1. Calculate $\int_1^4 \sqrt{x} \, dx$.

$$\int_1^4 \sqrt{x} \, dx = \left. \frac{2}{3} x^{3/2} \right|_1^4 = \frac{2}{3} (4^{3/2} - 1^{3/2}) = \frac{2}{3} (8 - 1) = \frac{14}{3}$$

2. Let $g(x) = \int_1^x \frac{t}{t^2 + 1} \, dt$. For what $x$ values, if any, does $g(x)$ have a local max or min. Hint: Find $g'(x)$?

$$g'(x) = \frac{x}{x^2 + 1} \text{ by FTC}$$

**Local min at $x = 0$**

(actually a global min)

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