

Due Feb 25<sup>th</sup> Submit at the beginning of the class (Put into the box with your TA's name)

1. Find the derivative of the function

$$g(x) = \int_{2x}^{3x} \frac{u^2 - 1}{u^2 + 1} du \quad (\text{Hint: } g(x) = \int_{2x}^{3x} \frac{u^2 - 1}{u^2 + 1} du = \int_{2x}^0 \frac{u^2 - 1}{u^2 + 1} du + \int_0^{3x} \frac{u^2 - 1}{u^2 + 1} du)$$

2. Find the derivative of the function

$$F(x) = \int_{\sqrt{x}}^{2x} \arctan t \, dt$$

3. Let  $F(x) = \int_2^x e^{t^2} dt$ . Find an equation of the tangent line to the curve  $y = F(x)$  at the point with x-coordinate 2 (meaning at  $x=2$ )

Evaluate the indefinite integral.

4.  $\int \frac{\cos(\pi/x)}{x^2} dx$

5.  $\int \frac{dt}{(\cos^2 t) \sqrt{1 + \tan t}}$

Evaluate the definite integral.

6.  $\int_{-\pi/4}^{\pi/4} (x^3 + x^4 \tan x) dx$

7.  $\int_0^1 \frac{1}{(1 + \sqrt{x})^4} dx$