

## Math 3131 Prof. Pennance – Summary of lecture 2

1. Definition of whole numbers.
2. Cardinality and ordinality.
3. Set model of number.
4. Measurement model of number - position on a scale.
5. Teaching counting
  - (a) Counting backwards.
  - (b) Skip counting by two's fives tens etc. up to 100
  - (c) Counting groups of objects. e.g. 3 groups of 10 balls.
6. Importance of skip counting.
  - (a) Place value system based on skip counting by 10's, 100's, etc.
  - (b) Connection with multiplication tables.
7. Some Systems of Numerals
  - (a) Tallies | | | |
  - (b) Ancient Egyptian
  - (c) Place value systems -decimal system.
8. Ancient Egyptian symbols and their Hindu-Arabic values:
  - (a) | (tally) for 1
  - (b) ∩ (heel) for 10
  - (c) ☉ (scroll) for 100
  - (d) 𐍎 (lotus) for 1,000
  - (e) 𐍈 (finger) for 10,000
  - (f) 𐍉 (fish) for 100,000
  - (g) 𐍊 (person) for 1,000,000
9. Convert 1231322 to Egyptian:  
 𐍊 𐍉 𐍉 𐍈 𐍈 𐍈 𐍆 ☉ ☉ ☉ ∩ ∩ | |
10. Add in Ancient Egyptian:  

$$\begin{array}{r} \text{𐍈} \text{ 𐍈} \text{ 𐍆} \text{ 𐍆} \text{ 𐍆} \text{ ☉} \text{ ∩} \text{ | |} \\ + \text{ 𐍆} \text{ ☉} \text{ ☉} \text{ ☉} \text{ ☉} \text{ ∩} \text{ |} \\ \hline \end{array}$$
11. Subtract in Ancient Egyptian:  

$$\begin{array}{r} \text{𐍈} \text{ 𐍈} \text{ 𐍈} \text{ 𐍆} \text{ 𐍆} \text{ 𐍆} \text{ 𐍆} \text{ 𐍆} \text{ 𐍆} \text{ 𐍆} \text{ ☉} \text{ ☉} \text{ ∩} \text{ | | | |} \\ - \text{ 𐍆} \text{ 𐍆} \text{ 𐍆} \text{ 𐍆} \text{ 𐍆} \text{ ☉} \text{ ☉} \text{ ☉} \text{ | | | |} \\ \hline \end{array}$$
12. Place value system -brief discussion.
13. Advantages:
  - (a) Codes large numbers compactly.
  - (b) Permits arbitrary precision. e.g. 123.456.
  - (c) Standard algorithms.
  - (d) Universally accepted.
14. Roman Numerals
15. Basic symbols
  - (a) I for 1
  - (b) X for 10
  - (c) C (as in century) for 100
  - (d) M (as in millenium) for 1000
16. Auxiliary symbols
  - (a) V for 5
  - (b) L for 50
  - (c) D for 500
17. Subtraction Principal
  - (a) IV means 4
  - (b) IX means 9
  - (c) XL means 40
  - (d) CM means 900
18. MCMXCVII is read M(CM)(XC)VIII which is 1998 in decimal.