Mathematics Essential Skills Work Samples

FACILITATOR'S GUIDE

Section: Introduction

Minutes: **5 minutes**

Slide: 1-2	**What to do:** Introduce presenter and participants. DO NOT distribute the handout until the Scoring Guide Activity is complete (slide 4).	**Additional Materials:** Sign-in sheet
Script: **Slide 2**	**What to say:** You will be provided with an in-depth training and calibration to the Official Mathematics Scoring Guide; including scoring student work samples to meet the Essential Skills requirement. Our discussion will focus on the Essential Skills requirement and the procedures for work sample administration. We will also look at and apply the Essential Skills work sample guidance template to develop or evaluate an Essential Skills work sample.	

Questions/Issues to Anticipate:

Questions:

Question #1 What is the relationship between Local Performance Assessments and Work Samples?

Ans. Local Performance Assessments are required to be administered once per year in grades 3-8 and once in HS in speaking, writing, math and scientific inquiry. Work Sample are a type of Local Performance Assessments that may be used to satisfy the requirement.

Question #2

Related Resources:

Resource #1 Essential Skills Manual

Resource #2 Official Scoring Guide

Adaptations:

Adaptation #1 Include additional slides for local context and welcome.

Adaptation #2 Icebreaker

Section: Official Scoring Guide

Minutes: 15 minutes

Slide: 3-4	**What to do:** Introduce Official Scoring Guide. DO NOT distribute the handout until the Scoring Guide Activity is complete (slide 4).	**Additional Materials:** Scoring Guide Puzzle

Script: **Slide 3**	**What to say:** The Official Scoring Guide has been in use since 1988 and last revised in 2011. The five process dimensions are listed on the slide. In 3-5 words please summarize each process dimension. Example MS: "translate into mathematics" In the same way a foreign language is translated into English the student translates the mathematics into words, equations and symbols. Example RS: "effective strategy" The solution path chosen may vary from inefficient to economical and is effective if it leads to a correct solution. Example CR: "flow of the paper" A significant gap is when the reader is using their own knowledge to infer why a student might have moved from one part of the work to another. Example A: "the solution" Minor errors are contextual and can be dependent on local requirements such as rounding expectations. Example RE: "the review" Solving the problem by a second method is the best way to review and will earn the student a 5.
Slide 4	
Slide 5	**What to say:** This is the part of the training that will focus on applying the math scoring guide to student work, with an emphasis on the differences between the 3 and 4 score points for all dimensions and whether or not the student work meets the essential skill requirement for an Oregon diploma. Distinguishing between the 3 and 4 scores points is important for three main reasons: 1) the 3/4 call is the most critical one for students because it determines whether or not they earn passing scores; 2) it is most likely the decision that will have to be made most frequently--most papers fall into this category; 3) it is relatively easy to identify papers that both exceed the standard and those that fall far below the standard. An additional concern at the high school level is whether or not a passing work sample meets the essential skill requirement for graduation. In order to qualify, the student work must reflect high school level standards. Now, with a partner place your puzzle pieces on the blank scoring guide in the 3 or 4 column. When the puzzle is complete identify the key words or phrases that differentiate a 3 or 4 for each process dimension.

Questions/Issues to Anticipate:

Questions:

Question #1 Are the process dimensions independent? In the past we were not allowed to "double ding" students.

Ans. The process dimensions are not mutually exclusive. For example a student with a week translation could very likely also have an ineffective strategy and would score low in both.

Question #2

Related Resources:

Resource #1 Student Language Scoring Guide

Resource #2

Adaptations:

Adaptation #1 Include additional slides for local context and welcome.

Adaptation #2

Section: Work Sample Template

Minutes: 30 minutes

Slide: 5-9	**What to do:** Introduce Guide to Writing Quality Work Samples. Review the guide and the matrix.	**Additional Materials:** Additional Work Sample Guides

Script: **Slide 7**	**What to say:** The next activity is to evaluate the quality of a Work Sample. Let's review and discuss the Guide and the Matrix.
Slide 8	**What to say:** You will now complete the task "Quadrilateral ABCD" and complete the Matrix for Evaluating Math WS Tasks. Please pay close attention to and be ready to share ideas for revision. **What to say:** Now complete the task and Matrix for "Gopher Security". Discuss the Matrix and ideas for revision.

