

Each problem is worth 0 points. In the event of an actual quiz, you would have received warning.

1. Evaluate  $\int \cot x \, dx = \int \frac{\cos x}{\sin x} \, dx$  *Substitution!* let  $u = \sin x$

$$= \int \frac{\cos x}{u} \cdot \frac{du}{\cos x}$$

$$= \int \frac{1}{u} \, du$$

$$= \ln |u| + C$$

$$= \ln |\sin x| + C$$

*(Yes, the absolute value matters!)*

2. Evaluate  $\int_0^1 x^2 \sqrt{1-x} \, dx$ . *Substitution!* let  $u = 1-x \Rightarrow x = 1-u$

$$= \int_1^0 x^2 \cdot u^{1/2} \cdot -du$$

$$= -\int_1^0 (1-u)^2 \cdot u^{1/2} \, du$$

$$= -\int_1^0 (1 - 2u + u^2) \cdot u^{1/2} \, du$$

$$= -\int_1^0 (u^{1/2} - 2u^{3/2} + u^{5/2}) \, du$$

$$= \left[ -\frac{2}{3} u^{3/2} + 2 \cdot \frac{2}{5} u^{5/2} - \frac{2}{7} u^{7/2} \right]_1^0$$

$$= 0 - \left( -\frac{2}{3} + \frac{4}{5} - \frac{2}{7} \right)$$

$$= \frac{70}{105} - \frac{84}{105} + \frac{30}{105}$$

$$= \frac{16}{105}$$