[Skip to main content](https://my.uopeople.edu/mod/assign/view.php?id=476251" \l "maincontent)

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* [My Courses](https://my.uopeople.edu/my/courses.php)
* [Resources](https://my.uopeople.edu/mod/assign/view.php?id=476251)
* [Links](https://my.uopeople.edu/mod/assign/view.php?id=476251)
* [Instructors](https://my.uopeople.edu/mod/assign/view.php?id=476251)
* [My Media](https://my.uopeople.edu/local/mymedia/mymedia.php)

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[](https://my.uopeople.edu/mod/assign/view.php?id=476251)

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Open course index

Open block drawer

1. [MATH 1201-01 - AY2025-T5](https://my.uopeople.edu/course/view.php?id=9060#section-1)
2. Math Assignment Unit 1

**Math Assignment Unit 1**

Completion requirements

**To do:**Make a submission

**Opened:** Thursday, 19 June 2025, 8:05 AM

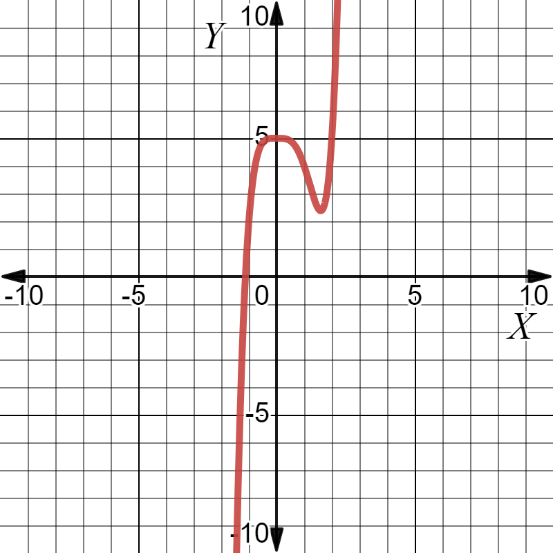
**Due:** Friday, 27 June 2025, 7:55 AM

This assignment assesses your skills/knowledge on identifying functions, the domain and range, using functions to calculate the rate of change and extrema, and interpret the graphs of functions.

In order to model real-world scenarios and transformations with limits, it's important for us to understand functions, domains, and ranges. Additionally, proficiency in rate of change and slopes helps with analyzing dynamic processes and data trends. Knowledge of extrema enables us to optimize problem-solving and time management. With this understanding, please answer the following questions and show stepwise calculations. Please explain your reasoning wherever necessary.

You are required to complete all the 5 tasks in this assignment. When you are instructed to make a graph in this assignment, please use[GeoGebra graphing tool](https://www.geogebra.org/calculator).

**Task 1.** Interpret the following graph in detail:



(i) Identify the domain and range.

(ii) Does this graph represent a function and a one-one function. Why/Why not? Provide a detailed explanation/justification.

**Task 2**.  Before working on this task 2, please read the following readings:

* + Reading section [1.2 Functions](https://yoshiwarabooks.org/mfg/functions.html) of the following textbook will help you in understanding the concepts better.

Yoshiwara, K. (2020). [*Modeling, functions, and graphs*.](https://yoshiwarabooks.org/mfg/colophon-1.html) American Institute of Mathematics. <https://yoshiwarabooks.org/mfg/colophon-1.html>

*Imagine that the export of Avocados from Indonesia is described by the relation:*

E(P) = P – 10000, P ≥10000 where P represents the production (in thousand) of Avocados.

On the basis of the above scenario, answer the following questions:

(i) Draw the graph of E(P).

(*Use graphing tool for drawing the graphs, use a scale where each unit represents one thousand on both the X and Y axes (Ex: consider 1= 1000)*).

Using the graph:

(ii) Determine if E(P) is a function of P.

(iii) Find the domain and range of E(P).

(iv) Find how much export is done for 70 and 20 thousand of production.

(v) What are dependent and independent variables in this problem?

**Task 3.** The following graph (representing f and g) illustrates the relationship between the weights (y in tons) of two animals and their respective lengths (x in feet).

(i) In the event of intersection on the graph, determine the rates of change in length concerning weight for both categories. What conclusions can be drawn from this?

(ii) Select any two points on each of the graphs f and g (designated as C and D on f, and E and F on g, excluding O and A), and calculate the slopes of the lines CD and EF connecting them. What insights can be inferred about their slopes within the context of the problem? Please discuss your findings.

A graph with a line and a red line

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**Task 4**. Use the following graph to explain the local extrema of the function at the given points. Explain clearly how they differ from maximum and minimum values of function. Determine the intervals of all extrema shown in the graph (mention the intervals with the names Ex: (A, B) and specify whether they are increasing or decreasing).

A graph of a function

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**Task 5.**Before working on this task 5, please read the following readings:

* + Reading section 1.4 Function Notation (pages 61-62) of the following textbook will help you in understanding the concepts better.

