Project Based Math 112, Fall 2001  
Activity #6 — Loki’s Dilemma

(Loki was a god in Norse mythology, with a reputation of being a trickster.)

1. Compute \[ \int x^2 \sin(x^3) \cos(x^3) \, dx \], using the substitution \( u = \sin(x^3) \). Check your answer by differentiating.

2. Compute \[ \int x^2 \sin(x^3) \cos(x^3) \, dx \], using the substitution \( u = \cos(x^3) \). Check your answer by differentiating.

3. Notice that the integrals in questions 1 and 2 are the same. Did you get the same answer for each? Explain.