CSCI 301, Winter 2017
Math Exercises #1

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Exercises for Section 1.1

C. Find the following cardinalities

30. $|\{\{1,4\},a,b,\{\{3,4\}\},\{\emptyset\}\}| = 5$

Exercises for Section 1.3

A. List all the subsets of the following sets.

8. $\{\{0,1\},\{0,1,\{2\}\},\{0\}\}$

$\{0,1\}$

$\{0\}$

$\{\}$

$\{0,1,\{2\}\}$

$\{\{0,1\},\{0,1,\{2\}\},\{0\}\}$

$\{0,1\},\{0\}$

$\{\{0,1,\{2\}\},\{0,1\}\}$

$\{\{0,1,\{2\}\},\{0\}\}$

Exercises for Section 1.4

A. Find the indicated sets.

12. $\{X \in \mathcal{P}(\{1,2,3\}) : 2 \in X\}$

$\{\{2\},\{1,2\},\{2,3\},\{1,2,3\}\}$

B. Suppose that $|A| = m$ and $|B| = n$. Find the following cardinalities.

18. $|\mathcal{P}(A \times \mathcal{P}(B))|=2^{m2^n}$

Exercises for Section 2.5 Write a truth table for the logical statements in problems 1–9:

8. $P \vee (Q \wedge \neg R)$

P	Q	R	$P \vee (Q \wedge \neg R)$
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	T
F	T	T	F
F	T	F	T
F	F	T	F
F	F	F	F

Exercises for Section 2.10 Negate the following sentences.

8. If x is a rational number and $x \neq 0$, then $\tan(x)$ is not a rational number.

There exists an x and $x \neq 0$, such that $\tan(x)$ is a rational number.

Exercises for Section 3.1

4. Five cards are dealt off a standard 52-card deck and lined up in a row. How many such lineups are there in which all 5 cards are of the same suit?

52 * 12 * 11 * 10 * 9 = 617,760 Possible Lineups

Exercises for Section 3.2

8. Compute how many 7-digit numbers can be made from the digits 1,2,3,4,5,6,7 if there is no repetition and the odd digits must appear in an unbroken sequence. (Examples: 3571264 or 2413576 or 2467531, but not 7234615.)

(4 * (4! * 3!)) = 576 Numbers

Exercises for Section 3.3

12. Twenty-one people are to be divided into two teams, the Red Team and the Blue Team. There will be 10 people on the Red Team and 11 people on the Blue Team. In how many ways can this be done?

$\frac{21*20*19*18*17*16*15*14*13*12*11!}{10!*11!}$ = 352716 Possible Teams

Exercises for Section 3.5

8. This problem concerns 4-card hands dealt off of a standard 52-card deck. How many 4-card hands are there for which all 4 cards are of different suits or all 4 cards are red?

$\frac{26*25*24*23}{4!}$ = 14,950 Red 4-Card Hands

13^4 = 28,561 4-Card Hands of Different Suits

together ... 43,511 Possible 4-Card Hands of Different Suits & Red 4-Card Hands