Derivatives Review Activity (10/24/19)

Grade: 11-12

Subject: AP Calculus AB

Materials: notebook paper, pen/pencil

Technology Needed: na

Instructional Strategies:

- ☐ Direct instruction
- ☐ **Guided practice**
- ☐ Socratic Seminar
- ☐ Learning Centers
- ☐ Lecture
- ☐ Technology integration
- ☐ Other (list)
- ☐ **Peer teaching/collaboration/ cooperative learning**
- ☐ Visuals/Graphic organizers
- ☐ PBL
- ☐ Discussion/Debate
- ☐ Modeling

Guided Practices and Concrete Application:

- ☐ Large group activity
- ☐ Independent activity
- ☐ **Pairing/collaboration**
- ☐ Simulations/Scenarios
- ☐ Other (list)
- ☐ Hands-on
- ☐ Technology integration
- ☐ Imitation/Repeat/Mimic

Explain:

Standards (As stated in the AP Calculus Standards manual)

2.5: Applying the Power Rule
2.7: Derivatives of cos(x), sin(x), e^x, and ln(x)
2.8: The Product Rule
2.9: The Quotient Rule
2.10: Finding the Derivatives of Tangent, Cotangent, Secant, and/or Cosecant Functions

Objectives (As stated in the AP Calculus Standards manual)

Objective for 2.5: Calculate derivatives of familiar functions.
Objective for 2.7: Interpret a limit as a definition of a derivative.
Objective for 2.8: Calculate derivatives of products and quotients of differentiable functions.
Objective for 2.9: Calculate derivatives of products and quotients of differentiable functions.
Objective for 2.10: Calculate derivatives of products and quotients of differentiable functions.

More Specific Objectives:

1. The students will be able to apply their knowledge of the derivative rules to new problems.
2. The students will be able to recognize which rule(s) is/are needed in each situation.
3. The students will be able to calculate derivatives by using the appropriate rule(s).

Bloom's Taxonomy Cognitive Level: Knowledge, Comprehension, Application

Differentiation

Below Proficiency:
I will make sure that students who are below proficiency are in groups with students who are emerging or above proficiency. I will monitor these students throughout the activity to check their understanding of the content.

Above Proficiency:
I will challenge these students to help their groupmates better understand the content as they progress through the review problems. This activity is meant to incorporate peer teaching/collaboration and cooperative learning, and I challenge the students who are above proficiency to initiate the process.

Approaching/Emerging Proficiency:
Students who are approaching proficiency should be able to complete the review problems with their groups in a timely manner. As with the students who are below proficiency, I will be monitoring these students throughout to check their understanding.

Modalities/Learning Preferences:
For auditory students: Students will be encouraged to talk within their groups about the problems and the steps they are following to get their answers.
For visual students: From the input of their group members, students will be able to see various ways of arriving at the same answer, which can act as an additional visual for these students.
For kinesthetic learners: Students will have the opportunity to move around and choose where their group will be for the review activity.
For interpersonal learners: The group work (collaboration) involved with this activity will help the interpersonal students understand the content better.

Classroom Management- (grouping(s), movement/transitions, etc.)

For the review activity, I will have the students get into groups of three (with one group of four) and have them move their desks accordingly. Since this is a good group of students, I am letting them pick their own groups. Once they are in their groups, I will continue with further directions.

Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.)

I expect the students to stay focused and work through the review problems as a group, not just one person doing all the problems and letting others just copy the work. The specific procedures for the activity will be listed below under the explain category.

Minutes	Procedures
20-30	**Set-up/Prep:** Compile all 15 review questions in a LaTeX file, print off at least six copies, then cut them into strips and put each group of strips in a Ziploc baggie.
10-15	**Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.)** Before the review activity, the students will take a short, 6-point learning check that will act as bell-work and get the students in the right mindset. Once everyone has finished the learning check, we will transition into the review.

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5-10	**Explain: (concepts, procedures, vocabulary, etc.)** Here are the directions/steps for the review game: 1. Students will get into groups of three (with one group of four) for the review, and each student will need notebook paper. 2. Each group will get a baggie with 15 review problems. 3. On my go, the groups will be able to start going through the problems one-at-a-time. **Important:** You will only be able to move on to the next problem when everyone in your group has the correct answer. 4. When everyone thinks they are ready, one student will need to raise his/her hand to get my attention and I will check everyone's answers. 5. The first group to finish all the problems, or get the farthest in the time allotted, wins. Then, I will ask: Can someone please re-state what I am asking you to do for this review activity?
35-45	**Explore: (independent, concrete practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)** As students are working through the review, I will be walking around the classroom and utilizing purposeful proximity to monitor each group's progress. This review should take all or most of the rest of the class period.
5-10	**Review (wrap up and transition to next activity):** If time allows, at the end of class (or at the beginning of class the next day), I will go through the top few problems that the groups struggled with during the review. Afterwards, I will ask what questions the students still have about the review, or the concepts in general. This extra review will be a good teaching moment and will better prepare the students for their derivatives test.

Formative Assessment: (linked to objectives)

Progress monitoring throughout lesson- clarifying questions, check-in strategies, etc.

I will be walking around the classroom during the review activity, to monitor student progress and check for questions. If enough groups have the same question or are struggling with the same problem, I will have everyone take a break from what they are doing so I can clarify for all the groups, and then let them continue their work.

Consideration for Back-up Plan:

If all the groups finish the review early, I will be able to go through more problems from the review and possibly ask students how they worked through the problems.

Summative Assessment (linked back to objectives)

End of lesson:

If applicable- overall unit, chapter, concept, etc.:

After the topic of continuity and differentiability is covered, there will be a unit test on derivatives.

Reflection (What went well? What did the students learn? How do you know? What changes would you make?):

The students were very engaged and excited about the competition aspect of the review. I never noticed any student off-task during the review. The review was a good learning experience for the students and for myself; they became better at calculating various derivatives and I learned different ways to go about the problems from the students. I needed a better transition into the review activity. It probably would have been better to explain more of the directions before letting them get into groups. I should have specified that the students did not have to do the problems in order. I also should have stopped everyone and clarified when the question arose. I also could have paid better attention at the end of the class so that I could have let the students know when there were 5 minutes left of class so they would know to finish up the problem they were on and start putting desks back in the original formation.