Class Activity Instructions: Work together to ensure that everyone in the group is following along and understanding every problem. Each student should show all work on their own line paper with the same guidelines as the written homework. Write the agreed-upon answers on the answer sheet to turn in.

Implicit Differentiation:
Differentiate both sides of the equation with respect to $x$ and then solve the resulting equation for $y'$.
Don't forget to apply the Chain Rule!

### The Function

<table>
<thead>
<tr>
<th>Function</th>
<th>Implicit Differentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y$</td>
<td>$\frac{d}{dx} y = y'$</td>
</tr>
<tr>
<td>$x$</td>
<td>$\frac{d}{dx} x = 1$</td>
</tr>
<tr>
<td>$3x^2$</td>
<td>$\frac{d}{dx} 3x^2 = 6x$</td>
</tr>
<tr>
<td>$3y^2$</td>
<td>$\frac{d}{dx} 3y^2 = 6y \cdot \frac{d}{dx} y = 6yy'$</td>
</tr>
</tbody>
</table>

### Directions: Find $y'$ by implicit differentiation

1. $4y^2 + 3 = 2x^3$
2. $5 = 2x^2 + 2y^3$
3. $4 = 4x^2 + 4y^3 + y^2$
4. $x + 5y^2 + 4y^3 = 3$
5. $4x = -4xy^3 - 2x^3y^3 + 2$
6. $(4y^2 + 3)^2 = 4x^3$
7. $\sec(y^9) = 5x^6 + 2$
8. $-3y^2 + 5 = 5x^2$
9. $4 = x^2 + y^2$
10. $x + y^2 = -3y + 4$
11. $-4y^2 - y + 3 = 4x^2$
12. $5x^2 = -4x^3y^3 - 3xy + 2$
13. $x^3 = (5y^2 + 5)^2$
14. $x^6 + 3 = \cos(3y^3)$

### Possible Answers

<table>
<thead>
<tr>
<th>$\frac{8x}{-8y - 1}$</th>
<th>$\frac{3x^2}{4y}$</th>
<th>$\frac{2y^3 + 3x^2y^3 + 2}{-6xy^2 - 3x^3y^2}$</th>
<th>$\frac{10x^5}{3y^8\sec(y^9)\tan(y^9)}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{-12x^2y^3 - 3y - 10x}{12x^3y^2 + 3x}$</td>
<td>$-\frac{5x}{3y}$</td>
<td>$-\frac{4x}{6y^2 + y}$</td>
<td>$-\frac{2x^5}{3y^2\sin(3y^3)}$</td>
</tr>
<tr>
<td>$\frac{3x^2}{16y^3 + 12y}$</td>
<td>$-\frac{2x}{3y^2}$</td>
<td>$-\frac{1}{10y + 12y^2}$</td>
<td>$\frac{3x^2}{100y^3 + 100y}$</td>
</tr>
<tr>
<td>$\frac{-1}{2y + 3}$</td>
<td>$-\frac{x}{y}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## MTH 210

Section 2.6: Implicit Differentiation Class Activity

**Group Participants:**
____________________________________
____________________________________
____________________________________
____________________________________

**Class Activity Instructions:** Work together to ensure that everyone in the group is following along and understanding every problem. Each student should show all work on their own line paper with the same guidelines as the written homework. Write the agreed-upon answers on the answer sheet to turn in.

---

**Group Answers:** Write the matching problem number in the correct box.

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**Bonus #1:**

**Bonus #2:**
Flip Your Class
(or even one session)
Without Flipping Out

Session S005

Dr. Kim Granger, St. Louis CC – Wildwood
Thursday, October 28, 2021
AMATYC 2021 in Phoenix, AZ
Agenda

• What is Flipped Teaching
• NSF iFLIP Grant
• Benefits of Flipped Teaching
• Class Flow
• Challenges of Flipped Teaching
Agenda

- **What** is Flipped Teaching
- **NSF iFLIP Grant**
- **Benefits** of Flipped Teaching
- **Class Flow**
- **Challenges** of Flipped Teaching
What is Flipped Teaching?

