# Math 10 A

## Syllabus

Instructor: Joe Ferrara

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Textbook: Calculus, Concepts, and Contexts by Stewart
fourth edition

## Midterms

Midterm 1: Mon Jan 27 in lecture
Midterm 2: Mon Feb 24 in lecture

No make up midterms.

Final: Friday March 20, 3:00-5:59pm location TBD

Course website: math.ucsd.edu/~jferrara/10awint20/

## Homeworks

8 written homeworks due Fridays at 3:50

Turn in homework to homework box of your TA

Homework boxes in basement of AP&M

No late homework

### Grading

75% for completion

25% 2 problems graded for correctness

## Grade breakdown

| | |
|---|---|
| Homework | 20% |
| Midterm 1 | 20% |
| Midterm 2 | 20% |
| Final | 40% |

Letter grade scheme

| | | | |
|---|---|---|---|
| 90s | As | 60s | Ds |
| 80s | Bs | >60 | F |
| 70s | Cs | | |

## TAs and Discussion Sections

10 discussion sections on Thursdays
4 TAs

Note: 8am, 9am sections moved to WLH 214

# 1.1 Four Ways to Represent a Function

A <u>function</u> consists of the following data:

1. A collection of inputs
2. A collection of possible outputs
3. A rule that assigns to each input one of the possible outputs.

Formally, let D and E be two sets (collections of objects).
A <u>function</u>, f, from D to E is a rule that assigns to each x in D an unique element f(x) in E.

The collection of inputs, D, is called the <u>domain</u> of f.
The collection of <u>possible</u> outputs, E, is called the <u>target</u> or <u>codomain</u> of f.

The collection of <u>actual</u> outputs, f(x) for x in D, is called the <u>range</u> of f.

In this class, the domain and target of $f$ are almost always collections of numbers.

Doesn't have to be the case though.

## Example 1

$D$ = collection of all people in world

$E$ = collection of all words

$f : D \longrightarrow E$ defined as $f(\text{person})$ = last name of that person

range = collection of all last names

## Graphs of functions

Assume $D, E$ are collections of numbers.

$f : D \longrightarrow E$ function from $D$ to $E$

The <u>graph</u> of $f$ is ~~the~~ all the pairs $(x, f(x))$ where $x$ is in $D$.

graph of $f = \{ (x, f(x)) : x \text{ is in } D \}$

## Example 2

$f(x) = x^2$, $D = \mathbb{R}$, $E = \mathbb{R}$ range $= [0, \infty)$

means all y such that $0 \le y < \infty$

graph of f

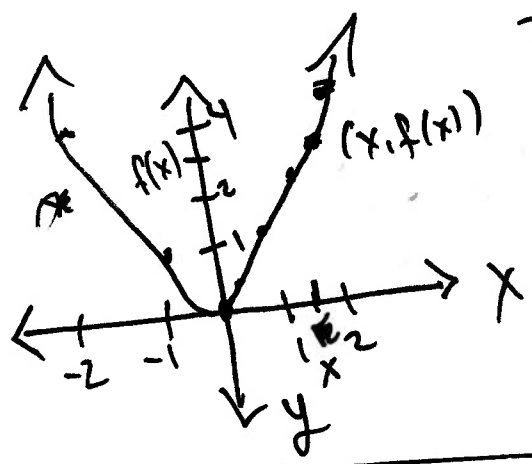
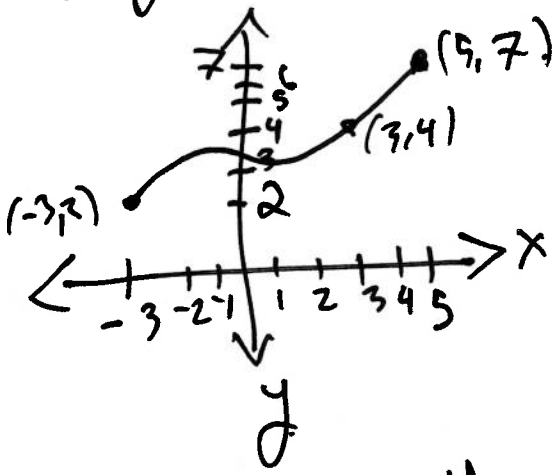



table of values

| x (inputs) | $f(x) = x^2$ |
|---|---|
| $-2$ | $f(-2) = (-2)^2 = 4$ |
| $-1$ | 1 |
| 0 | 0 |
| 1 | 1 |
| $\sqrt{2}$ | 2 |
| 2 | 4 |

## Example 3

Graph of a function, f




$f(3)=4$

D = domain = $[-3,5]$ = all $x$, $-3 \le x \le 5$

range = $[2,7]$ = all $y$, $2 \le y \le 7$

not specified what target E is

could be $\mathbb{R}$, $[2,7]$, $(0,\infty)$

or any set of numbers containing $[2,7]$

## Four ways to represent a function

- verbally (by a description in words) — example 1
- numerically (by a table of values) — example 2
- visually (by a graph) — example 2 and 3
- algebraically (by a formula) — example 2

(*) Need to be able to go between the different descriptions. (*)