Questions/Issues to Anticipate:

Questions:

Question #1

Question #2

Related Resources:

Resource #1

Resource #2

Adaptations:

Adaptation #1 Include additional slides for local context and welcome.

Adaptation #2

Section: Work Sample Calibration – Roads in Prezville

Minutes: **40 minutes**

Slide: 10-15	**What to do:** Score work samples and compare individual scores to known scores.	**Additional Materials:** Extra Scoring Guides

Script: **Slide 10**	**What to say:** You will fist individually solve "Roads in Prezville", then as a group we will collect the "key concepts".
Slide 11-12	**What to say:** Now that we have an idea of the key concepts we will score the first two papers J-5 and J-12. The recommended method of scoring is to read the criteria for a score of 3 on one process dimension. Review the student work and if it seems stronger than a 3 read the 4 through 6 criteria. If it is weaker than a 3, consider the 1 and 2 criteria. Assign a score for that dimension and repeat the process for the other 4 dimensions. It is recommended to have a colleague score a few of your papers (without seeing the scores that you gave) and then have a discussion about any differences in your scores.
Slide 13-15	**What to say:** Now we will check your scores against the know scores and discuss any differences. Now that we are calibrated please score the remaining three student papers.

Questions/Issues to Anticipate:

Questions:

Question #1 What evidence constitutes a reflection in a proof Work Sample?

Ans. The nature of a direct proof is to provide a logical argument by making a statement and then include a reason as to why the statement is correct. The reflection is then embedded into the proof as a sequence of reasons. If the student does a second style of proof that would constitute a different method and be eligible to earn a 5 in Reflecting and Evaluating.

Question #2

Related Resources:

Resource #1 Essential Skills Manual

Resource #2 Official Scoring Guide

Adaptations:

Adaptation #1 Include additional slides for local context and welcome.

Adaptation #2 Substitute alternative Geometry Work Sample

Section: Work Sample Calibration – Homework and Grades

Minutes: 40 minutes

Slide: 16-21	**What to do:** Score work samples and compare individual scores to known scores.	**Additional Materials:** Extra Scoring Guides

Script: **Slide 16**	**What to say:** You will fist individually solve "Homework and Grades", then as a group we will collect the "key concepts".
Slide 17-18	**What to say:** Now that we have an idea of the key concepts we will score the first two papers M-6 and M-8. Follow the recommended method of scoring by reading the criteria for a score of 3 on one process dimension. Review the student work and if it seems stronger than a 3 read the 4 through 6 criteria. If it is weaker than a 3, consider the 1 and 2 criteria. Assign a score for that dimension and repeat the process for the other 4 dimensions. It is recommended to have a colleague score a few of your papers (without seeing the scores that you gave) and then have a discussion about any differences in your scores.
Slide 19-21	**What to say:** Now we will check your scores against the know scores and discuss any differences. Now that we are calibrated please score the remaining three student papers.

Questions/Issues to Anticipate:

Questions:

Question #1 What happens when two raters cannot agree on a score point?

Ans. It is recommended that a third rater blindly score the paper to resolve conflicting scores.

Question #2

Related Resources:

Resource #1 Essential Skills Manual

Resource #2 Official Scoring Guide

Adaptations:

Adaptation #1 Include additional slides for local context.

Adaptation #2 Substitute alternative Probability and Statistics Work Sample

Section: Work Sample Calibration – Don't Hit the Ceiling

Minutes: 40 minutes

Slide: 22-27	**What to do:** Score work samples and compare individual scores to known scores.	**Additional Materials:** Extra Scoring Guides

Script: **Slide 22**	**What to say:** You will fist individually solve "Don't Hit the Ceiling", then as a group we will collect the "key concepts".
Slide 23-24	**What to say:** Now that we have an idea of the key concepts we will score the first two papers B-1 and B-7. Follow the recommended method of scoring by reading the criteria for a score of 3 on one process dimension. Review the student work and if it seems stronger than a 3 read the 4 through 6 criteria. If it is weaker than a 3, consider the 1 and 2 criteria. Assign a score for that dimension and repeat the process for the other 4 dimensions. It is recommended to have a colleague score a few of your papers (without seeing the scores that you gave) and then have a discussion about any differences in your scores.
Slide 25-26	**What to say:** Now we will check your scores against the know scores and discuss any differences. Now that we are calibrated please score the remaining three student papers.

