

## 235 Quiz 5

Name: \*key\*

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You have 30 minutes to complete this quiz. Work individually. You may use your Notebooks.

1. Find  $\int \frac{3x}{1+x^2} dx$ .

$$\int \frac{3x}{1+x^2} dx = \boxed{\frac{3}{2} \ln|1+x^2| + C},$$

1 pt  
↓

because  $\frac{d}{dx} \left( \frac{3}{2} \ln|1+x^2| \right) = \frac{3}{2} \frac{1}{1+x^2} (2x) = \frac{3x}{1+x^2}$

10 pts

2. Use Riemann sums to prove that  $\int_a^b c f(x) dx = c \int_a^b f(x) dx$ . Justify all steps.

$$\int_a^b c f(x) dx = \lim_{n \rightarrow \infty} \sum_{k=1}^n c f(x_k^*) \Delta x \quad (\text{def'n def. int.})$$

$$= \lim_{n \rightarrow \infty} c \sum_{k=1}^n f(x_k^*) \Delta x \quad (\text{CM rule for sum})$$

$$= c \lim_{n \rightarrow \infty} \sum_{k=1}^n f(x_k^*) \Delta x \quad (\text{CM rule for lim})$$

$$= c \int_a^b f(x) dx \quad (\text{def'n def. int.})$$

10 pts