

September 25, 2026

National Quesadilla Day

Today in History:

Bill of Rights sent to the States (1789)

Central High School integrated (1957)

Number of the Day: 2526

$2526 = 2 \times 3 \times 421$

2526 is 666 in base 20

Fun Fact:

Volleyball was invented in 1895.

Quote of the Day:

“There is considerable overlap between the intelligence of the smartest bears and the dumbest tourists.”

Yellowstone Park Ranger on why it is hard to design a bear-proof garbage can.

Today's Weather:

Sunshine and a few clouds, high 67°

PUBLIC LECTURE IN MATHEMATICS AND STATISTICS

Dr. Shankar Bhamidi

University of North Carolina at Chapel Hill

Friday, Sept. 25, 2026

1:00 to 2:00 p.m. Schmitt Auditorium

Reception to follow in Hovorka Atrium

*A Mathematical Journey Through Networks, Chemistry,
fixation of popularity, and Machine Learning.
Meditation on “what is the use?”*

What is the use of learning something when its connection to our future plans is nowhere in sight? Students ask this question, and I often did too—especially when curiosity pulled me toward a topic with no obvious career payoff. In this public lecture, I will tell a story about what can happen when we follow that curiosity, echoing John Lennon’s reminder that life unfolds while we are busy making plans. Our story begins with the minimum spanning tree: how can we connect a network as cheaply as possible? Pursuing this question led through unrelated places: particles merging in colloidal chemistry, the multiplicative coalescent, Erdős’s leader problem and the fixation of popularity, and network models showing how limited choice influences group formation. Each detour supplied an essential piece of the original puzzle. No technical background is assumed. The broader message is personal: many of my most rewarding discoveries came from questions whose immediate “use” I could not see, while things pursued purely for a specific career goal often led nowhere interesting.



**CASE WESTERN RESERVE
UNIVERSITY**
College of Arts and Sciences

Mathematics, Applied Mathematics,
and Statistics



RSVP here

Math 121

Quiz #16

The power P (in watts) delivered by a battery to an apparatus of resistance R (in ohms) is

$$P = \frac{5R}{(R+2)^2}$$

Find the rate of change of power with respect to resistance for $R = 3$ ohms.

$$\begin{aligned}\frac{dP}{dR} &= \frac{(R+2)^2(5) - (5R)(2)(R+2)}{(R+2)^4} \Big|_{R=3} \\ &= \frac{(25)(5) - (15)(2)(5)}{625} \\ &= \frac{125 - 150}{625} = -\frac{1}{25} \frac{\text{WATTS}}{\text{OHMS}}\end{aligned}$$

HIGHER DERIVATIVES

$$f'(x) \quad y' \quad \frac{dy}{dx} \quad \frac{df}{dx} \quad \text{1ST DERIVATIVE}$$

$$f''(x) \quad y'' \quad \frac{d^2y}{dx^2} \quad \frac{d^2f}{dx^2} \quad \text{2ND DERIVATIVE}$$

$$\frac{d^2y}{dx^2} = \frac{d}{dx} \left(\frac{dy}{dx} \right)$$

EXAMPLE 1

$$f(x) = 3x^2 + 2x + 5$$

$$\frac{df}{dx} = 6x + 2$$

$$\frac{d^2f}{dx^2} = 6$$

EXAMPLE 2

$$f(x) = 3e^x + x$$

$$f'(x) = 3e^x + 1$$

$$f''(x) = 3e^x$$

3rd $f'''(x) = 3e^x$

4th $f^{(4)}(x) = 3e^x$

6th $f^{(6)}(x) = 3e^x = f^{(5)}(x) = f^{(4)}(x)$

$$f^{(N)}(x) \quad N \text{ TH DER.}$$

$$f(x) = x^5 + x^4 + x^3 + x^2 + x + 1$$

$$f'(x) = 5x^4 + 4x^3 + 3x^2 + 2x + 1$$

$$f''(x) = 20x^3 + 12x^2 + 6x + 2$$

$$f'''(x) = 60x^2 + 24x + 6$$

$$f^{(4)}(x) = 120x + 24$$

$$f^{(5)}(x) = 120$$

$$f^{(6)}(x) = 0$$

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$$f(x) = \frac{x+1}{x-1}$$

$$f'(x) = \frac{\cancel{(x-1)}(1) - \cancel{(x+1)}(1)}{(x-1)^2}$$

$$= \frac{-2}{(x-1)^2} = \frac{-2}{(x^2-2x+1)}$$

$$f''(x) = \frac{\cancel{(x^2-2x+1)}(0) - (-2)(2x-2)}{(x^2-2x+1)^2}$$

$$= \frac{4x-4}{(x^2-2x+1)^2}$$