Math 3131 Prof. Pennance – Summary of Lecture 8 - Division

1. Definition of Exact Division

   Let m and n be integers such that n is a multiple of m. The *quotient* $n \div m$ is the integer which fits in the blank.

   $$\_\_\_\_\_\_ \times m = n$$

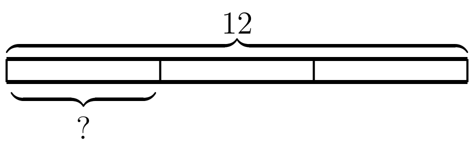
   n is called the *dividend*, and m the *divisor*

   Example: 12 is a multiple of 3. Therefore, $12 \div 3$ is the number which fits

   $$\_\_\_\_\_\_ \times 3 = 12$$

2. Interpretations of Division

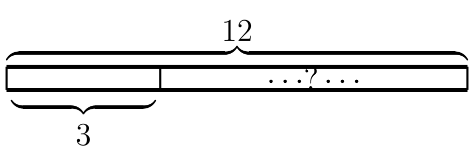
   (a) Partitive interpretation
   $12 \div 3$ is the number in each group if 3 equal groups are formed from 12 individuals. or the measure of each part if a piece of total measure 12 is subdivided into 3 equal parts.

   i. Example. 3 chocolates bars cost a total of 12 dollars. How much does each cost?

   ii. A journey of 12 miles is completed in 3 stages. How long is each stage.

   (b) Measurement Division
   $12 \div 3$ is the number of groups if a group of 12 objects is divided into groups of size 3 or the number of pieces if an object of measure 12 is divided into parts of measure 3.

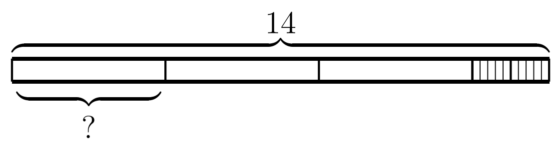
3. "four-fact families"

   (a) $4 \times 3 = 12$ (c) $3 \times 4 = 12$

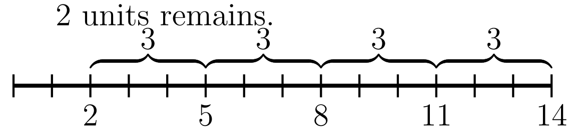
   (b) $12 \div 3 = 4$ (d) $12 \div 4 = 3$

4. Division with Remainder

   (a) Partitive division
   $14 \div 3 = 4\ R\ 2$.
   4 is number in each group if 3 equal groups, are formed from 14 individuals and 2 remain. The groups are as large as possible.

   (b) Measurement division
   $14 \div 3 = 4\ R\ 2$
   4 is the number pieces if an object of measure 14 units is divided into as many pieces as possible of measure 3 units and a piece of measure 2 units remains.

5. The division theorem (quotient remainder theorem)

   For any two whole numbers n and m with $m \neq 0$ there are unique whole numbers q (the quotient) and r (the remainder) such that

   $$n = (q \times m) + r$$

   and $0 \leq r < m$.

   Example. Let $n = 14$ and $q = 3$. Since $14 = (4 \times 3) + 2$, the quotient $q = 4$ and the remainder $r = 2$. Notice $0 \leq r < 3$.