Questions/Issues to Anticipate:

Questions:

Question #1 Can a student use "guess and check" to solve "Don't hit the Ceiling" and earn 4's in all process dimensions?

Ans. There are situations where "guess and check" is acceptable in the problem solving process, such as finding the roots of higher order polynomials. In this instance the student is charged with finding features of a quadratic. The algebraic methods for finding the features of a quadratic sits solidly in the high school standards. Using a table to estimate the vertex would be acceptable for Reflecting and Evaluating when partnered with an algebraic approach.

Question #2

Related Resources:

Resource #1 Essential Skills Manual

Resource #2 Official Scoring Guide

Adaptations:

Adaptation #1 Include additional slides for local context and welcome.

Adaptation #2

Section: Work Sample Administration

Minutes: 10 minutes

Slide: 28-36	**What to do:** Introduce the Essential Skills manual and discuss Work Sample administration.	**Additional Materials:** Essential Skills Manual

Script: **Slide 28**	**What to say:** Now we move into the final part of the presentation which is to highlight components of Work Sample administration. These highlights are all components of the Essential Skills Manual which is your resource for questions relating to Work Samples and Essential Skills.
Slide 29-34	**What to say:** Included in the Essential Skills manual is a complete list of the supports that are available to students. If a Work Sample is eligible for revision the only acceptable feedback is to circle, highlight, or underline portions of the Official Scoring Guide or Feedback form. The "Tips Sheet" is a universal tool available to students that breaks down the 5 process dimensions into student language to verify that they have addressed all five dimensions.
Slide 35	**What to say:** If you are looking for the ODE created Work Sample bank or district created Work Samples they are housed in ORSkills. ORSkills is operated by Willamette ESD and along with a the bank of Work Samples they also offer a Work Sample scoring service.

Questions/Issues to Anticipate:

Questions:

Question #1 Are the ODE crated Work Samples free of cost?

Ans. Yes, pending successful completion of the ORSkills security training all 30 of the ODE created math Work Samples are free to Oregon schools and districts.

Question #2

Related Resources:

Resource #1 Essential Skills Manual

Resource #2

Adaptations:

Adaptation #1 Include additional slides for local context and welcome.

Adaptation #2

Matrix for Evaluating Mathematics Work Sample Tasks: Quadrilateral

In designing a task, writers may consider the following matrix. Task writers may use the matrix to reflect on and revise their work, or as a training tool for use in developing tasks in teams.

Process Dimension	Questions	Yes/No Ideas for Revision
Making Sense of the Task	Does the task ask students to change important information into mathematical ideas?	No, too guided. Provide a situation that a student can create their own figure to manipulate.
Representing and Solving the Task	Are there clear math strategies students can use to solve this problem?	Yes
Communicating Reasoning	Does the task require a logical chain of reasoning that is robust enough for the student to demonstrate communication?	No, leave it open ended. For example take a quadrilateral drawn in the 1st quadrant and perform "x" transformations to move it to the 3rd quadrant.
Accuracy	Is there one answer? Does the task allow students to make their own connections and determine which steps to take?	Yes, one answer. No, too guided. Low floor and low ceiling task.
Reflecting and Evaluating	Is there a reasonable way for the student to rework the problem by solving with an alternate method, by working backwards or double-checking the result?	No, only one way to solve.
Characteristic	**Questions**	**Yes/No Ideas for Revision**
Grade level standards are addressed	Will the task be used to demonstrate Essential Skills? Does the complexity of the task deter students from addressing below grade level standards?	No, 8th grade standards 8.G.A.2 and 8.G.A.3
Non-routine	Does the task deviate from a standard mathematical template? Does the task suggest an approach that is neither automatic nor routine?	No, too scripted and introductory.
Appropriate level of rigor	Is the task too hard, too easy, not enough steps?	No, too easy.
Bias, Sensitivity and Accessibility	Is the language clear and straightforward? Is the task culturally equitable, free of stereotypes, and within the students' realm of experience?	No, notation doesn't represent two transformations.

