

Helping students learn from mistakes

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Motivation and Implementation

- I read James Lang's book "small teaching". This inspired me to integrate some group work into the class period.
- Many students make the same "typical" mistakes. How do we as educators help them to identify and avoid those mistakes.
- Idea: Students come having worked on some pre-assigned problems. For each I select two students (one who feels comfortable, one who wants to learn). The students discuss together and write up a common solution. I project the students' solution on the overhead for everyone to look over. I return the marked up solution to the students who then have to submit a corrected version.

Sample problem

3, #46

$$y = \ln \left| \frac{x^2-4}{2x+5} \right| \Rightarrow$$

$$= \ln|x^2-4| - \ln|2x+5|$$

$$2x+5 < 0$$

$$2x < -5$$

$$x < -5/2$$

diff. both sides!

$$f'(x) = \begin{cases} \frac{f'(x)}{f(x)} & \text{if } x > -5/2 \\ \frac{f'(-x)}{f(-x)} & \text{if } x < -5/2 \end{cases}$$

$$\frac{d}{dx} \left(\ln \left(\frac{x^2-4}{2x+5} \right) \right)$$

$$= \frac{2x+5}{x^2-4} \left(\frac{2x+5(2x) - (x^2-4)(2)}{(2x+5)^2} \right)$$

$$y' = \frac{(2x+5)2x - 2(x^2-4)}{(x^2-4)(2x+5)} \quad \text{if } x > -5/2$$

if $y = \ln|x|$ then $y' = \frac{1}{x}$ ← True whether x is negative or positive.

$$y = \begin{cases} \ln \left(\frac{x^2-4}{2x+5} \right) & \text{if } -5/2 < x \\ \ln \left(\frac{(-x)^2-4}{-2x+5} \right) & \text{if } -5/2 > x \end{cases}$$

NOT TRUE.

$$\frac{d}{dx} \left(\ln \left(\frac{(-x)^2-4}{-2x+5} \right) \right)$$

$$y' = \frac{(-2x+5)2x + 2(x^2-4)}{(x^2-4)(-2x+5)} \quad \text{if } x < -5/2$$