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Quiz – February 3, 2004

Find $\int \sin 2x \cos 2x \, dx$. Check your answer.

Answer: Let $u = \sin 2x$. So, $du = 2\cos 2x \, dx$, and $\frac{1}{2}du = \cos 2x \, dx$. The original integral is equal to

$$\tfrac{1}{2}\int u \, du = \tfrac{1}{4}u^2 + C = \boxed{\frac{1}{4}\sin^2 2x + C.}$$

Check: The derivative of the proposed answer is

$$\tfrac{1}{4}(2)\sin 2x(\cos 2x)2 = \sin 2x \cos 2x. \checkmark$$