Matrix for Evaluating Mathematics Work Sample Tasks: Gopher Security

In designing a task, writers may consider the following matrix. Task writers may use the matrix to reflect on and revise their work, or as a training tool for use in developing tasks in teams.

Process Dimension	Questions	Yes/No Ideas for Revision
Making Sense of the Task	Does the task ask students to change important information into mathematical ideas?	No, too guided. Provide a situation that a student can create their own figure to manipulate.
Representing and Solving the Task	Are there clear math strategies students can use to solve this problem?	Yes
Communicating Reasoning	Does the task require a logical chain of reasoning that is robust enough for the student to demonstrate communication?	No, leave it open ended. For example take a quadrilateral drawn in the 1st quadrant and perform "x" transformations to move it to the 3rd quadrant.
Accuracy	Is there one answer? Does the task allow students to make their own connections and determine which steps to take?	Yes, one answer. No, too guided. Low floor and low ceiling task.
Reflecting and Evaluating	Is there a reasonable way for the student to rework the problem by solving with an alternate method, by working backwards or double-checking the result?	No, only one way to solve.
Characteristic	**Questions**	**Yes/No Ideas for Revision**
Grade level standards are addressed	Will the task be used to demonstrate Essential Skills? Does the complexity of the task deter students from addressing below grade level standards?	No, 8th grade standards 8.G.A.2 and 8.G.A.3
Non-routine	Does the task deviate from a standard mathematical template? Does the task suggest an approach that is neither automatic nor routine?	No, too scripted and introductory.
Appropriate level of rigor	Is the task too hard, too easy, not enough steps?	No, too easy.
Bias, Sensitivity and Accessibility	Is the language clear and straightforward? Is the task culturally equitable, free of stereotypes, and within the students' realm of experience?	No, notation doesn't represent two transformations.

Scores and Commentary: Roads in Prezville, Paper #J-5

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
4	3	3	3	3

MS 4: The student correctly marks the figure with the given information and begins to use the given information to create a paragraph proof.

RS 3: The strategy is only partially effective. The student initiates the proof with an unsupported statement and uses this unsupported claim to establish proof.

CR 3: There are significant gaps in the communication of the reasoning.

AC 3: The solution is partially complete. The parallelogram opposite angles theorem and opposite sides theorem could be used to prove the streets form a parallelogram, however, the foundational supports for these claims are missing.

RE 3: The embedded reflection only partially justifies the outcome due to the missing support for the initial SAS triangle conjecture.

Scores and Commentary: Roads in Prezville, Paper #J-12

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
5	5	5	5	5

MS 5: The interpretation is thoroughly developed. The student translates the task into the symbolic representation of a formal proof.

RS 5: The strategy selected is insightful and complex through the formal structure and detail of the proof.

CR 5: The communication is enhanced through the use of detail in both the statements and the reasons. The reasons also reference previous steps in the argument, allowing the reader to move easily through the work.

AC 5: The solution is enhanced by making a connection between each step in the proof and the specific steps that lead to and support it.

RE 5: Each step is completely justified throughout the two column proof. The proof is also argued a second way in paragraph form. The second representation utilizes many of the reasons given earlier in the two column proof. Since the student does not actually complete the formal argumentation in the paragraph proof this is an example of a weak 5.

Scores and Commentary: Roads in Prezville, Paper #J-15

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
3	3	3	2	2

MS 3: The interpretation is only partially developed. There are some correct statements but these are not effectively connected to the conclusion. There is also a misinterpretation by using ASA instead of SAS.

RS 3: The strategy is only partially effective and partially complete. The student arrives at congruent triangles, but makes an unsupported leap to get to that conclusion.

CR 3: There are significant gaps in the reasoning in both the initial solution and the review.

AC 2: The conclusion is not adequately supported by the work. Mistakes amount to more than minor making this is an example of a strong 2.

