Day 10 is Tuesday, February 5, 2013

Quiz 3 Thursday

Practice writing out solutions to Examples + Match Problems

You will need to show steps clearly, with proper notation.

New Rule (a combination of two rules in the book)

The Sum Rule and Constant Multiple Rule

Single ~~Two~~ equation form

$$\frac{d}{dx}\left(a\cdot f(x) + b\cdot g(x)\right) = a\cdot\frac{df(x)}{dx} + b\cdot\frac{dg(x)}{dx}$$

constant multiple — function — constant multiple — function

the ~~co~~ constant multiples come right through the derivative symbol and become constant multiples in front.

Examples

#1 (A) find derivative of $f(x) = -3x^2 + 5x - 7$

Solution Notice that I write out the steps in detail

$$\frac{d}{dx} f(x) = \frac{d}{dx}\left(-3 x^2 + 5 x - 7 \right)$$ identify constant multiples

$$= -3 \frac{d}{dx} x^{2} + 5 \frac{d}{dx} x - \frac{d}{dx} 7$$ Sum + constant multiple rule

n=2

$$= -3\left(2 \cdot x^{2-1}\right) + 5(1) - (0)$$

Power Rule — from yesterday power rule — from yesterday

$$\boxed{f'(x) = -6x + 5}$$

Notice that this agrees with ~~the~~ result ~~that~~ that we got last Tuesday Jan 29 in class using the definition of the derivative.

(B) Find x-coordinates of all points on graph of $f(x) = -3x^2+5x-7$ that have tangent lines with a slope of 11.

Solution

We are told that $m = 11$.

But m is obtained from $f'(x)$.

So we are being told that $f'(x) = 11$

And we are being asked for x.

Strategy: Set $f'(x) = 11$ and solve for x.

$$-6x + 5 = 11 \quad \text{solve for } x$$

$$-6x + 5 - 11 = 0$$

$$-6x - 6 = 0$$

$$-6x = 6$$

$$x = -1$$