Sum and Difference Rule

Goal:
• Can use sum and difference rule to take the derivative of polynomials   • Understands how to derive sum and difference rule
Terminology:
• Sum and Difference rule
Reminders
• Quiz on Thursday on 2.1-2.3

Review: 1. In order to find the derivative of x^n using the limit definition of the derivative how did we expand $(x + h)^n$?

2. Given $f(x) = \frac{8}{\sqrt{x^3}}$ determine $f'(x)$ and its domain.

3. What does $\frac{dy}{dx}$ measure?

We want to be able to take the derivative of an entire polynomial, not just a monomial. On the boards use the definition of the derivative.

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

Example: Given $y = -\frac{1}{3}x^3 - 3x^2 + 7x + 2$, find point(s) where the slope of the curve is 0.

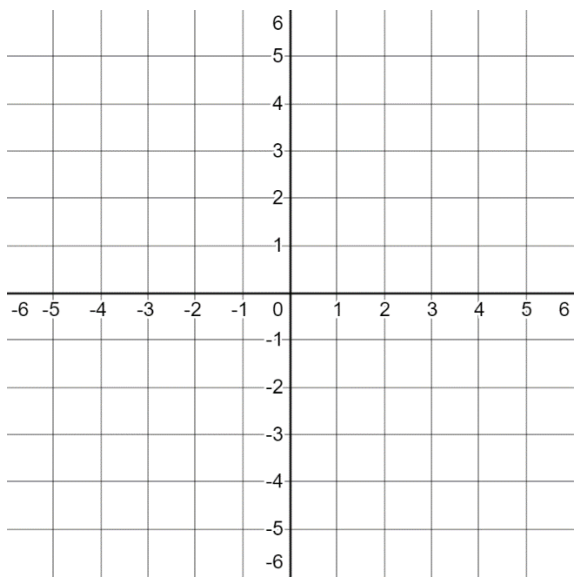**Practice Problems**: 2.3: # 1-3 (do what you need), 6-11
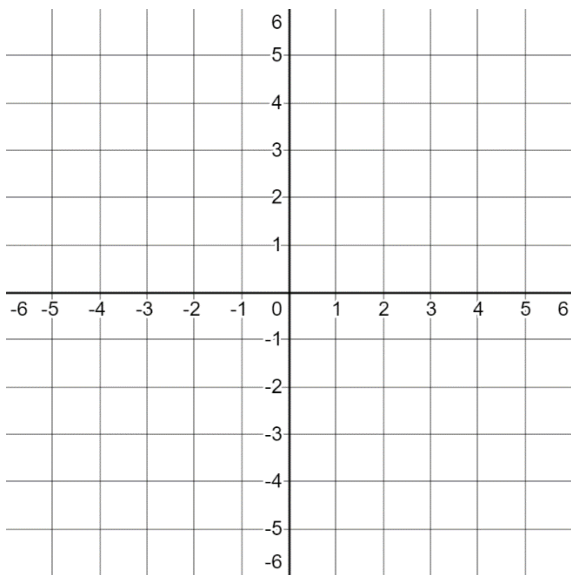
12, 13, Problem Plus

In Class Evidence

8. Show that the curve $y = 10x^3 + 4x + 2$ has no tangent lines with slope 3. (What is the minimal slope of the curve?)

10. Fund the equations of the tangent lines to the parabola $y = x^2 + x$ that pass through the point $(2, -3)$. Sketch the curve and its tangents.

12. Let

$$f(x) = \begin{cases} 2x + 3 & x < -1 \\ x^2 & -1 \le x \le 1 \\ 3 - 2x & x > 1 \end{cases}$$

a. Where is f differentiable?

b. Find an expression for f' and sketch it and f

Problem Plus: Suppose that the tangent line at a point P on the curve $y = x^3$ intersects the curve again at the point Q. Show that the slope of the tangent at Q is 4 times greater than the slope at P.