

M  
S C R A B B L E  
T  
H

A game of *Scrabble* was played by two mathematics students and peculiarly enough every word was a math word (or almost!).

The game was played on a regulation *Scrabble* board using the standard rules for *Scrabble*. The following abbreviations are used on the board: TWS = Triple Word Score; DWS = Double Word Score; TLS = Triple Letter Score; and DLS = Double Letter Score. The chart below gives the frequency and the value of the Letter tiles:

| Tile | Frequency | Value |  | Tile  | Frequency | Value |
|------|-----------|-------|--|-------|-----------|-------|
| A    | 9         | 1     |  | N     | 6         | 1     |
| B    | 2         | 3     |  | O     | 8         | 1     |
| C    | 2         | 3     |  | P     | 2         | 3     |
| D    | 4         | 2     |  | Q     | 1         | 10    |
| E    | 12        | 1     |  | R     | 6         | 1     |
| F    | 2         | 4     |  | S     | 4         | 1     |
| G    | 3         | 2     |  | T     | 6         | 1     |
| H    | 2         | 4     |  | U     | 4         | 1     |
| I    | 9         | 1     |  | V     | 2         | 4     |
| J    | 1         | 8     |  | W     | 2         | 4     |
| K    | 1         | 5     |  | X     | 1         | 8     |
| L    | 4         | 1     |  | Y     | 2         | 4     |
| M    | 2         | 3     |  | Z     | 1         | 10    |
|      |           |       |  | Blank | 2         | 0     |

Play alternated between the two math students until all but three tiles were played (V, F, and U). You must determine each word played, correct placement on the board, and the score at the end of the game. You are given a clue for each word played. The correct placement of the first letter of the first word has been given to you. Remember that no more than SEVEN additional letters may be placed at one time. In this game, blanks were played only after all tiles of a particular letter were played (the two blanks were played in move #13 and move #17).

| Score    |          | Clues  |
|----------|----------|--|
| Player 1 | Player 2 |  |
| _____    | X        | 1. The name of the point whose coordinates are (0,0).<br>Word begins at (6,8).   |
| X        | _____    | 2. One of the three undefined terms of geometry (a "dot" with zero dimensions). Word begins at (11,11).  |
| _____    | X        | 3. The name for the y-coordinate. Word begins at (6,8).  |
| X        | _____    | 4. The equation $y = 3x - 1$ is called a _____ equation.<br>Word begins at (5,5).  |
| _____    | X        | 5. The line, all of whose y-coordinates equal zero,<br>is called the x-_____. Word begins at (6,3).  |
| X        | _____    | 6. An angle divides the plane into three sets of points:<br>the angle, the exterior, and the _____.<br>Word begins at (8,8).                                       |
| _____    | X        | 7. The formula $\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$ is called the _____<br>formula. Word begins at (11,14).                                   |
| X        | _____    | 8. The mathematical theory, founded by John von Neuman, of<br>optimal behavior in situations involving conflicts is called _____<br>theory. Word begins at (9,14). |
| _____    | X        | 9. One of the four sections into which the two coordinate axes<br>separate the plane. Word begins at (8,12).   |
| X        | _____    | 10. The first number of an ordered pair is called the x-_____.<br>Word begins at (6,10).   |
| _____    | X        | 11. $\frac{y_2 - y_1}{x_2 - x_1}$ is the formula for the _____.<br>Word begins at (9,10).  |
| X        | _____    | 12. Plural of locus. Word begins at (4, 10).   |
| _____    | X        | 13. The identity element for addition. Word begins at (5,13).  |
| X        | _____    | 14. Plane geometry is _____ - dimensional.<br>Word begins at (11,7).   |

| Score    |          | Clues   |
|----------|----------|---|
| Player 1 | Player 2 |   |
| _____    | X        | 15. A statement that is proven to be true. Word begins at (4,1).  |
| X        | _____    | 16. $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ is known as the _____ formula.<br>Word begins at (15,15).  |
| _____    | X        | 17. An arc of more than 180 degrees is called a _____ arc.<br>Word begins at (2,7).   |
| X        | _____    | 18. An angle whose measure lies between 90 and 180 degrees is called _____. Word begins at (13,7).  |
| _____    | X        | 19. The integer that follows four. Word begins at (2,12).   |
| X        | _____    | 20. The segment opposite the vertex angle of an isosceles triangle. Word begins at (11,3).  |
| _____    | X        | 21. In BASIC computer language, this statement assigns a value to a variable. Word begins at (4,3).   |
| X        | _____    | 22. A type of function. Word begins at (3,14).  |
| _____    | X        | 23. In ballistics, the angle between the direction of the axis of a shell and the direction of its velocity vector is the _____ angle.<br>Word begins at (3,8).                     |
| X        | _____    | 24. Owed or owing as a debt. Word begins at (2,2).  |
| _____    | X        | 25. One of the most important items in life insurance is the person's _____. Word begins at (13,12).  |
| X        | _____    | 26. "Every positive integer greater than 1 is prime or can be expressed as a product of prime numbers" is called _____<br>Fundamental Theorem of Arithmetic. Word begins at (13,5). |
| _____    | X        | 27. These two students always _____ about math.<br>Word begins at (1,14).   |
| X        | _____    | 28. Player 2 was left with the letter tiles F, U, and V, which she could not use.   |
| <hr/>    |          |   |
| _____    | _____    | TOTAL SCORE   |

