Math 3131 Prof. Pennance – Summary of Lectures 13 and 14

1. Let a and m be non zero whole numbers, then

$$a^m = \underbrace{a \cdot a \cdot \cdots \cdot a.}_{m \text{ times}}$$

2. Let a be a non zero whole numbers, then $a^0 = 1$.

3. Examples.

   (a) $10^0 = 1$

   (b) $10^1 = 10$

   (c) $10^2 = 10 \times 10 = 100$

   (d) $10^3 = 10 \times 10 \times 10 = 1000$

   (e) $2347 = (2 \times 10^3) + (3 \times 10^2) + (4 \times 10^1) + (7 \times 10^0)$

4. Powers of 2:
   $2^0, 2^1, 2^2, \ldots, 2^{10}$

5. Rules for exponents:
   For whole numbers $a, b \neq 0$, m and n.

   (a) $a^m \cdot a^n = a^{m+n}$

   (b) $a^m \div a^n = a^{m-n}$

   (c) $(a^m)^n = a^{mn}$

   (d) $a^m \cdot b^m = (ab)^m$

6. Scientific Notation.
   $c \times 10^n$ where $1 \leq c < 10$.

   (a) $1030 = 1.03 \times 10^3$

   (b) $.0103 = 1.03 \times 10^{-2}$

7. Let n and k be whole numbers. We say *n is divisible by k* if A is a multiple of k, that is if $n = k \cdot a$ for some whole number a.

8. The following are synonymous:

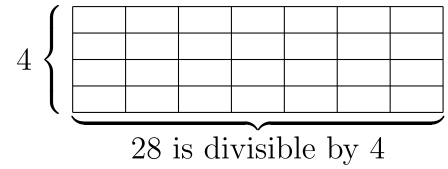
   (a) n is divisible by k.

   (b) n is a multiple of k.

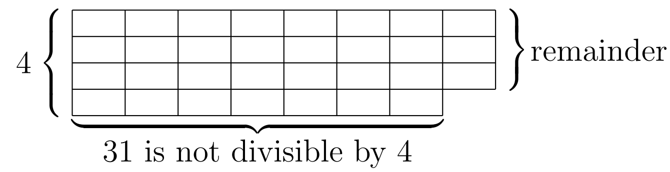
   (c) k divides n.

   (d) k is a factor of n.

9. Example.

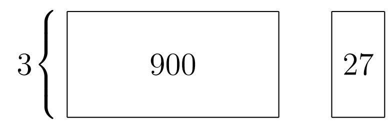


10. Example.

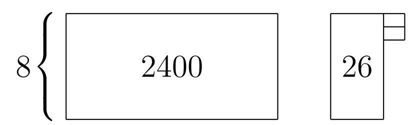


11. Suppose n is a number divisible by k. Then $n + m$ is divisible by k if and only if m is divisible by k.

12. Example. 927 is divisible by 3.



13. Example. 2426 is not divisible by 8 since 2400 is divisible by 8 but not 26.



14. A number is divisible

   (a) by 10 if and only if its last digit is 0.

   (b) by 5 if and only if its last digit is 0 or 5.

   (c) by 2 if and only if its last digit is 0, 2, 4, 6, or 8.

   (d) by 4 if and only if its last two digits form a number divisible by 4.

   (e) by 8 if and only if its last three digits are a number divisible by 8.

   (f) by 3 if and only if the sum of the digits is divisible by 3.

   (g) by 9 if and only if the sum of the digits is divisible by 9.