UNIT 3 GUIDE

Note: Video titles are clickable links.

Readings Day 14

(1) Read in OpenStax: The subsections of Section 3.3 titled "The Product Rule", "The Quotient Rule", and "Combining Differentiation Rules"

(a) Theorem 3.5 - The Product Rule

(b) Theorem 3.6 - The Quotient Rule

(c) Read through to Checkpoint 3.20

Videos Day 14

(1) The Product Rule
(2) The Quotient Rule

Pre-Class Quiz 14

(1) Which of the following expressions is the derivative of a function $y = f(x)\,g(x)$?

◯ (a) f'(x)g'(x)

◯ (b) f(x)g(x) + f'(x)g'(x)

◯ (c) f'(x)g(x) + g(x)f'(x)

◯ (d) None of the above

(2) Which of the following expressions is the correct derivative of the function $y = \frac{f(x)}{g(x)}$?

◯ (a) f'(x) / g'(x)

◯ (b) f(x) / g'(x)

◯ (c) f'(x)g'(x) / f(x)g(x)

◯ (d) None of the above

(3) True or false: to find the derivative of a function, we sometimes should use both the quotient rule and the product rule.

◯ (a) True

◯ (b) False

Readings Day 15

(1) Monday will be a catch-up and review day for the Unit 2 Quiz. You should review the Unit 2 - Study Guide before class on Monday.

Videos Day 15
nothing
Pre-Class Quiz 15

(1) What Unit 2 topics do you still have questions about?

◯ (a) Finding critical points

◯ (b) How to verify a critical point is a local min or max

◯ (c) How to find points of inflection

◯ (d) How to determine where function is increasing and decreasing

◯ (e) How to find where a function is concave up or down

◯ (f) How to find absolute mins and maxs

◯ (g) I don't have any questions right now

Readings Day 16

(1) Read in OpenStax: The subsection of Section 2.4 titled "Continuity over an Interval" from example 2.35 through Theorem 2.10

(a) Theorem 2.10 - Continuity of Trigonometric Functions

(2) Read in OpenStax: Section 3.5

(a) Theorem 3.8 - The Derivatives of sin(x) and cos(x)

(b) Theorem 3.9

(3) Read in OpenStax: The subsection of 3.9 titled "Derivative of the Exponential Function" through Theorem 3.14. Also read Theorem 3.16, part ii, example 3.79, checkpoint 3.53

   (a) Theorem 3.14 - Derivative of the Natural Exponential Function

   (b) Theorem 2.16 - Derivatives of General Exponential Functions

(4) Read in OpenStax: Read example 4.6 and try checkpoint 4.6

Videos Day 16

(1) Trig Functions
(2) Exponential Functions
(3) All about a polynomial

Pre-Class Quiz 16

(1) Find the derivative of $f(x) = x\sin(x)$

◯ (a) $f'(x) = \cos(x)$

◯ (b) $f'(x) = \cos(x) + x\sin(x)$

◯ (c) $f'(x) = x\cos(x) + \sin(x)$

◯ (d) $f'(x) = \cos(x) - \sin(x)$

(2) Find the derivative of $k(x) = \frac{5}{3}e^x x^{\frac{1}{5}}$

◯ (a) $k'(x) = \frac{1}{3}e^x x^{-\frac{4}{5}}$

◯ (b) $k'(x) = \frac{1}{3}e^x x^{-\frac{4}{5}} - \frac{5}{3}e^x x^{\frac{1}{5}}$

◯ (c) $k'(x) = \frac{1}{3}e^x x^{-\frac{4}{5}} + \frac{5}{3}e^x x^{\frac{1}{5}}$

◯ (d) $k'(x) = \frac{1}{3}e^x x^{-\frac{4}{5}} - \frac{5}{3}xe^{x-1}x^{\frac{1}{5}}$

(3) What is the amplitude and period of the function $f(x) = 9\sin\left(\frac{1}{2}x\right)$

◯ (a) Amplitude is 9; period is 1/2

◯ (b) Amplitude is 1/9; period is 1/2

◯ (c) Amplitude is 4π; period is 9

◯ (d) Amplitude is 1/9; period is 4π

◯ (e) Amplitude is 1/2; period is 9

◯ (f) Amplitude is 9; period is 4π

(4) What topics do you still have questions about?

◯ (a) Derivatives of Trig Functions

◯ (b) Derivatives of Exponential Functions

◯ (c) Using Combinations of Derivative Rules

Readings Day 17

(1) Read in OpenStax: Section 3.6

(a) Rule: The Chain Rule

(b) Rule: Power Rule for Composition of Functions

(c) Theorem 3.10 - Using the Chain Rule with Trigonometric Functions

(d) Rule: Chain Rule for a Composition of Three Functions

(e) Rule: Chain Rule using Leibniz's Notation

(2) Read in OpenStax: The subsection of 3.9 titled "Derivative of the Exponential Function" through Checkpoint 3.50
(3) Read in OpenStax: Read example 4.7 and try checkpoint 4.7
(4) Read in OpenStax: Read example 4.12, part b
(5) Read in OpenStax: Read examples 4.34 and 4.36 and try our checkpoints 4.33 and 4.35

Videos Day 17

(1) Chain Rule With Polynomials

(2) Chain Rule With Other Functions

Pre-Class Quiz 17

(1) Decompose the function $y = \cos(3x))$ in the form $y = f(u)$ and $u = g(x)$. Select the correct functions for $y = f(u)$ and $u = g(x)$.

◯ (a) $y = \cos(u)$

◯ (b) $u = \cos(x))$

◯ (c) $y = 3u$

◯ (d) $u = 3x$

(2) Decompose the function $y = e^{\sqrt{x}}$ in the form $y = f(u)$ and $u = g(x)$. Select the correct functions for $y = f(u)$ and $u = g(x)$.

◯ (a) $y = e^u$

◯ (b) $u = e^x$

◯ (c) $y = \sqrt{u}$

◯ (d) $u = \sqrt{x}$

Readings Day 18

(1) Monday will be a continuation of Friday's material, so there is no pre-class reading for Monday.

Videos Day 18

nothing

Pre-Class Quiz 18

(1) Let $y = \sin^7(x)$. . Which of the following is the outer function, $f(x)$, and the inner function, $g(x)$, so that $y = f(g(x))$?

◯ (a) $f(x) = sin(x), g(x) = x^7$

◯ (b) $f(x) = sin^7(x), g(x) = x$

◯ (c) $f(x) = x^7, g(x) = sin(x)$

◯ (d) None of the above

(2) What is the derivative of $y = \sin^7(x))$?

(3) Which of the following topics do you still have questions about in regards to the chain rule? **Choose ALL that apply**.

◯ (a) How to determine f(x) and g(x)

◯ (b) Finding the derivative of f(x) and g(x)

◯ (c) Using the other derivative rules (trig, quotient, etc) inside the chain rule

◯ (d) Understanding the concept of the chain rule