

Name: \_\_\_\_\_

Math 212 POW Three

Due: Monday, 2/9

### FORMAT

- Write neatly and clearly on white paper (lined or unlined)
- Attach a POW cover sheet to the front of your work for turn in
- Before starting your problem solving process, refer to your POW directions (linked to your Math 212 home page).

Adapted from the Bennett and Nelson *Digit Draw Investigation* (Chapter 6, Section 2) from the Bennett, Burton and Nelson Online Learning Center.

### The Original Digit Draw Game

Make 10 cards labeled with the digits: 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9

Place the 10 cards marked with the digits 0 through 9 in a container and select one at a time without replacement. As each card is selected, write its digit in one of the place value boxes (A, B, C, D) shown below in Figure 1. As soon as each digit is selected it must be written in a box, and no changes can be made. This activity can have several goals. One might be to form the largest possible product; another might be to form the smallest possible product. The activity can be carried out as a game among several people, with each player using each digit as it is selected; or as a solitaire, with one person trying to satisfy a certain goal.

$$\begin{array}{r} \boxed{A} \\ \times \boxed{C} \end{array} \cdot \begin{array}{r} \boxed{B} \\ \boxed{D} \end{array} \quad \text{Figure 1}$$

### POW Questions (a bit different than the original game)

Assume that you are a teacher who is investigating this game, in particular, you are looking at all possible sets of 4 different digits—you aren't just looking at the original game set up.

Carefully explain your answers to each of the following five questions. Use a problem solving approach and clearly communicate your process and thoughts. You did not need to use a formal four-step format unless you prefer to.

*Use the original ten cards and Figure 1 for questions 1, 2 and 3*

1. What is the largest possible product (A.B × C.D) that can be formed? Explain in detail.
2. What is the product (A.B × C.D) that is closest to one? Explain in detail.
3. Once four digits have been written in the boxes, will the product be changed if the digits picked for B and D are interchanged? Compare A.B × C.D and A.D × C.B. Explain in detail.

A similar activity might involve sums, differences, or quotients, and the decimals might be hundredths or thousandths. For example

Use the original ten cards and Figure 2 for question 4

4. What is the difference closest to zero that can be formed by placing six different digits in the following boxes? Explain in detail.

$$\boxed{A} . \boxed{B} \boxed{C} - \boxed{D} . \boxed{E} \boxed{F} \text{ Figure 2}$$

Use the original ten cards and Figure 3 for question 5.

5. What is the largest sum that can be formed by placing six different digits in the following boxes? Explain in detail.

$$\boxed{A} . \boxed{B} \boxed{C} + \boxed{D} . \boxed{E} \boxed{F} \text{ Figure 3}$$