1. For \( f(x) = x^2 + 2 \), find \( \frac{d}{dx} f^{-1}(x) \bigg|_{x=f(2)=6} \) (total 5 points).

Answer: \( \frac{d}{dx} f^{-1}(x) \bigg|_{x=f(2)=6} = 1/4 \)

(3 points for \( \frac{d}{dx} f(x) \big|_{x=2} = 2x \big|_{x=2} = 4 \); and 2 points for the correct final step \( \frac{d}{dx} f^{-1}(x) \bigg|_{x=f(2)=6} = \frac{1}{\frac{d}{dx} f(x) \big|_{x=2}} = 1/4 \). Please give 4 points if the correct answer is obtained through \( \frac{d}{dx} f^{-1}(x) \bigg|_{x=f(2)=6} = \frac{1}{2 \sqrt{x-2}} \big|_{x=6} = 1/4 \)).

2. Evaluate \( \int \cot \theta d\theta \) (total 5 points).

Answer: \( \int \cot \theta d\theta = -\ln|\csc \theta| + C \)

(2 points for \( \int \cot \theta d\theta = \int \frac{d\sin \theta}{\sin \theta} \); 2 points for \( \int \cot \theta d\theta = \ln|\sin \theta| + C \); and 1 point for correct final result)