

Name: _____
AP Calculus AB: FTC PII Homework

Date: _____
Ms. Loughran

For questions 1-3, find the derivative using the FTC Part II and check your answer by evaluating the integral and then differentiating.

1. $\frac{d}{dx} \int_1^{x^3} \frac{1}{t} dt$

2. $\frac{d}{dx} \int_1^{\ln x} e^t dt$

3. $\frac{d}{dx} \int_1^{x^2} t\sqrt{1+t} dt$

4. Let $F(x) = \int_0^x \frac{\cos t}{t^2 + 3} dt$. Find:

(a) $F(0)$

(b) $F'(0)$

(c) $F''(0)$

5. Find $\frac{d}{dx} \int_x^1 \sin(t^2) dt$

6. Find $\frac{d}{dx} \int_{\tan x}^3 \frac{t^2}{1+t^2} dt$

7. Find $\frac{d}{dx} \int_1^x \sin(\sqrt{t}) dt$

8. Find $\frac{d}{dx} \int_x^0 \frac{t}{\cos t} dt$

9. Let $F(x) = \int_2^x \sqrt{3t^2 + 1} dt$. Find:

(b) $F(2)$

(b) $F'(2)$

(c) $F''(2)$

10. Find $\int_0^e \frac{dx}{x+e}$