

Anchor Paper Scoring and Rationales – Task: The Soccer Competition

Name: Student A

Criteria	Performance Level (Advanced, Proficient, Developing, Emerging)	Rationale
Mathematical Understanding	Proficient	The student demonstrates an understanding of concepts and skills associated with the task. The student applies a guessing and estimation approach to correctly identify the victor based on the greater horizontal distance.
Problem Solving	Proficient	The problem-solving strategy displays an understanding of the underlying mathematical concept. The student guessed and estimated that A went further than B, but the landing point was not confirmed because the data did not show where the ball hit the x-axis.
Communication and Reasoning	Developing	Uses limited mathematical language to partially communicate thinking. Student identifies that the landing point is not 100% confirmed but does not provide specific information regarding the horizontal distance for both students A and B.
Representations and Connections	Developing	Makes a partial mathematical connection or the connection is not relevant to the context of the problem. Student uses a guess and check strategy but has not developed a mathematical pathway to the solution.

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Student B

Criteria	Performance Level (Advanced, Proficient, Developing, Emerging)	Rationale
Mathematical Understanding	Developing	The student demonstrates a partial understanding of concepts and skills associated with the task. Although the student identified the solutions as coordinates, the connection between the coordinates and x-intercepts was not identified.
Problem Solving	Emerging	The problem-solving strategy displays a limited understanding of the underlying mathematical concepts as the student did not connect the solutions to the horizontal distance. Solutions presented were relevant to the problem.
Communication and Reasoning	Developing	Reasoning or justification of solution steps is limited and contains a misconception. Although the student represented answers as ordered pairs, the solution of (81, 15.8) for Student A in the problem indicates a level of imprecision as it does address that the ball is still in the air. Student used limited mathematical language to partially communicate thinking with words such as ‘between’ and ‘bigger’.
Representations and Connections	Developing	The student makes a partial mathematical connection within the context of the problem by identifying the x-intercept on the graph of Student C as a landing point between 60 to 80 feet.

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Student C

Criteria	Performance Level (Advanced, Proficient, Developing, Emerging)	Rationale
Mathematical Understanding	Proficient	Student applies mathematical concepts and skills which lead to a valid and correct solution. Data collected for Student B, Student C, Student D in the problem were converted to a tabular format for comparison with Student A.
Problem Solving	Proficient	The student's strategy of using tables to compare the data displays an understanding of the underlying mathematical concepts and confirms a solution relevant to the problem as well as confirms the reasonableness of the solution. The chosen strategy is not the most efficient and the estimated locations along the horizontal distance were not determined for Students A, B, and C.
Communication and Reasoning	Proficient	The student demonstrates reasoning, justifies the solution steps, and supports their claim with evidence. The mathematical language used to communicate thinking was not precise and the student did not identify the x-intercepts as the solutions.
Representations and Connections	Proficient	The student uses multiple representations with accurate labels to model the problem as evidenced by the estimated points on the graph for Student C and the use of a table for Student B. A mathematical connection that is relevant to the problem is made.

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Student D

Criteria	Performance Level (Advanced, Proficient, Developing, Emerging)	Rationale
Mathematical Understanding	Proficient	The student demonstrates an understanding of and applies mathematical concepts and skills which lead to a valid and correct solution. The identification of the values for a, b, and c for Student A indicates the student knew to use quadratic regression and represented the solutions as coordinate pairs.
Problem Solving	Proficient	The problem-solving strategy displays an understanding of the underlying mathematical concept and produces a solution relevant to the problem. The student used Desmos for quadratic regression and graphing of functions.
Communication and Reasoning	Developing	The student provides limited evidence to support arguments and claims as solutions were not provided for Student B and Student C. The student uses limited/no mathematical language to partially communicate thinking (“I just typed it in and it gave me the answer.”)
Representations and Connections	Developing	The student does not make a connection to the context of the problem. Points were plotted on the graph for Student C, but the x-intercept was not one of the points and the x-intercept was not identified as the solution for Student A.

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Student E

Criteria	Performance Level (Advanced, Proficient, Developing, Emerging)	Rationale
Mathematical Understanding	Advanced	The student uses relationships among mathematical concepts and makes mathematical generalizations based on their understanding and application of mathematical skills that lead to a valid solution when it is recognized that Student A at 81 feet is still 15.8 feet in the air when compared to Students B and C.
Problem Solving	Advanced	The problem-solving strategy is well developed and efficient. The student uses Desmos to create a quadratic regression for Students A and graphs the functions for Students B and D which allowed for comparison with the graph provided for Student C.
Communication and Reasoning	Advanced	Reasoning and justification are comprehensive as student consistently describes, with precise mathematical language, the strategies used and identifies the x-intercepts as the determinant of the winner.
Representations and Connections	Advanced	The student uses representations to analyze relationships and extend thinking when creating and analyzing graphs for Students A, B, and D to identify the x-intercepts and conclude the winner.