Math 01124
Reasoning with Functions

Tuesday, September 3

Instructor: Adam Abrams

Section 17
CRN (Course Registration Number) 45656
Tuesday/Thursday/Friday 3:30 - 4:45 pm

Topics

Basic operations with numbers and variables

Functions in general

Polynomial and rational functions

Exponential and logarithmic functions

Policies and files

See **theadamabrams.com/01124**

Grades

The course grade is determined using

- six quizzes (15 points each), but the lowest score is ignored;
  - up to 2 points per quiz can be earned by completing homework;
- one final exam (20 points);
- participation (5 points).

This makes $15 \times 5 + 20 + 5 = \mathbf{100}$ total possible points.

Points	[0, 60)	[60, 70)	[70, 80)	[80, 90)	[90, 100]
Grade	F	D^-, D, D^+	C^-, C, C^+	B^-, B, B^+	A^-, A, A^+

Cutoffs for – and + to be determined later.

Accessibility

Office of Accessibility Services
Academic Success Center

- Office: 304 Savitz Hall
- Website: rowan.edu/studentaffairs/asc/
- Phone: (856) 256-4259

If you need extra time on exams, course materials in a different format, or other **accommodations**, please talk to me!

Me

Adam Abrams

- “Adam” or “Dr. Abrams” or “Professor Abrams” or variants

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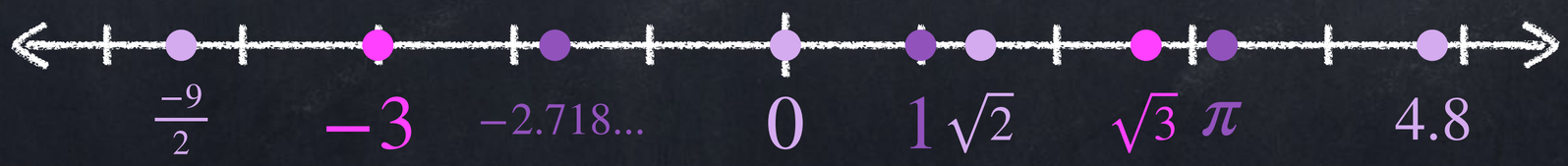
- Possible office hours: Wednesdays 12 - 2 pm
  Fridays 10 - 11 am

Language and survey

Draw a cube

Types of numbers

- **Natural** numbers: $0, 1, 2, 3, 4, \ldots$ (in some books, only $1, 2, 3, 4, \ldots$)
- **Integers**: $\ldots, -3, -2, -1, 0, 1, 2, 3, 4, \ldots$
- **Rational** numbers are all the numbers that *can* be written as one integer divided by another. Examples: $\frac{1}{2}, \frac{-2}{3}, 1.5, \frac{8}{1} = 8, 0, \frac{-5}{4}$
- **Real** numbers are all the values on a number line. Examples:



- **Complex** numbers are not part of this course.

Real numbers that are not rational are called **irrational**.

A number cannot be both rational and irrational, but the other types overlap.

- All natural numbers are rational numbers (for example, 5 is also $\frac{5}{1}$, so it can be written as one integer divided by another).
- All rational numbers are real numbers.

Examples:

- 18 is natural → also integer and rational and real.
- $\frac{-2}{5}$ is rational → also real.
- $\sqrt{7}$ is irrational → also real.

Properties of + and ×

Commutativity

- $a + b = b + a$
- $a \times b = b \times a$, also written $a \cdot b = b \cdot a$ or just $ab = ba$
- Note powers are *not* commutative: $a^b \neq b^a$.

Associativity

- $a + (b + c) = (a + b) + c$
- $a(bc) = (ab)c$

Distributive: $a(b + c) = ab + ac$

Properties of + and x

Identity

- $a + 0 = a$
- $a \times 1 = a$

Inverse

- $a + (-a) = 0$, also written $a - a = 0$
- $a \times \frac{1}{a} = 1$, also written $\frac{a}{a} = 1$

Calculate $(5 \times 8) \times \frac{1}{8}$.

Calculate $(5 + 8) \times \frac{1}{8}$.

Order of operations

"**PEMDAS**" is a way to help remember

① **P**arentheses

② **E**xponents

③ **M**ultiplication and **D**ivision (left to right)

④ **A**ddition and **S**ubtraction (left to right)

Examples: $-3^2 =$ $(-3)^2 =$

$(5+3)^2 =$ $5+3^2 =$ $5^2+3^2 =$

$2+7\times 3 =$ $2+(7\times 3) =$

Task 1: Plug $x = 5$ into $4x + 9$.

Task 2: Plug $t = -6$ into into $\frac{t^2}{2}$.

Exponents

$9^2 =$

$9^{-2} =$

$9^{1/2} =$