A teaching method where:

→ The first contact with new concepts occurs outside of class time

→ And the application of content occurs through active and collaborative activity during class time
Agenda

- **What** is Flipped Teaching
- **NSF iFLIP Grant**
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- **Class Flow**
- **Challenges** of Flipped Teaching
Innovative Flipped Learning Instructional Project (IFLIP)

The NSF funded research project aimed at advancing flipped teaching in STEM education

NSF GRANT #1821664
Participating Institutions

- Southern Illinois University Edwardsville (SIUE): a public university located in Edwardsville, IL (4-YI)

- St. Louis Community College (STLCC): a community college system with four campuses across the St. Louis metropolitan area, MO (2-YI)
Pre-COVID iFLIP Study
Summary of Pre-COVID Faculty Data

- Flipped teaching is beneficial but require an adjustment period that may delay a full successful implementation.
- The perceived barriers decreased after repeated implementations.
- Participants were more comfortable implementing flipped teaching after repeated use.
- Feedback grew increasingly positive after repeated implementation.
Student Transition to Online Learning during COVID
iFlip Conclusions

• Flipped Teaching provided effective preparation for faculty and students for online instruction at both institutions.

• Flipped Teaching can be effectively adapted to online instruction preserving some aspects of active learning.
Innovative Flipped Learning Instructional Project (IFLIP)

The NSF funded research project aimed at advancing flipped teaching in STEM education

NSF GRANT #1821664
Agenda

• **What** is Flipped Teaching
• **NSF** iFLIP Grant
• **Benefits** of Flipped Teaching
  • Class **Flow**
  • **Challenges** of Flipped Teaching
Flipped Teaching Benefits Student Learning

- Allows for self-paced learning
- Prevents cognitive overload
- Promotes student engagement with peers
- Promotes student engagement with the instructor
- Allows for active & collaborative activity
Benefits of Flipping...

Community College Center for Student Engagement

Five Benchmarks for Student Engagement:

→ Active & Collaborative Learning
→ Student Effort
→ Academic Challenge
→ Student-Faculty Interaction
→ Support for Learners
Flipped Teaching Benefits Instructors

- Promotes student engagement with the instructor
- Every Class is Energetic and Active!
Agenda

- **What** is Flipped Teaching
- **NSF** iFLIP Grant
- **Benefits** of Flipped Teaching

- **Class Flow**
- **Challenges** of Flipped Teaching
Flipped Teaching Flow

**Before:**

- Pre-class assignment (video, reading, activity)

There must be a grade that is connected to the pre-class assignments, such as a graded activity or an in-class assessment.
Flipped Teaching Flow

**Before:**
• Pre-class assignment (video, reading, activity)

**During:**
• Assessment of pre-class assignment
• Mini Lecture
• Collaborative activities
Flipped Teaching Flow

**Before:**
- Pre-class assignment (video, reading, activity)

**During:**
- Assessment of pre-class assignment
- Mini Lecture
- Collaborative activities

**After:**
- Post-class practice
FLIPPED LEARNING

EXCITING CLASSROOM OPPORTUNITIES TO INFINITY AND BEYOND!
Agenda

- **What** is Flipped Teaching
- **NSF iFLIP** Grant
- **Benefits** of Flipped Teaching
- Class **Flow**
- **Challenges** of Flipped Teaching
Flipped Teaching Challenges

- Preparation of class materials
- Student perception
- Student effort
YOU DIDN'T WATCH THE VIDEO?

I CAN'T WAIT TO HEAR YOUR EXCUSE.
Part 2: Get Students Fired Up for Math with Collaborative Learning Activities

The use of Collaborative Learning Activities makes class fun and promotes deeper learning. The presenter has been using collaborative learning for 25 years and will share an easy process that you can implement as early as next week to create and facilitate effective collaborative activities.

S074
Friday @ 2:55pm
in Encanto B