1. Integrate.

\[ \int \cos^3 3x \sin^4 3x \, dx \]

2. In class on Monday we discussed that for integrals involving \( \sec^n \theta \tan^m \theta \) we can use the substitution \( u = \sec \theta \) or \( u = \tan \theta \) for many of them.

(a) If \( u = \sec \theta \) what is \( du \)?

(b) If \( u = \tan \theta \) what is \( du \)?

(c) Using the appropriate substitution from above, integrate the following.

\[ \int \sec^4 \theta \tan^4 \theta \, d\theta \]

Continued on the other side.
3. For each of the integrals below, choose an appropriate trigonometric substitution, compute the corresponding ‘$dx$’ term, and draw the associated triangle - please label all three sides. **Do not integrate.**

\[
\int \sqrt{9 + x^2} \, dx
\]

(a) The appropriate trigonometric substitution.

(b) The corresponding ‘$dx$’ term.

(c) The associated triangle.

\[
\int \sqrt{4x^2 - 1} \, dx
\]

(a) The appropriate trigonometric substitution.

(b) The corresponding ‘$dx$’ term.

(c) The associated triangle.