

Lesson plan for most class sessions (100 min)
Example section 2.3 limit definition of a derivative.

Instructor hands back homework from previous class (section 2.1) then collects notes from limit definition of a derivative (section 2.3) pre-work videos. (shouldn't take more than one song, yes I play music)

Instructor asks for 3-5 hard problems from previous HW evaluate limits (section 2.2). Takes volunteers to put up worked solutions to those problems (presentations count toward their grade). While students work solutions on board (alternate marker color to separate problems), students correct their homework, instructor records Pre-work video notes in their gradebook (section 2.3). (about 8-11 min)

Instructor hands back Pre-work video notes. Instructor explains and makes corrections, if corrections are necessary, to problems on board. Collect homework from evaluate limits (section 2.2). (15-25 min)

Randomize groups. Shuffle a partial deck of cards and hand them out. 2s, 3s, 4s... group up. Assign a list of problems ie. 11,15,21,35,41,47. Group 2&3 work down the list 11 to 47. Group 5&6 work up the list 47 to 11. Group 4 does every other odd ie 11,21,41,15,35,47. The number of problems should be determined depending on time it takes to complete them. If time permits the completion of 5 problems, assign 7. (time determined by how much time post-work took and estimate of how long class wrap up is going to take.) ←this takes practice.

Instructor walks around checking to make sure group members know each others names. Keep groups on task. Offers hints/not solutions to problems. Monitors problem set progress and which groups have finished what problems.

Place a dry erase maker in each group and assign the group a problem, that they hopefully completed, to put up on the board (presentations count toward their grade). Group chooses somebody to present. (8-15 min)

Instructor explains/corrects work on the board and offers pro-tips. (15-20ish minutes)

Assign homework section 2.3 9-57 every other odd and video notes for section 2.4 differentiation rules. (1 min)

*each class member must present 4 problems throughout the term for participation credit (adjust to class size).

** every 3 to 5 class sessions instructor gives a "big picture" lecture about what the techniques being practiced actually mean. (20ish minutes)

Guided flipped worksheet

1) calculate the slope of a line using $\frac{y_2 - y_1}{x_2 - x_1}$ through the points (0,-6) and (1,-3)

2) calculate the slope of a line using $\frac{y_2 - y_1}{x_2 - x_1}$ through the points $(x_1, f(x_1))$ and $(x_2, f(x_2))$

3) if $f(x) = 3x - 6$ find $f(0) = \underline{\hspace{2cm}}$ and $f(1) = \underline{\hspace{2cm}}$



where $|ab| = x$ and $|bc| = h$ write an expression for $|ac|$ in terms of x and h

$|ac| = \underline{\hspace{2cm}}$

5) Using $f(x)$ from part 3 find $f(\heartsuit) = \underline{\hspace{2cm}}$

Now Using $f(x)$ from part 3 find $f(x+h) = \underline{\hspace{2cm}}$

6) using the parts above construct the difference quotient

$$\frac{f(x+h) - f(x)}{h} = \underline{\hspace{2cm}}$$