Problem 1.1. For a fixed number, $n$, use the fundamental theorem of calculus (version 1) to find

$$
\frac{d}{dx} \left( \int_{1}^{x^n} \frac{1}{t} \, dt \right) =
$$

Problem 1.2.

$$
\frac{d}{dx} \left( \tan(\sec(x)) \right) =
$$
Problem 1.3.

\[ \int \cos^5(x) \, dx = \]

Problem 1.4.

\[ \int \sec^2(x) \sin(\tan(x) + 3) \, dx = \]
Problem 1.5.

\[ \frac{d}{dx} \left( \frac{\sin(x)}{x^2} \int_1^x \frac{1}{t} \, dt \right) = \]

Problem 1.6.

\[ \frac{d}{dx} \left( \csc(x^2 \sin(x)) \right) = \]