

# ASTRONOMY 100, Section 1, Fall 2001

## Study Guide

### Chapter 1. From Earth to Universe

- The purpose of this chapter is to get students acquainted with astronomical numbers and know where we are in the universe.

- Exponential notations and powers of 10:

<u>Name</u>	<u>Number</u>	<u>Notation</u>	<u>Prefix</u>	<u>Abbreviation</u>
billion	1,000,000,000	$10^9$	giga	(G)
million	1,000,000	$10^6$	mega	(M)
thousand	1,000	$10^3$	kilo	(k)
ten	10	$10^1$	deca	...
one	1	$10^0$	...	...
one-thousandth	1/1,000	$10^{-3}$	milli	(m)
one-millionth	1/1,000,000	$10^{-6}$	micro	( $\mu$ )

- Calculations with exponential numbers:  $10^a \times 10^b = 10^{a+b}$  ;  $10^a/10^b = 10^{a-b}$
- Comparing exponential numbers: If  $a > b$ , then  $10^a > 10^b$ .

- Distance units:

<u>Name</u>	<u>Notation</u>	<u>Length</u>	<u>Meaning</u>
kilometer	km	$10^3$ m	
astronomical unit	AU	$1.5 \times 10^8$ km	distance between Earth and Sun
light year	ly	$9.5 \times 10^{12}$ km	the distance light travels in a year
parsec	pc	$3.09 \times 10^{13}$ km	the distance at which 1 AU subtends $1''$

- Our location in the universe, and *approximate* sizes of the systems:

(No need to memorize these numbers. Try to appreciate these astronomical numbers.)

Urbana	5 miles	8 km
Illinois	400 miles	$6 \times 10^2$ km
USA	3,000 miles	$5 \times 10^3$ km
Earth	12,736 km	$1.27 \times 10^4$ km
Solar system	80 AU	$1.2 \times 10^{10}$ km
Galaxy (Milky Way)	30 kpc	$9 \times 10^{17}$ km
Cluster of galaxies (the Local Group)	10 Mpc	$3 \times 10^{20}$ km
Universe	20,000 Mpc	$6 \times 10^{23}$ km ???