The goal of the substitution method is to convert a complicated integral into one that is easier to compute, and hopefully something we know how to compute directly. Consider the following integral

$$\int \frac{3x^2\ dx}{4+100x^6}$$

1. We have no formula for integrating this expression directly, so the substitution method should be applied. Rewrite this integral using the substitution $u = 25x^3$.

2. Remember that when you want to compute integrals, the formula needs to *exactly* match the ones we have learned. Modify this expression to make it match a formula we know and compute the integral.

3. If you did not have a guide to solving this problem, you may have considered using $u = 10x^3$. Work out the integral with this substitution, and then see what needs to be done to make it work. Compute the final integral and see that you get the same answer.

4. Another option that one may consider when trying to solve this problem is $u = 4 + 100x^6$. Work out the integral with this substitution. What do you get after converting the integral to be entirely in u? Is this simpler than the original integral? This should tell you that this is the incorrect substitution.

5. You can still work from this last integral to get the answer. Do another substitution to simplify the integral. You should be aiming for an arctangent type integral this time. See that you get the same answer as before.