot b^3 = (ab)^7$  
4. $x + y - 3(z + w) = x + y - 3z + w$  
5. $\frac{r}{4} - \frac{(6 - s)}{2} = \frac{r - 12 - 2s}{4}$  
6. $3a + 4b = 7ab$  
7. $3x^{-1} = \frac{1}{3x}$  
8. $\sqrt{x^2 + y^2} = x + y$  
9. $\frac{x + y}{x + z} = \frac{y}{z}$  
10. $\frac{1}{x - y} = \frac{-1}{x + y}$  
11. $\frac{x}{y} + \frac{r}{s} = \frac{x + r}{y + s}$  
12. $x \left(\frac{a}{b}\right) = \frac{ax}{bx}$  
13. $\frac{xa + xb}{x + xd} = \frac{a + b}{d}$  
14. $\sqrt{-x} \sqrt{-y} = \sqrt{xy}$  
15. If $2(2 - z) < 12$ then $z < 4$  
16. $\frac{1}{1 - x} = \frac{y}{1 - x}$  
17. $a^2 \cdot a^5 = a^{10}$  
18. $(3a)^4 = 3a^4$  
19. $\frac{a}{b} - \frac{b}{a} = \frac{a - b}{ab}$  
20. $(x + 4)^2 = x^2 + 16$  
21. $\frac{r}{4} - \frac{6 - s}{4} = \frac{r - 6 - s}{4}$  
22. $(a^3)^3 = a^9$