## The Initial Playing Board

|           |          |          |          |          |          |          |          |          |          |           |           |           |           |           |           |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>15</b> | TWS      |          |          | DLS      |          |          |          | TWS      |          |           |           | DLS       |           |           | TWS       |
| <b>14</b> |          | DWS      |          |          |          | TLS      |          |          |          | TLS       |           |           |           | DWS       |           |
| <b>13</b> |          |          | DWS      |          |          |          | DLS      |          | DLS      |           |           |           | DWS       |           |           |
| <b>12</b> | DLS      |          |          | DWS      |          |          |          | DLS      |          |           |           | DWS       |           |           | DLS       |
| <b>11</b> |          |          |          |          | DWS      |          |          |          |          |           | DWS       |           |           |           |           |
| <b>10</b> |          | TLS      |          |          |          | TLS      |          |          |          | TLS       |           |           |           | TLS       |           |
| <b>9</b>  |          |          | DLS      |          |          |          | DLS      |          | DLS      |           |           |           | DLS       |           |           |
| <b>8</b>  | TWS      |          |          | DLS      |          |          |          | DWS      |          |           |           | DLS       |           |           | TWS       |
| <b>7</b>  |          |          | DLS      |          |          |          | DLS      |          | DLS      |           |           |           | DLS       |           |           |
| <b>6</b>  |          | TLS      |          |          |          | TLS      |          |          |          | TLS       |           |           |           | TLS       |           |
| <b>5</b>  |          |          |          |          | DWS      |          |          |          |          |           | DWS       |           |           |           |           |
| <b>4</b>  | DLS      |          |          | DWS      |          |          |          | DLS      |          |           |           | DWS       |           |           | DLS       |
| <b>3</b>  |          |          | DWS      |          |          |          | DLS      |          | DLS      |           |           |           | DWS       |           |           |
| <b>2</b>  |          | DWS      |          |          |          | TLS      |          |          |          | TLS       |           |           |           | DWS       |           |
| <b>1</b>  | TWS      |          |          | DLS      |          |          |          | TWS      |          |           |           | DLS       |           |           | TWS       |
|           | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> | <b>8</b> | <b>9</b> | <b>10</b> | <b>11</b> | <b>12</b> | <b>13</b> | <b>14</b> | <b>15</b> |

ANSWER KEY

| Player #1     |             | Move | Player #2     |             |
|---------------|-------------|------|---------------|-------------|
| <u>Points</u> | <u>Word</u> |      | <u>Points</u> | <u>Word</u> |
| 14            | origin      | 1    |               |             |
|               |             | 2    | 14            | point       |
| 15            | ordinate    | 3    |               |             |
|               |             | 4    | 12            | linear      |
| 20            | axis        | 5    |               |             |
|               |             | 6    | 27            | interior    |
| 13            | midpoint    | 7    |               |             |
|               |             | 8    | 9             | game        |
| 58            | quadrant    | 9    |               |             |
|               |             | 10   | 19            | coordinate  |
| 9             | slope       | 11   |               |             |
|               |             | 12   | 6             | loci        |
| 24            | zero        | 13   |               |             |
|               |             | 14   | 7             | two         |
| 13            | theorem     | 15   |               |             |
|               |             | 16   | 99            | distance ** |
| 12            | major       | 17   |               |             |
|               |             | 18   | 16            | obtuse      |
| 20            | five        | 19   |               |             |
|               |             | 20   | 6             | base        |
| 3             | let         | 21   |               |             |
|               |             | 22   | 14            | kei         |
| 9             | yaw         | 23   |               |             |
|               |             | 24   | 8             | due         |
| 4             | age         | 25   |               |             |
|               |             | 26   | 6             | the         |

| Player #1 |      |       | Player #2 |      |  |
|-----------|------|-------|-----------|------|--|
| Points    | Word | Move  | Points    | Word |  |
| 20        | yak  | 27    |           |      |  |
|           |      | 28    | -9        | ---- |  |
| -----     |      |       | -----     |      |  |
| 234       |      | TOTAL | 234       |      |  |

\*\* The word DISTANCE occupies two triple word scores.  
The rules state that the value for the word is tripled and then tripled again.

### The Solution

|    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |   |
|----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|---|
| 15 |   |   |   |   |   |   |   |   |   |    |    |    |    |    | D  |   |
| 14 | Y | A | K |   |   |   |   |   | G | A  | M  | E  |    |    | I  |   |
| 13 |   |   | E |   | Z |   |   |   |   |    | I  |    |    |    | S  |   |
| 12 |   | F | I | V | E |   |   | Q | U | A  | D  | R  | A  | N  | T  |   |
| 11 |   |   |   |   | r |   |   |   |   |    | P  |    | G  |    | A  |   |
| 10 |   |   |   | L | O | C | I |   | S | L  | O  | P  | E  |    | N  |   |
| 9  |   |   |   |   |   | O |   |   |   |    | I  |    |    |    | C  |   |
| 8  |   |   | Y |   |   | O | R | I | G | I  | N  |    |    |    | E  |   |
| 7  |   | m | A | J | O | R |   | N |   |    | T  | W  | O  |    |    |   |
| 6  |   |   | W |   |   | D |   | T |   |    |    |    | B  |    |    |   |
| 5  |   |   |   |   | L | I | N | E | A | R  |    |    |    | T  | H  | E |
| 4  |   |   |   |   |   | N |   | R |   |    |    |    |    | U  |    |   |
| 3  |   |   |   | L |   | A | X | I | S |    |    | B  | A  | S  | E  |   |
| 2  |   | D | U | E |   | T |   | O |   |    |    |    |    | E  |    |   |
| 1  |   |   |   | T | H | E | O | R | E | M  |    |    |    |    |    |   |
|    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |   |

Lower case letters indicate blanks.