SIT190 - PAGE - WEEK 8

TRIMESTER 1, 2024

Task 1: Give-it-a-go and Give-it-a-go-again

The purpose of the Give-it-a-go and Give-it-a-go-again quizzes is to help you identify what you have understood and to identify any areas that you need further help in. This task is about reflecting on those attempts and acting on them to achieve your learning goals.

You must attempt all questions and achieve at least 60% in the Give-it-a-go-again quiz.

Usually we would expect an improvement in the Give-it-a-go-again quiz compared to the Give-it-a-go quiz.

(1) Attempt the Give-it-a-go quiz early in the week. Take a screenshot of the results.
(2) Review your quiz results.
   (a) If you did not achieve full marks, identify a question that you need answered in order to understand the material.
   (b) Identify and implement a strategy to address this question. For example, you might submit a question to the weekly discussion forum, visit the Maths Mentors or the HelpHub, ask the unit chair, or do further reading.
   (c) Describe the question you identified and your strategy for addressing it (2-4 sentences).
(3) Attempt the Give-it-a-go-again quiz later in the week. Take a screenshot of the results.
   Note: your screenshot should include the summary of results including the session ID. Remember, you must achieve at least 60% in this quiz.
(4) Submit a short reflection (approximately 80 words) on your improvement between the Give-it-a-go and Give-it-a-go again quizzes. Explain how your strategy helped. If it was not useful, explain why and suggest what you might do next time.

Task 2: Derivatives

(1) If $f(x) = 4x^2 + 1$, find $\lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$.

(2) Table 1 gives the displacement of a vehicle from the starting position. Give the average rate of change in displacement between 4 and 8 hours.

Table 1

Time (hours)	0	2	4	6	8	10
Displacement (km)	0	135	210	298	329	428

(3) Find the derivative of the following functions:

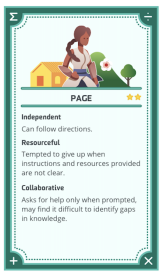
(a) $f(x) = 7x^3 - \frac{5}{x^3} - \frac{4}{x^{-1}} - \frac{5}{\sqrt{x+1}}$

(b) $y = 3\cos(4x^2) - 2\sin(\frac{x}{3}) + \tan(x)$

(c) $y = 3e^{7x^2}$

(d) $y = \ln(5x^3)$
(Note: You will need to use a log rule before differentiating 3(d).)

(4) Sketch the graph $y = x^2 + 4x - 13$.
- Find the derivative of this function and use this to find the stationary point.
- Give all working for finding the x and y-intercepts.
- Use a sign diagram or the second derivative test to identify if the stationary point of $y = x^2 + 4x - 13$ is a local maximum or a local minimum.



Submission

To successfully complete this assessment, you must submit:

Task 1: Quizzes, Question, Strategy and Reflection
- 1.1 Screenshot of results of Give-it-a-go quiz.
- 1.2 Screenshot of results of Give-it-a-go-again quiz (You must achieve at least 60% in this quiz).
- 1.3 Describe the question you identified and your strategy for addressing it (2-4 sentences).
- 1.4 Submit a short reflection (approximately 80 words) on your improvement between the Give-it-a-go and Give-it-a-go again quizzes.

Task 2: Derivatives
- 2.1 The $\lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$ showing all working.
- 2.2 The average rate of change including all working.
- 2.3 The derivatives of the functions including all working.
- 2.4 A hand-drawn sketch of the graph showing the intercepts and stationary points. Show all working for finding the stationary point and and for finding the intercepts. Classify the stationary point using one of the methods and showing all working.

Useful resources

- Watch, Read and Think Section 7:
  - Section 7.2 - will help with Q2.1 and 2.2
  - Section 7.3 gives the power rule which will help with Q 2.3(a).
  - Section 7.4 demonstrates the use of derivative to find and classify stationary points (including a video).
  - Section 7.5 gives the rules for finding the derivative of trigonometric functions $\sin(kx)$ and $\cos(kx)$, and the functions $\ln(x)$ and e^{kx}.
- Treasure Chests ("Finding the derivative using first principles', 'Derivatives of polynomials', 'Sign test for classifying stationary points' and 'Finding the derivative').
- You may also find it useful to refer to the Formula Sheet. (Remember, you can differentiate term by term.)