



WSMC High School Regional Competition

Prognosticators

Team Problem

March 19, 2003

Three Geometer's Basketball League experts, prognosticators: Lady Luck, Euclid and Hypatia were picking the today's winners in this the fourteenth game day of the season. Lady Luck picked the Triangles, Pentagons, Rhombuses, and the Octagons. Euclid picked the Triangles, Squares, Hexagons, and the Parallelograms. Hypatia picked the Triangles, Octagons, Hexagons, and the Parallelograms. The computer that always picks winners based on the teams with the best records predicts only one tie. This is surprising since the Triangles and the Hexagons are tied for first followed by a three way tie for second among the Octagons, the Parallelograms and the Pentagons (9 wins and 4 losses), and there is a tie for last. When all was said and done, the fourteenth day was a good day for the three prognosticators. They had their best record possible

1. If the eighth team's name was a parallelogram, what was it?
2. Which teams played each other?
3. What were the records of the prognosticators?
4. Which teams won?
5. Find all possible records for the teams before they played their fourteenth game. Justify the validity of the possible records and justify the elimination of other possible records.

You will be scored as follows:

Understands and Applies Mathematical Concepts and Procedures

- **Number Sense:** 2 pt - Uses appropriate number skills
- **Geometric Sense** 2 pt - Uses geometric understanding when appropriate

Solves Problems - 10 pt

- Understands the problem
- Strategies are used appropriately
- Answers for the required items are appropriate

Reasons Logically - 6 pt

- Appropriately analyzes information
- Presents a thorough and systematic verification

Communicates Understanding - 8 pt

- Presentation is clear, organized, and easy to follow; appropriate labels are included

Total Points - 28 possible

Prognosticators- Rubric for Scorers

Note: On 2-point items: 2 - meets given criteria, 1-partially meets given criteria, 0-meets none.

1. (2 points)

	Geometric Sense: 2 pt – Correctly names the 8 th team as Rectangles or 1 pt – names a parallelogram that is not a rectangle
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2. (6 points)

	Communicates Understanding: 1 pt – Organizes teams and predictions in a <u>useful format</u> to find match-ups 1 pt – Labels information so that it is clear and easy to follow
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	Reasons Logically: 1 pt – Shows process of eliminating impossible match-ups, i.e., none of the teams that Lady Luck predicted as winners can play each other 1 pt – Uses computer prediction of a tie to determine last two match-ups
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	Solves Problems: 2 pt – Lists the teams that play each other: Triangles-Rectangles, Squares-Octagons, Parallelograms-Pentagons, Rhombuses-Hexagons or 1 pt – Lists two or three of the pairs that will play each other
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3. (6 points)

	Communicates Understanding: 2 pt – Information is well organized in a <u>useful format</u> to find the experts' records and is labeled so that it is clear and easy to follow
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	Reasons Logically: 1 pt – Compares possible expert records 1 pt – Uses the fact that “They had the best record possible” to justify the answer, the total of 9 correct predictions is the best possible
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	Solves Problems: 2 pt – Answer indicate that the experts records were Lady Luck 2, Euclid 3, and Hypatia 4; or 1 pt – gives 2 of the 3 predictions correctly
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4. (2 points)

	Reasons Logically: 2 pt – Lists the 4 winner as Triangles, Octagons, Parallelograms, Hexagons or 1 pt – lists 2 or three of the winners
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5. (8 points)

	Number Sense: 1 pt – Recognizes that teams tied for first can have 10, 11, 12, or 13 wins 1 pt – Uses 52 as the total number of wins possible
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	Communicates Understanding: 1 pt – Organizes information in a <u>useful format</u> 1 pt – Labels information so that it is clear and easy to follow
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	Reasons Logically: 2 pt – Shows/explains why various combinations are or are not possible: such as 13 is not possible since sum is greater than 52, etc.
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	Solves Problems: 2 pt – Lists the solutions: 1 st place- 10&3, last two places 0&13 and next to last 5&8, or last two places could be 1&12, next up 3&10, etc.
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Overall (4 points)

	Solves Problems: 2 pt – Uses appropriate strategies and needed, i.e., chart, tree diagram, etc.
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	Communicates Understanding: 2 pt – The overall paper is organized, labeled, easy to follow, etc.
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	Total Points (28 points possible)
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Team Problem Answer Sheet

Only this page will be evaluated. You may use front side only. You might want to draft your answer on scratch paper first.

School Name _____ Team Number _____

Names _____

Sample Solution to Prognosticators Regional 2003

1. The unknown team must be the Rectangles, the only name of a parallelogram that is not used.

	Triangles	Rhombuses	Squares	Pentagons	Hexagons	Octagons	Parallelograms	Rectang
Triangles	X	LL	E	LL	E,H	LL,H	E,H	Play
Rhombuses	LL	X		LL		LL		2*
Squares	E		X		E		E	2*
Pentagons	LL	LL		X		LL		2*
Hexagons	E,H		E		X	H	E,H	2*
Octagons	LL,H	LL		LL	H	X	H	2*
Parallelograms	E,H		E		E,H	H	X	2*
Rectangles	Play	2*	2*	2*	2*	2*	2*	X

2. First they should enter who can't play each other based on the picks. Since only the Rectangles are left, the Triangles must play them. Therefore no one else can*. Since the Hexagons play either the Rhombuses or the Pentagons and the same is true of the Parallelograms then the Squares must play the Octagons. The only way left for the computer to pick a tie is for the Pentagons to play the Parallelograms therefore the Hexagons must be playing the Rhombuses.
3. Therefore the following shows all the possible records for the experts:

				Winning Record		
				LL	Eu	Hy
Hex over Rhm	Penta over Para	Sq over Oct	Tri over Rect	2	3	2
			Rect over Tri	1	2	1
		Oct over Sq	Tri over Rect	3	2	3
			Rect over Tri	2	1	2
	Para over Penta	Sq over Oct	Tri over Rect	1	4	3
			Rect over Tri	0	3	2
		Oct over Sq	Tri over Rect	2	3	4
			Rect over Tri	1	2	3
Rhm over Hex	Penta over Para	Sq over Oct	Tri over Rect	3	2	1
			Rect over Tri	2	1	0
		Oct over Sq	Tri over Rect	4	1	2
			Rect over Tri	3	0	1
	Para over Penta	Sq over Oct	Tri over Rect	2	3	2
			Rect over Tri	1	2	1
		Oct over Sq	Tri over Rect	3	2	3
			Rect over Tri	2	1	2

This shows that the best possible record for the experts would be 4 for Hypatia, three for Euclid and 2 for Lady Luck.

4. If that is the experts' best record, then the Hexagons beat the Rhombuses, the Parallelograms beat the Pentagons, the Octagons beat the Squares, and the Triangles beat the Rectangles.
5. Since the total number of games for each team is thirteen then the total wins for all teams is 52. Since three teams have a total of 27 wins and the first place teams must have better records or at least 10 wins apiece, the total wins are at least 47. That means that there are only five wins to move around. Here are the only possible records as all others will not maintain their current placings or the correct number of total wins and losses:

10-3	10-3	11-2	12-1
10-3	10-3	11-2	12-1
9-4	9-4	9-4	9-4
9-4	9-4	9-4	9-4
9-4	9-4	9-4	9-4
5-8	3-10	3-10	1-12
0-13	1-12	0-13	0-13
0-13	1-12	0-13	0-13