

Dealing Up Determinants

By Colleen Dabney

Algebra II (Grades 9-12)

Time: 1 class period

Objectives:

Students will...

- Find value of determinants.
- Find inverses of 2×2 matrices.
- Solve 3×3 determinants using diagonals.

Goals:

- Enhance math communication among students.
- Use manipulatives to enhance understanding of matrices.

Materials List:

- 1 deck of cards per student pair (jokers=0, ace=1, 2-10, jacks=11, queens=12, and kings=13)
- 1 “Dealing Up Determinants Log” sheet per student pair
- 1 pencil or pen per group
- Scrap paper (optional)
- Calculators (optional)

Directions:

1. Review previously learned material on finding a determinant, finding inverses of 2×2 matrices, and using diagonals to solve 3×3 matrices.
2. Distribute the materials for each group.
3. Instruct each group to shuffle and deal out all the cards between the two players.
4. Tell the students that they will participate in three activities consisting of five rounds each.
5. When a student wins a round, they initial the blank for that activity and round.
6. The winner is determined by who wins the most rounds.

Activity 1: Dominant Determinant

Each player places four cards face-up on their desk, forming a 2×2 matrix. Hearts and diamonds (red cards) are negative and spades and clubs (black cards) are positive. Each player calculates the value of the determinant. Highest score wins the round. Complete four more rounds. Reshuffle and deal again after all the rounds for the activity are completed.

Activity 2: First to the Inverse

Each player deals four cards forming a 2×2 matrix, and then calculates the inverse. The first player to give the correct answer wins the round. Use a graphing calculator to settle any disputed answers. Complete four more rounds. Reshuffle and deal again after all the rounds for the activity are completed.

Activity 3: Dueling Diagonals

Each player deals a 3×3 matrix and repeat columns one and two on their paper. Using diagonals, they solve the matrix. Highest determinant wins the round. Complete four more rounds. Reshuffle and deal again after all the rounds for the activity are completed.

Culminating Activity:

The two players with the most wins are declared the winners. Write their names in the “Winner’s Circle” — Player 1 has the most wins; Player 2 has the next highest number of wins.

Conclusion:

Collect all materials and have students solve one problem per activity on their papers, without cards, as an exit to the lesson.

Dealing Up Determinants Log

Activity 1: Dominant Determinant

Round 1: _____

Round 2: _____

Round 3: _____

Round 4: _____

Round 5: _____



Activity 2: First to the Inverse

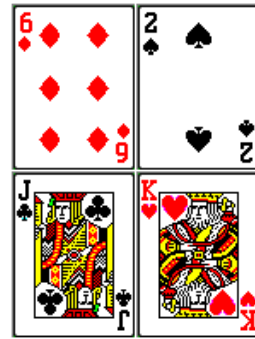
Round 1: _____

Round 2: _____

Round 3: _____

Round 4: _____

Round 5: _____



Activity 3: Dueling Diagonals

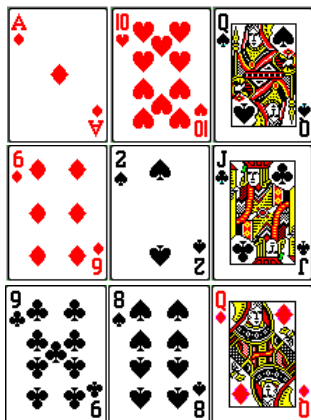
Round 1: _____

Round 2: _____

Round 3: _____

Round 4: _____

Round 5: _____



The Winner's Circle



Player 1: _____

Player 2: _____