

Honors Math 182 Quiz 1 Version A

1. State the following integration and differentiation formula:

$$\int_a^b \sin x \, dx = \boxed{\phantom{000000}}$$

$$\int_a^b \arcsin x \, dx = \boxed{\phantom{000000}}$$

assuming  $-1 \leq a < b \leq 1$

$$\int_a^b \cos x \, dx = \boxed{\phantom{000000}}$$

$$\int_a^b \arccos x \, dx = \boxed{\phantom{000000}}$$

assuming  $-1 \leq a < b \leq 1$

$$\int_a^b x^\alpha \, dx = \boxed{\phantom{000000}}$$

assuming  $\alpha \neq -1$

$$\int_a^b \frac{1}{\sqrt{1-x^2}} \, dx = \boxed{\phantom{000000}}$$

assuming  $-1 < a < b < 1$

$$\int_a^b \ln x \, dx = \boxed{\phantom{000000}}$$

assuming  $0 < a < b$

$$\int_a^b \frac{1}{x} \, dx = \boxed{\phantom{000000}}$$

assuming  $0 < a < b$

$$\int_a^b \frac{1}{1+x^2} \, dx = \boxed{\phantom{000000}}$$

$$\frac{d}{dx} e^x = \boxed{\phantom{000000}}$$

$$\int_a^b 5^x \, dx = \boxed{\phantom{000000}}$$

$$\frac{d}{dx} \ln x = \boxed{\phantom{000000}}$$

assuming  $x > 0$

$$\frac{d}{dx} \sin x = \boxed{\phantom{000000}}$$

$$\frac{d}{dx} \arcsin x = \boxed{\phantom{000000}}$$

assuming  $-1 < x < 1$

$$\frac{d}{dx} \cos x = \boxed{\phantom{000000}}$$

$$\frac{d}{dx} \arccos x = \boxed{\phantom{000000}}$$

assuming  $-1 < x < 1$

$$\frac{d}{dx} x^\alpha = \boxed{\phantom{000000}}$$

$$\frac{d}{dx} 7^x = \boxed{\phantom{000000}}$$

$$\frac{d}{dx} \arctan x = \boxed{\phantom{000000}}$$

$$\frac{d}{dx} |x| = \boxed{\phantom{000000}}$$

assuming  $x \neq 0$

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2. State and prove the integration by parts formula for definite integrals.

3. Solve the following integration and differentiation problems:

(i)  $\int_{\frac{1}{6}}^{\frac{1}{2}} 9x^2 dx$

(ii)  $\frac{d}{dx} \left( \frac{|x|^3}{3 + \arctan x} \right)$