Stitz, C., & Zeager, J. (2013). [*College algebra*](https://stitz-zeager.com/szca07042013.pdf). Stitz Zeager Open Source Mathematics. [https://stitz-zeager.com/szca07042013.pdf](https://my.uopeople.edu/pluginfile.php/2003172/mod_assign/intro/Stitz%20Zeager.pdf)

*In the highly prosperous nation of 'W', the income tax system is structured as follows:*

*a. Individuals earning up to $2200 are taxed at a flat rate of 10% of their income.*

*b. For those with incomes exceeding $2200 and up to $8945, the taxation scheme is bifurcated:*

* + *The first $2200 of income is taxed at 10%.*
  + *The remainder, above $2200 and up to $8945, is taxed at a rate of 18.5%.*

*c. If an individual's income surpasses $8945, the taxation policy is delineated as follows:*

* + *The initial $2200 of income is taxed at 10%.*
  + *The subsequent income, above $2200 and up to $8945, is taxed at 18.5%.*
  + *Any income exceeding $8945 is taxed at a rate of 30%.*

Based on the above scenario, answer the following questions:

(i) Represent the above rule that country W has made as a piecewise function mathematically using the symbol ≤ or any other relevant symbol.

(ii) Take any income that comes in each slab from the country W and calculate the tax for each segment.

**Submission Settings:**

* + Please answer all the 5 tasks in this Math Assignment.
  + You may write ONE word document that addresses the questions mentioned above. Read the rubric on how you are going to be graded on this assignment.
  + Use APA citations and references if you use ideas from the readings or other sources. For assistance with APA formatting, view the [**Learning Resource Center: Academic Writing**](https://my.uopeople.edu/mod/book/view.php?id=223403).
  + The document should be double-spaced in Times New Roman font, which is no greater than 12 points in size.
  + Use high-quality, credible, relevant sources to develop ideas that are appropriate for the discipline and genre of writing.

**This assignment activity will be assessed by your instructor using the rubric below.**

Top of Form

Add submission

Bottom of Form

**Submission status**

|  |  |
| --- | --- |
| **Attempt number** | This is attempt 1. |
| **Submission status** | No submissions have been made yet |
| **Grading status** | Not graded |
| **Time remaining** | 10 hours 2 mins remaining |

**Grading criteria**

|  |  |
| --- | --- |
| **Rubric** | |
| **1. Graphs-Domain, range and one-one function** | |  |  |  |  | | --- | --- | --- | --- | | (i)Accurately provides a comprehensive analysis of the domain and range using the graph. (ii)Accurately provides a thorough discussion of function and one-one function using the graph.  ***20 points*** | (i) Accurately provides a comprehensive analysis of the domain and range using the graph. (ii)Accurately provides a thorough discussion function, (OR)one-one function using the graph.  ***16 points*** | (i) Accurately provides a comprehensive analysis of the domain and range using the graph, (OR)(ii) Accurately provides a thorough discussion of function and one-one function using the graph.  ***10 points*** | Unable to meet any of the preceding levels  ***0 points*** | |
| **2.Functions and graphs** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | (i) Accurately presented the graph. (ii)Accurately explained if it is a function. (iii)Accurately presented the Domain, and Range: (iv) Accurately calculates export for 70 and 20 thousand. (v)Accurately explains the dependent and independent variables.  ***20 points*** | (i) Accurately presented the graph. (AND) Accurately describes any 3 points of (ii)-(v)  ***16 points*** | (i) Accurately presented the graph. (AND) Accurately describes any 2 points of (ii)-(v)  ***10 points*** | No graph/incorrect graph is present. (AND) Accurately describes more than 1 of (ii)-(v)  ***6 points*** | Unable to meet the preceding levels.  ***0 points*** | |
| **3. Rate of change.** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Accurately calculates the rate of change of length with respect to weight for both categories (ii) Accurately calculates the slopes of the graphs by taking points, and correctly infers about the comparison of length and weight of two animals.  ***20 points*** | Accurately calculates the rate of change of length with respect to weight for both categories (ii) Inaccurately calculates one of the slopes of the graphs by taking points, and correctly infers about the comparison of length and weight of two animals.  ***16 points*** | Accurately calculates the rate of change of length with respect to weight for both categories (ii) Inaccurately calculates the slopes of the graphs by taking points, and incorrectly infers about the comparison of length and weight of two animals.  ***10 points*** | Accurately calculates the rate of change of length with respect to weight for both categories(OR) (ii) Accurately calculates the slopes of the graphs by taking points, and correctly infers about the comparison of length and weight of two animals.  ***6 points*** | Unable to meet any of preceding levels.  ***0 points*** | |
| **4.The local extrema of functions.** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Accurately explains local extrema and the difference between maxima or minima Correctly determines intervals of increase and decrease. Provides a deep analysis of the function's behavior, mentioning extremum values.  ***20 points*** | Accurately explains local extrema. and the difference between maxima or minima Correctly determines intervals of increase and decrease. Provides a deep analysis of the function's behavior, mentioning extremum values on the positive X-axis alone.  ***16 points*** | Accurately explains local extrema. and the difference between maxima or minima. Mentions the extreme values. But did not predict the behavior of function.  ***10 points*** | Accurately explains only local extrema.  ***6 points*** | Unable to meet any of the preceding levels  ***0 points*** | |
| **5. Piecewise Function** | |  |  |  | | --- | --- | --- | | Accurately describes piecewise function. Correctly calculates the taxes at each slab.  ***20 points*** | Describes the piecewise functions with minor errors Incorrectly calculates the taxes at each slab.  ***10 points*** | Inaccurately describes piecewise function with major errors. Incorrectly calculates the taxes at each slab  ***0 points*** | |