

Your Name: Key

Calculus I, Math 151-06, Quiz #10

1. [6 points] Evaluate $\frac{d}{dx} \int_3^x (\cos^3(t) + 2 \cdot 4^t)^7 dt.$

$$= (\cos^3 x + 2 \cdot 4^x)^7$$

2. [7 points] Evaluate $\frac{d}{dx} \int_{\sin x}^{x^2} \frac{\ln t}{t^2} dt.$

$$= \frac{\ln(x^2)}{(x^2)^2} \cdot 2x - \frac{\ln(\sin x)}{(\sin x)^2} \cdot \cos x$$

3. [6 points] Evaluate $\int_{-2}^1 (4x^2 - 7x + 2) dx$. Simplify your answer.

$$\begin{aligned}
 &= \left[\frac{4}{3}x^3 - \frac{7}{2}x^2 + 2x \right]_{-2}^1 \\
 &= \left[\frac{4}{3}(1)^3 - \frac{7}{2}(1)^2 + 2(1) \right] - \left[\frac{4}{3}(-2)^3 - \frac{7}{2}(-2)^2 + 2(-2) \right] \\
 &= \left[\frac{4}{3} - \frac{7}{2} + 2 \right] - \left[\frac{4}{3}(-8) - \frac{7}{2}(4) - 4 \right] \\
 &= \left[\frac{-1}{6} \right] - \left[\frac{-32}{3} - 14 - 4 \right] = \frac{-1}{6} + \frac{86}{3} = \frac{171}{6} = \boxed{\frac{57}{2}}
 \end{aligned}$$

4. [6 points] Evaluate $\int_1^4 \left(\frac{2}{q} - \frac{2}{\sqrt{q}} \right) dq$. Simplify your answer.

$$\begin{aligned}
 &= 2\ln|q| - \left[\frac{2q^{1/2}}{1/2} \right]_1^4 = 2\ln|q| - 4\sqrt{q}]_1^4 \\
 &= [2\ln 4 - 4\sqrt{4}] - [2\ln 1 - 4\sqrt{1}] \\
 &= 2\ln 4 - 8 - [0 - 4] = 2\ln 4 - 8 + 4 = \boxed{2\ln 4 - 4}
 \end{aligned}$$