

Classroom to Campus: Math and Stats Challenge

Grade 12 – MCT4C

Topic A: Exponential Functions Estimating Beverage Temperature Over Time

You're at a café with friends, enjoying a freshly brewed cup of coffee. You want to determine how long it will take for the coffee to cool to a drinkable temperature of 50°C.

The temperature of the coffee over time can be modelled by:

$$T = 71.25(0.96)^t + 19.50$$

Where T is temperature in degrees Celsius, and t is time in minutes.

- Sketch the graph of the temperature function and describe its key features (e.g., intercepts, asymptotes, long-term behavior).
- Determine the initial temperature of the coffee. *(Round your final answer to two decimal places.)*
- Determine the time (in minutes) it will take for the coffee to cool to 50°C. *(Round your final answer to two decimal places.)*
- If you prefer your coffee at 40°C, how much additional time (in minutes) will it take to cool from 50°C to 40°C? *(Round your final answer to two decimal places.)*
- Determine the room temperature (in °C). *(Round your final answer to two decimal places.)*
- If the coffee were placed in a refrigerator at 5°C how would the cooling rate change? Discuss the effect of a lower ambient temperature on the cooling process.

**DON'T
MISS THIS
CHANCE TO
SHINE!**

**Explore your
potential with
Mohawk College!**

**Put your math and
stats skills to the test**

Submit your solutions for a chance to win an exclusive experience: selected students and their teachers will receive a VIP guided tour of Mohawk College, where they'll get to be a college student for a day—exploring labs, meeting faculty, and discovering exciting career opportunities.

To submit solutions email
[**Sigma@mohawkcollege.ca**](mailto:Sigma@mohawkcollege.ca)

**Take your skills to the
next level!**

Register for the annual SIGMA @ Mohawk College Competition, designed for students in college-stream math courses. Test your problem-solving abilities, compete against peers and experience math and stats in action with real-world applications.

To learn more visit
[**mohawkcollege.ca/Sigma**](http://mohawkcollege.ca/Sigma)

