# CSCE 222-200 Discrete Structures for Computing

**Fall 2024**


**Instructor:** Dr. Jianer Chen
**Office:** PETR 428
**Phone:** (979) 845-4259
**Email:** chen@cse.tamu.edu
**Office Hours:** T+R 2:00pm–3:30pm

**Teaching Assistant:** Evan Kostov
**Office:** EABC Cubicle 6
**Phone:** (469) 996-5494
**Email:** evankostov@tamu.edu
**Office Hours:** MW 4:15pm-5:15pm


## Assignment # 1

**(Due September 5)**

**1.** Prove by induction that $3^n < n!$ if $n$ is an integer greater than 6.

**2.** (a) Find a formula for $\frac{1}{1\cdot 2} + \frac{1}{2\cdot 3} + \cdots + \frac{1}{n(n+1)}$ by examing the values of this expression for small values of $n$.
(b) Prove by induction the formula you conjectured in part (a).

**3.** Prove by contradiction that if $x^3$ is irrational, then $x$ is irrational.

**4.** Prove by contradiction that $\sqrt{2} + \sqrt{3}$ is irrational.

**5.** Let $p$, $q$, and $r$ be the propositions:

$p$: You get an A on the final exam;
$q$: You do every exercise in this book;
$r$: You get an A in this class.

Write each of the propositions below using $p$, $q$, $r$ and logical operators:

(a) You get an A in this class, but you do not do every exercise in this book.
(b) You get an A on the final, you do every exercise in this book, and you get an A in this class.
(c) To get an A in this class, it is necessary for you to get an A on the final.
(d) You get an A on the final, but you do not do every exercise in this book; nevertheless, you get an A in this class.
(e) Getting an A on the final and doing every exercise in this book is sufficient for getting an A in this class.
(f) You will get an A in this class if and only if you either do every exercise in this book or you get an A on the final.

**6.** For each of the compound propositions below, use the conditional-disjunction equivalence to find an equivalent compound proposition that does not involve conditionals:

(a) $\neg p \rightarrow \neg q$; (b) $(p \vee q) \rightarrow \neg p$; (c) $(p \rightarrow \neg q) \rightarrow (\neg p \rightarrow q)$;