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Day 16 is Tuesday, October 2, 2012

Please sit in groups of three.

Working on New Class Drill

Derivatives of Functions
Containing Logarithms.

Derivatives of Functions Containing Logarithms

2012 - 2013 Fall Semester MATH 1350 (Barsamian) Class Drill

(based on Section 4-2 Example 2 and Example 3 and suggested exercise 4-2#19)

(A) Let $f(x) = 12 \ln\left(\frac{13}{x}\right)$. Find $f'(x)$. Hint: Start by rewriting f using a rule of logarithms.

$$f(x) = 12 \ln\left(\frac{13}{x}\right) = 12(\ln(13) - \ln(x)) \quad \ln\left(\frac{a}{b}\right) = \ln(a) - \ln(b)$$

$$= 12 \ln(13) - 12 \ln(x)$$

$$\text{So } f'(x) = \frac{d}{dx} 12 \ln(13) - \frac{d}{dx} 12 \ln(x)$$

constant

$$= 0 - \frac{12}{x} \quad \text{results from yesterday}$$

$$f'(x) = -\frac{12}{x}$$

(B) Let $f(x) = 12 \ln(x^{13})$. Find $f'(x)$. Hint: Start by rewriting f using a rule of logarithms.

$$\ln(a^b) = b \ln(a)$$

$$f(x) = 12 \ln(x^{13}) = 12 \cdot 13 \cdot \ln(x)$$

$$f'(x) = \frac{d}{dx} (12 \cdot 13) \ln(x) = 12 \cdot 13 \cdot \frac{d}{dx} \ln(x) = 12 \cdot 13 \cdot \frac{1}{x}$$

$$= \frac{12 \cdot 13}{x}$$

(C) Let $f(x) = 12x \ln(13)$. Find $f'(x)$.

Start by rewriting $f(x)$ with constants in front.

$$f(x) = 12x \ln(13) = 12 \ln(13) \cdot x$$

$$f'(x) = \frac{d}{dx} (12 \ln(13)) \cdot x = 12 \ln(13) \cdot \frac{d}{dx} x$$

$$= 12 \ln(13) \cdot 1$$

$$= 12 \ln(13)$$

Question (D) is on back. →

