

Math 181 Honors Quiz 7 Version A

1. Find the following derivatives using any method:

(i) $\frac{d}{dx}(x + x + x)$

(ii) $\frac{d}{dx}(x \sin 5x)$

(iii) $\frac{d}{dx} \arctan(x^2)$

(iv) $\frac{d}{dx} \left(\frac{x}{|x| + 1} \right)$

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2. Solve the inequality $2x^2 + 5x \leq 7$.

3. Recall that

$$\frac{\sin \Delta x}{\Delta x} \rightarrow 1 \quad \text{and} \quad \frac{1 - \cos \Delta x}{\Delta x} \rightarrow 0 \quad \text{as} \quad \Delta x \rightarrow 0.$$

Use the above limits and the method of increments to show that

$$\frac{dy}{dx} = \cos x \quad \text{for} \quad y = \sin x.$$