Each of the following equations contains a mistake. Spot the mistake, explain why it is wrong, and promise you will never make that mistake. Then try to write something that would be true. Keep in mind, though, that sometimes the diffculty is knowing when to *stop* simplifying - in many of the cases below, there really isn't anything helpful you can do to simplify it.

For example:
$\frac{3}{x} + \frac{x+2}{x^2} = \frac{3+x+2}{x+x^2}$
Mistake: You need to get a common denominator to add fractions! You can't just add the numerator and add the denominator. Multiplication works like that, but definitely not addition. If it did, then $\frac{1}{2} + \frac{1}{2}$ would be $\frac{2}{4}$, and that is ridiculous. I promise that I will never, ever, EVER make that mistake. The correct way to add:
$\frac{3}{x} + \frac{x+2}{x^2} = \frac{3x}{x^2} + \frac{x+2}{x^2} = \frac{4x+2}{x^2}$

Another example:
$\sin^{-1} x = \frac{1}{\sin x}$
Mistake: The -1 exponent on a trig function does NOT indicate a reciprocal - instead, it indicates the *inverse* sine function. I promise that I will never, EVER confuse $\sin^{-1} x$ with $\frac{1}{\sin x}$ (but I will complain frequently about how confusing the notation is). There really isn't a good way to rewrite it, since $\sin^{-1} x$ just is what it is. (If you don't like the notation $\sin^{-1} x$, you can rewrite is as $\arcsin x$.)

1. $\sin(2x+3) = \sin 2x + \sin 3$

2. $(x+3)^2 = x^2 + 9$

3. $\frac{\log_2 x}{\log_2 5} = \log_2 x - \log_2 5$

4. $\tan\theta = \frac{\sin}{\cos}\theta$

5. $e^{x+2} = e^x + e^2$

6. $\tan(x^2) = \tan^2 x$

7. $\frac{x^2+x+3}{x+4} = \frac{x^2+3}{4}$

8. $\frac{\sin x}{\sin y} = \frac{x}{y}$

9. $e^x e^2 = e^{2x}$

10. If $\sin x = \frac{1}{2}$, then $\sin^{-1} x = 2$.