**Quiz 2**

Name: key Row:________

[4] **1.** Find the derivative of $G(x) = \int_0^{x^2} \frac{1}{\cos x + 1}\, dx$. (You do not need to do any integration for this problem!)

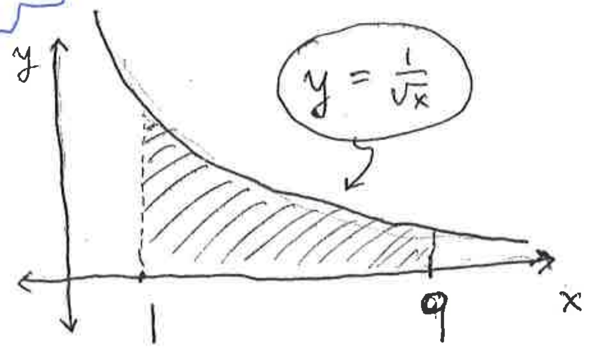
Let $h(x) = x^2$ and $F(x) = \int_0^x \frac{1}{\cos x + 1}\, dx$.

Then $h'(x) = 2x$ and $F'(x) = \frac{1}{\cos x + 1}$, by the Fund. Theorem of Calculus part (1).

Since $G(x) = F(h(x))$, then by the chain rule,

$G'(x) = F'(h(x)) \cdot h'(x) = \boxed{\frac{1}{\cos(x^2)+1} \cdot 2x}$

**2.** Find the area of the shaded region:




[8] $A = \int_1^9 \frac{1}{\sqrt{x}}\, dx = \int_1^9 x^{-1/2}\, dx$ (2) (2)

$= \left[ \frac{x^{1/2}}{\frac{1}{2}} \right]_{x=1}^{x=9}$ (2)

$= \left[ 2\sqrt{x} \right]_1^9 = 2\sqrt{9} - 2\sqrt{1} = 6 - 2 = \boxed{4}$ (2)

[8] **3.** Evaluate the indefinite integral $\int \cos^4 x \sin x\, dx$. Remember to express your answer as a function of $x$. Show all work.

Let $u = \cos x$ (2)

Then $\frac{du}{dx} = -\sin x$ (2), so $du = -\sin x\, dx$

$\int \cos^4 x \sin x\, dx = \int u^4 (-du)$ (2)

$= -\int u^4\, du = -\frac{u^5}{5} + C = \boxed{-\frac{(\cos x)^5}{5} + C}$.

(1) (1)