1. [8 points] Parts **a.** and **b.** are unrelated.

a. [4 points] Let $f(x)$ and $h(x)$ be functions given by the formulas:

$$f(x) = \sqrt{1 + \pi\sqrt{x}} \qquad \text{and} \qquad h(x) = \sqrt{x}.$$

You do not need to show work for this part.

(i) Find a formula for a function $s(x)$ such that $f(x) = s(h(x))$.

Answer: $s(x) =$ $\sqrt{1 + \pi x}$

(ii) Find a formula for a function $r(x)$ such that $f(x) = h(r(x))$.

Answer: $r(x) =$ $1 + \pi\sqrt{x}$

b. [4 points] Given the function $K = g(c)$ below, find a formula for $g^{-1}(K)$. *Show all of your work.*

$$K = g(c) = \frac{\ln(c^{10}) - \ln(c^7)}{\log(10^4)}$$

$$K = \frac{10 \cdot \ln(c) - 7\ln(c)}{4}$$

$$4K = 3\ln(c)$$

$$\ln(c) = \frac{4}{3}K$$

$$c = e^{4/3 K}$$

Answer: $g^{-1}(K) =$ $e^{\frac{4}{3}K}$