Calc AB

Lesson 25

8/26/15

Agenda: 8/26/15

HW leader:

Lesson 25

Rules of derivatives

★ Test 1 on Friday

★ Handout Derivatives 1 WS

Period 3: Kayva J.

Period 4: Katie F.

Check Calculators for Programs while doing WS

Rules: If $\frac{d}{dx}(f(x))$ and $\frac{d}{dx}(g(x))$ exist

1. $\frac{d}{dx}(cf(x)) = c \cdot \frac{d}{dx}(f(x))$
2. $\frac{d}{dx}(f(x) \pm g(x)) = \frac{d}{dx}(f(x)) \pm \frac{d}{dx}(g(x))$

Proof (1)

$$\frac{d}{dx}(cf(x)) = \lim_{h\to 0} \frac{cf(x+h) - cf(x)}{h} = c \cdot \lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$$ ← Prop of Limits!

$$= c\frac{d}{dx}(f(x)) \checkmark$$

Proof (2)

$$\frac{d}{dx}(f(x)+g(x)) = \lim_{h\to 0} \frac{f(x+h)-f(x) + g(x+h)-g(x)}{h}$$

$$= \lim_{h\to 0} \frac{f(x+h)-f(x)}{h} + \lim_{h\to 0} \frac{g(x+h)-g(x)}{h}$$

$$= \frac{d}{dx}(f(x)) + \frac{d}{dx}(g(x))$$

Ex. $y = \sqrt{\pi}\, x^{-e}$

Ex. $f(x) = \frac{1}{\sqrt{2}x^2} + \frac{3}{\sqrt{2}}x^{\pi}$

Ex. Find $K'(z)$ where $K(z) = \frac{3}{z\sqrt{7}} - 2z^{\pi} - \frac{1}{z-2} + 5$

$$K(z) = 3z^{-\sqrt{7}} - 2z^{\pi} - z^2 + 5$$

$$K'(z) = -3\sqrt{7}\, z^{-\sqrt{7}-1} - 2\pi z^{\pi-1} - 2z + 0$$