Integers Worksheet   Name:_____

MA 201

1. Use repeated addition to explain the following multiplication facts.

   (a) $5 \times 4 = 20$

   (b) $5 \times -4 = -20$

2. Let m and n be positive integers. What can you say about $m \times (-n)$?

3. Can you use repeated addition to evaluate -5×4? -5×-4 Let's try to discover what these products should be from another direction.

4. Examine the following products and discuss any patterns that you find.

   (a) 5×5

   (b) 5×4

   (c) 5×3

   (d) 5×2

   (e) 5×1

   (f) 5×0

   (g) 5×-1

   (h) 5×-2

   (i) 5×-3

   (j) 5×-4

   (k) 5×-5

   Let m and n be positive integers. Using the pattern above, what can you say about $m \times (-n)$? Does this conclusion agree with your conclusion in problem 2?

5. Let's use patterns to examine other products of integers. Complete the following multiplication problems by following the pattern.

   (a) i. $5 \times 4 = 20$

       ii. $4 \times 4 = 16$

       iii. $3 \times 4 = 12$

       iv. $2 \times 4 = 8$

       v. $1 \times 4 = 4$

       vi. $0 \times 4 = 0$

       vii. $-1 \times 4 =$

viii. $-2 \times 4 =$

ix. $-3 \times 4 =$

x. $-4 \times 4 =$

xi. $-5 \times 4 =$

Let m and n be positive integers. What can you say about $(-m) \times n$?

(b) i. $-5 \times 5 = -25$

ii. $-5 \times 4 = -20$

iii. $-5 \times 3 = -15$

iv. $-5 \times 2 = -10$

v. $-5 \times 1 = -5$

vi. $-5 \times 0 = 0$

vii. $-5 \times -1 =$

viii. $-5 \times -2 =$

ix. $-5 \times -3 =$

x. $-5 \times -4 =$

xi. $-5 \times -5 =$

Let m and n be positive integers. What can you say about $(-m) \times (-n)$?

6. Based on your conclusions about $m \times n$, $(-m) \times n$, $m \times (-n)$ and $(-m) \times (-n)$, what can you say about the properties of multiplication on the integers?

7. What model for division makes sense when you are talking about division with integers? How would you define division for the integers using this model?

8. Using your definition for division, determine the rules of signs for division of integers.