MATH 192

CALCULUS I * FALL, 2025 *

Mon, June 12

Quiz #1 ✓

The Catalog of Curves

Interval Notation
Linear Inequalities
Quadratic Inequalities
Lines: Point-Slope Form
Domain

All six of these documents are described in the emails I've sent you.

HW

Know the branch-function definition of **absolute value**:

$$|x| = \begin{cases} \_\_\_\_\_ & if \_\_\_\_\_ \\ \_\_\_\_\_ & if \_\_\_\_\_ \end{cases}$$

Simplify: $\sqrt{(x-19)^2}$

Solve for x: $|x| < 10$

If $s(t) = 3\sqrt{t}$, find $\bar{v}$, the average velocity, for t = 9 to 144.

Review the problem we did today:

For $s(t) = t^2$, we calculated $v(5)$, the instantaneous velocity at t = 5 to be **10**.

If $s(t) = t^2$, find $v(15)$, the instantaneous velocity at t = 15.

If $s(t) = t^2$, find $v(20)$, the instantaneous velocity at t = 20.

If $s(t) = t^2$, find $v(t)$, the instantaneous velocity at moment t.

Study pages **1–4** from the following link: ***Trig Summary***

Tue, June 13

Quiz #2 ✓

HW

***Mathwithsteve.com* / Trigonometry / Summary**
but skip The Law of Sines, The Law of Cosines, and Area of a Triangle

For Quiz #3, I'll let you use any HANDWRITTEN notes you want.

Wed, June 14

Quiz #3 ✓

HW

I. **Textbook:** Section 3.1, Page 181, Power Rule

One more thing you need to know:

$$D(f+g) = D(f) + D(g)$$

For example, if

$$f(x) = x^3 + 7x^2,$$

then

$$f'(x) = 3x^2 + 14x.$$

Problems: 3, 5, 9, 11, 13, 15, 17, 19, 23, 25, 37, 39

II. Use the **definition** of the derivative $\left(\lim_{h\to 0} \ldots\right)$ to calculate $f'(x)$ for the given function f. Assume that a, b, c, d, and m represent constants.

A. $f(x) = c$ Ans: 0

B. $f(x) = mx + b$ Ans: m

C. $f(x) = ax^2 + bx + c$ Ans: $2ax + b$

D. $f(x) = ax^3 + bx^2 + cx + d$ Ans: $3ax^2 + 2bx + c$

E. $f(x) = \sqrt{mx+b}$ Ans: $\dfrac{m}{2\sqrt{mx+b}}$

F. $f(x) = \dfrac{1}{mx+b}$ Ans: $\dfrac{-m}{(mx+b)^2}$

OR, $-\dfrac{m}{(mx+b)^2}$

Thu, June 15

Quiz #4 ✓

HW

I. **Textbook:** Section 3.1
43 (Don't graph),
51 (Don't graph),
59 (Hint: A horizontal line has a slope of 0.)

II. **Textbook:** Section 3.4
7, 9, 11

III. Find the derivative of each function:

A. $y = 4(7x-1)^{-5}$ B. $y = \dfrac{1}{(3x+5)^7}$

C. $y = \dfrac{2}{(x^3+x+1)^{-8}}$ D. $y = \left(\sqrt{x}+\sqrt[3]{x}\right)^{10}$

IV. Find the <u>equation</u> of the tangent line to the curve $y = \sqrt[3]{x}$ at the point where $x = 8$.

V. Calculate $v(2)$ for the position function $s(t) = (3t+4)^5$.

VI. Use the <u>definition</u> of the derivative to find $f'(x)$. You should be able to check your answers using the Power Rule and the Chain Rule.

A. $f(x) = \sqrt{5x}$ B. $f(x) = \sqrt{x+3}$

C. $f(x) = \dfrac{1}{4x}$ D. $f(x) = \dfrac{1}{x-2}$

VII. Finish Wednesday's HW.

Mon, June 19

Tue, June 20

Review Quiz #4

Review HW

Lecture

Review for Test #1

Quiz #5

Wed, June 21

Lecture

Test #1 ✓

HW

Textbook:

Section 2.2, Page 92, The Limit of a Function

Problems 5, 9, 15, 17

Section 2.3 Example 3

Problems 11, 13, 15, 17

Section 2.6 Examples 1, 2, 9

Problems 3, 5, 7

Thu, June 22

Quiz #6 ✓

HW

Section 3.1, Page 181, *Derivatives of Polynomials and Exponentials*

7, 21, 27, 41 (tangent line), 61

Section 3.2, Page 189, *The Product and Quotient Rules*

1, 3, 5, 7, 9, 11, 25, 27, 31, 35, 37 (tangent line)

Section 3.3, Page 197, *Derivatives of the Trig Functions*

1, 5, 9, 11, 13, 15, 19, 27, 29, 31, 39

Section 3.4, Page 206, *The Chain Rule*

1 – 27 ODD, 33, 37, 39, 41, 43

Mon, June 26

Quiz #7 ✓

HW

A.

3.3 -- 3, 7, 17, 36, 37

3.4 -- 31, 37, 45, 47, 55, 59, 61(a), 65

B. Mimic what we did in class today to find the derivative of $y = \ln x$ at the point where $x = 20$.

C. Use Calculus to prove that the x-coordinate of the extreme point (called the **vertex)** of the parabola $y = ax^2 + bx + c$ is $-\frac{b}{2a}$.

D. For each function, use **CALCULUS** to find where it is increasing, decreasing, concave up, concave down, and then calculate any extreme points (maximum or minimum points):

1. $y = mx + b$, where $m > 0$
2. $y = e^x$
3. $y = \frac{1}{x}$
4. $y = \sqrt{x}$
5. $y = x^2$
6. $y = \sqrt[3]{x}$

Tues, June 27

Quiz #8

HW

3.6 -- 3, 5, 7, 9, 23, 29

4.3 -- 1, 9, 17, 21, 23

Wed, June 28

Review Quiz #8
Rev HW
Lecture

Review for Test #2 ✓

Quiz #9 ✓

Mon, July 3

Lecture

Test #2 ✓

HW

3.5 -- 5, 7, 11, 13, 17, 27, 29, 31

3.9 -- Study Examples 1, 2, 4
Do Problems 3, 5

Tue, July 4

Wed, July 5

Review Test #2

Review HW

Quiz #10

Thu, July 6

HW

1. Derive the formulas for the derivatives of $\sin^{-1} x$ and $\tan^{-1} x$.

2. **3.9** - Related Rates - 3, 5, 7, 9, 15, 17

3. **4.4** - l'Hospital's Rule - 9, 11, 13, 15, 17, 19, 20, 22, 23, 26, 47
   For the even-numbered problems, use your calculator to verify your answer.

4. Problems 2, 4, and 6 from Thursday's handout on Optimization.

5. **4.7** - Optimization - Study Example 2; do problems 1, 17, 19, 25

6. Find the **derivative** of each function:

   A. $y = \sin^{-1}(x^2 + \pi)$

   B. $y = \tan^{-1}(\ln x)$

   C. $y = 10^{\tan x + e^x}$

   D. $y = \log_2(\sin x)$

   E. $y = (\tan^{-1} x)^2$

   F. $y = \sqrt{\sin^{-1}(x^2)}$

   G. $y = \log_5(\ln x)$

   H. $y = 2^{\tan^{-1} x}$

7. Find the second derivative of $y = \tan^{-1} x$.