UNIT 5 GUIDE

Note: Video titles are clickable links.

Readings Day 25

(1) Read in OpenStax: Section 4.8 from the beginning of the section through Example 4.40, and the subsection entitled "Growth Rates of Functions"

(a) Theorem 4.12: L'Hopital's Rule (0/0 Case)

(b) Theorem 4.13: L'Hopital's Rule (∞/∞ Case)

(c) Theorem 3.13 - Derivatives of Inverse Trig Functions

Videos Day 25

(1) L'Hopital's Rule

Pre-Class Quiz 25

(1) Write in your own words what the expression $\lim_{x\to a} f(x)$.

(2) Find the linear approximation to $f(x) = x^2 + 3x$ at $x = 1$.

◯ (a) L(x) = 4(x - 1) + 5

◯ (b) L(x) = (x - 4) + 5

◯ (c) L(x) = 5(x - 4) + 1

◯ (d) L(x) = 5(x - 1) + 4

◯ (e) L(x) = (x - 5) + 4

(3) What questions do you have about L'Hopital's Rule?

◯ (a) What kind of limits can be found with L'Hopital's Rule?

◯ (b) Can L'Hopital's rule be used on any limit?

◯ (c) How do I apply L'Hopital's Rule?

◯ (d) I have no questions right now

Readings Day 26

(1) Monday will be a review of Unit 4, so there is no pre-reading for Monday.

Videos Day 26

nothing

Pre-Class Quiz 26

(1) What Unit 4 topics do you have questions about?

- ◯ (a) Derivatives of Inverse Trig Functions
- ◯ (b) Derivatives of Logarithmic Functions
- ◯ (c) Implicit Differentiation
- ◯ (d) Finding the Tangent Lines for Implicit Curves
- ◯ (e) Setting up Related Rates Problems
- ◯ (f) Differentiating Relates Rates Equations
- ◯ (g) Solving Related Rates Questions of One of the Rates
- ◯ (h) I have no questions right now

Readings Day 27

(1) Read in OpenStax: Section 2.2

- (a) Definition of a Limit
- (b) Definition of One-Sided Limits
- (c) Definition of Infinite Limits
- (d) Definition of Vertical Asymptote

Videos Day 27

(1) Limit Applications

Pre-Class Quiz 27

(1) Briefly explain why L'Hopital's rule does not apply to the limit $\lim_{x\to 2} \dfrac{x^3}{x+6}$.

(2) Determine the $\lim_{x\to\ 2} \frac{x^3}{x+6}$ either graphically or numerically.

◯ (a) 2

◯ (b) 0

◯ (c) ∞

◯ (d) 2

◯ (e) Does not exist

(3) Determine the limit$\lim_{x\to 9} \sqrt{x-5}$

◯ (a) 9

◯ (b) -5

◯ (c) 2

◯ (d) 4

◯ (e) Does not exist

(4) Determine the limit $\lim_{x\to 0} \sqrt{x-5}$

◯ (a) 0

◯ (b) -5

◯ (c) 5

◯ (d) 1

◯ (e) Does not exist

Readings Day 28

(1) Read in OpenStax: Section 2.4

(a) Definition of Continuity

(b) Definition of Types of Discontinuities

(c) Continuity from the right and the left

(d) Theorem 2.11: The Intermediate Value Theorem

(2) Read in OpenStax: Section 4.6 from the beginning through the Definition of Infinite Limits at Infinity

(a) Definition of Limit at Infinity

(b) Definition of Horizontal Asymptote

(c) **Note:** You do not need to read the "Formal Definition of the Limit"

(3) Read in OpenStax: Section 4.6 from the subsection titled "End Behavior" through Example 4.27

Videos Day 28

(1) Discontinuities

Pre-Class Quiz 28

(1) Briefly describe in your own words what it means for a function to be continuous.

(2) Graph the function $g(x) = \frac{|x|}{x}$ on an interval that contains x = 0. Does the limit $\lim_{x\to 0} \frac{|x|}{x}$, yes or no? [answer1] Is the function $g(x) = \frac{|x|}{x}$ continuous at the point x = 0, yes or no? [answer2]

(3) Graph the function $f(x) = \frac{2x^2-100}{x^2+2}$, look at the graph in differently sized viewing windows and determine, if possible, $\lim_{x\to\infty} \frac{2x^2-100}{x^2+2}$.

◯ (a) 2

◯ (b) 0

◯ (c) ∞

◯ (d) $-\infty$

◯ (e) Does not exist

(4) Which of the following topics do you still have questions about?

◯ (a) Definition of Continuity

◯ (b) How to determine if a function is continuous at a point

◯ (c) Finding limits as x goes to positive or negative infinity

◯ (d) I have no questions right now

Readings Day 29

(1) Read in OpenStax: Section 4.6 from the subsection titled "Guidelines for Drawing the Graph of a Function" through the end of the section.

(a) Problem Solving Strategy - Drawing the Graph of a Function

Videos Day 29

(1) Sketching a Graph

Pre-Class Quiz 29

(1) What will be true about the graph of the function f, if f' is always positive?

◯ (a) The graph of f will always be increasing

◯ (b) The graph of f will always be decreasing

◯ (c) The graph of f will always be concave up

◯ (d) The graph of f will always be concave down

(2) What will be true about the graph of the function f, if f' is always positive, but $f''$is always negative?

◯ (a) The graph of f will always be increasing and concave up.

◯ (b) The graph of f will always be decreasing and concave down.

◯ (c) The graph of f will always be decreasing and concave up.

◯ (d) The graph of f will always be increasing and concave down.

(3) What questions do you still have about curve sketching?

◯ (a) Determining where a function is increasing or decreasing

◯ (b) Where a function is concave up or concave down

◯ (c) Where a function has vertical asymptote(s)

◯ (d) Where a function has a horizontal asymptote(s)

◯ (e) The end behavior of a function

◯ (f) Sketching a function given conditions of the function.

◯ (g) I have no questions right now

Readings Day 30

(1) Friday will be a review for the Unit 5 Quiz, so there is no pre-class reading. Congratulations on making it to the end of the term!

Videos Day 30

nothing

Pre-Class Quiz 30

(1) What questions do you still have about topics in Unit 5?

◯ (a) Using L'Hopital's Rule

◯ (b) Determining limits algebraically

◯ (c) Where a function has vertical asymptote(s)

◯ (d) Where a function has a horizontal asymptote(s)

◯ (e) The end behavior of a function

◯ (f) Sketching a function given conditions of the function.

◯ (g) Determining continuity of a function

◯ (h) I have no questions right now