Name:_____

Part I: In your groups, please discuss the following questions. You do not need to record your answers. Each group will have a chance to share their thinking when we discuss these as a class following your group discussion time.

- What are the primary goals of a University education?

- How does a person learn something new?

- What do you expect to remember from your university courses 20 years from now?

- What role does making mistakes play in the process of learning new things?

- How can we create a classroom environment where taking risks and productive failure (not being afraid to make mistakes and learning from our mistakes) are encouraged and valued?

Part II: Complete as many of the following problems as you can during class time.

1. Find the value of each of the following expressions (without using a calculator). Instead of showing your work, write your answer and briefly state how you found it, emphasizing key observations and properties of integers that you made use of to find the answer.

   (a) $(2^4 - 4^2)(5^7 - 7^5)$

   (b) $(67 - 11 + 925 - 81) + (81 + 11 - 925 - 67)$

   (c) $(125 - 982) + (982 - 43) + (43 - 620) + (620 - 79) + (79 - 125)$

   (d) $75(147 - 229) + 229(75) - 147(75)$

2. In the space provided, write out the Axioms of Integer Arithmetic from page 5 in your textbook:

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3. Discuss the pros and cons of each of the following potential definitions of the additive inverse of an integer x.

   (a) The additive inverse of x is $-x$.

   (b) The additive inverse of x is $0 - x$.

   (c) The additive inverse of x is an integer y such that $x + y = 0$.

   (d) The additive inverse of x is $(-1)x$.

4. Let a, b, and c be integers.

   (a) Prove that $a \cdot 0 = 0$ [Hint: this is not completely obvious. Start with the fact that $0 + 0 = 0$ and multiply both sides by a.]

   (b) Use the definition of an **additive inverse** to prove that $-(ac) = a(-c)$. [Hint: show that $x + y = 0$ for an appropriate choice of x and y]

   (c) Prove that $-(ac) = (-a)c$

   (d) Prove that $-(a + b) = -a - b$.