PASS
PEER ASSISTED STUDY SESSIONS

FACIL: Neil Douglas **WEEK:** 4

EMAIL: neildouglas@cmail.carleton.ca **OFFICE:** CSAS, 4th Floor MacOdrum Library

COURSE: ECOR 2606 **OFFICE HOURS:** Friday 3:00 pm to 4:00 pm

Opener: (10 mins)

- Core concepts to be covered today
  - Finding roots using the Newton search method
  - Finding roots using the secant search method

But first, we're going to do a Kahoot quiz to quickly review what we learned about bisection search in last week's workshop. Answer the Kahoot questions based on the bisection search presented below.

Function: $3\sin\left(\frac{1}{2}x\right) = -1$

Root-finding form of this function: _____

Step	X_L	X_H	X_R	f(X_L)	f(X_H)	f(X_R)
1	5	10		+	-	
2						

Notes:

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Activity 1: Newton search (30 mins)

For this activity, we will be using the Newton search method to find a root of the following function: $x^2 + 2 = 5x$.

Part A – First let's watch a short video explaining the theory behind a Newton search. Use the space below to take some notes.

Part B – Let's apply what we've learned about Newton searches to explain graphically how a Newton search locates a root of $x^2 + 2 = 5x$. Our initial guess is x=3.5.

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Part C – Manually perform three iterations of a Newton search on $x^2 + 2 = 5x$. What is our best guess at the root after three iterations? What is the absolute error of this guess? Round all answers to four decimal places.

Function in root-finding form: _____

Derivative of the function: _____

Step	X_k	X_{k+1}	f(X_{k+1})	E_A
1	3.5000			
2				
3				

Rough work:

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Activity 2: Secant search (30 mins)

For this activity, we will be using the secant search method to find a root of the same function presented in Activity 1.

Part A: First let's watch a quick video explaining the theory behind a secant search. Use the space below to take some notes.

Part B: Let's apply what we've learned about secant searches to explain graphically how a secant search locates a root of $x^2 + 2 = 5x$. The two starting points that we are given are x=2.1 and x=4.1.

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Part C: Manually perform three iterations of secant search on $x^2 + 2 = 5x$. What is our best guess of the root after three iterations? What is the absolute error on this estimation? Round all answers to four decimal places.

Function in root-finding form: _____

Step	X_{k-1}	X_k	X_{k+1}	f(X_{k+1})	E_A
1	2.1000	4.1000			
2					
3					

Rough work:

Closer: What would you like to see on the mock-midterm? (5mins)

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