

# Expectations for Test 1

## Thursday, February 26, 2009

Review your notes and assigned work over the topics below.

### Chapter 1 Expectations: Getting Started in Learning Mathematics via Problem Solving

You will be expected to:

1. give a general definition of problem solving in mathematics and distinguish between *exercises* and *problems*
2. explain, illustrate, and use Polya's 4-step problem solving process (Activity 1.7):
  - understand the problem
  - devise a plan
  - carry out the plan
  - look back
3. explain, illustrate, apply the following strategies:
  - guess and test (What's My Number?, Poison)
  - use a variable (pigs and hens, Poison, Cereal Boxes and Patio Tiles)
  - draw a picture (pigs and hens, Die Hard, Cereal Boxes and Patio Tiles /Tournament/ Triangular Numbers)
  - look for a pattern (pigs and hens, Cereal Boxes and Patio Tiles, how many squares)
  - make a list (What's My Number?, pigs and hens, Census taker, Constructing Numbers)
  - solve a simpler problem (how many squares)
4. understand why it is important to learn how to solve mathematics problems (Activity 1.7)

### Chapter 2 Expectations: Numeration

You will be expected to:

5. work with a numeration system different than our own (Activity 2.1-2.4), i.e., Tally, Egyptian, Babylonian, Chinese-Japanese, and Roman.
6. compare the characteristics and properties of the Hindu-Arabic numeration system with other systems (2.1-2.4)
7. distinguish between a number, a numeral, and the name of a number (2.2)
8. understand the ideas of face value, place value, a number base, a minimal collection, and the concepts of grouping, trading, and decomposing (i.e., a flat into a long) in any number base.
9. be able to count in another base.
10. explain how to use a number grid to add or subtract whole number and why it works.
11. represent addition or subtraction of whole numbers using base pieces.
12. convert a numeral from any base to base ten and vice versa.
13. write a numeral given in any base in expanded form and understand the place value and face value of any digit.
14. determine the base of a given numeral if you know the number it represents.
15. explain, illustrate, and use the following thinking strategies for learning basic addition and subtraction facts in base 10 (or equivalent ideas in another base):
  - commutativity (turn around facts)
  - counting on by 1 and 2
  - adding zero
  - adding 10
  - combinations to 10 (10's complement)
  - doubles
  - doubles plus 1, doubles plus 2, doubles minus 1, doubles minus 2
  - fact families