RE 2: Reflection is embedded in the reasoning of a proof, however the reasons given are infective and the review contradicts the initial attempt.

Scores and Commentary: Roads in Prezville, Paper #J-27

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
2	2	2	2	1

MS 2: The translation of the task is underdeveloped. The figure is marked incorrectly and angles are improperly referenced in the Work Sample.

RS 2: The strategy is underdeveloped and the reasoning required to support the given statements is missing.

CR 2: The communication of the reasoning is significantly underdeveloped.

AC 2: The solution given is incomplete and not supported by the work.

RE 1: The reflection is not evident.

Scores and Commentary: Roads in Prezville, Paper #J-28

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
3	3	3	2	2

MS 3: The translation is only partially developed. The student shows an understanding of some of the key concepts but does not show an understanding of the criteria for a parallelogram or alternate interior angles.

RS 3: The strategy is only partially effective and partially displayed. The student begins well, but misses the connections needed to reach a correct solution.

CR 3: Significant gaps are present in the argument and the communication. The student ambiguously names angles X, Y, Z and R.

AC 2: The given solution is incomplete. The student draws correct conclusions, but does not support them.

RE 2: The reflection is only partial. Some of the reflection is embedded but not enough to justify the given conclusion.

Scores and Commentary: Homework & Grades, Paper #M-6

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
5	6	6	5	6

MS 5: The student looks at the task through two distinct approaches. Both are thoroughly developed by the use of models and probability notation.

RS 6: The strategies used are complex. The student employs Bayes' Theorem as a strategy and then uses the joint and marginal probabilities to answer the question a second time.

CR 6: The use of mathematical language and formal probability notation are both insightful and enhanced. The use of models makes it easy for the reader to move from one thought to another.

AC 5: Correct answers are reached by using conditional probabilities and joint probabilities. The student connects the two solutions by recognizing that joint probabilities support the claim and the conditional probability provides strong "overwhelming" evidence for the claim.

RE 6: The student reworks the task using a different method and evaluates the relative efficiency of different approaches taken, "Here is a Venn diagram, which is an easier way."

Scores and Commentary: Homework & Grades, Paper #M-8

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
3	2	3	2	1

MS 3: The interpretation of the task is only partially developed. The student displays the correct joint probabilities, but does not support the joint probabilities with correct mathematics.

RS 2: The student attempts to estimate the distribution of students by using a theoretical class of 30 students creating rounding issues that are in conflict with the solution. The student is missing the critical probability of homework and a B average in math. This Work Sample represents a strong 2.

CR 3: The communication contains significant gaps and is hard to follow. The student never addresses the implications of rounding given the estimate of only 30 students. The final claim asserts proof, but it is disjointed and not supported by mathematics.

AC 2: The solution is incomplete and not justified with mathematics.

RE 1: The reflection is not evident.

Scores and Commentary: Homework & Grades, Paper #M-10

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
4	4	4	4	4

MS 4: The interpretation is both effective and complete. The student shows an understanding of the key concepts and how the given information is related by translating percentages into a sample size of 100.

RS 4: The strategy is effective and complete. The table provides a simple way to compute the missing probabilities and the commentary interprets the results correctly.

CR 4: All of the important elements are in place and the path through the work is clear. The student supports the conclusion by comparing the joint probabilities two different ways.

AC 4: The solutions given are correct and supported by the work.

RE 4: All of the values in the table are justified by the equations below. The conclusion is drawn by looking at the data two different ways. This Work Sample represents a strong 4.

Scores and Commentary: Homework & Grades, Paper #M-22

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
2	2	3	2	1

MS 2: The interpretation is partially developed. The use of ratios is applied inappropriately.

RS 2: The strategy selected is sketchy and underdeveloped. The student correctly computes one missing marginal probability and two missing joint probabilities, but does not compute the required probabilities to support the claim.

CR 3: The communication contains significant gaps. The description of the probabilities lacks precision and contains errors.

AC 2: The solution given is incomplete and incorrect.

RE 1: The ratios as a reflection of the concepts and strategies are ineffective, and it is not particularly evident that the use of ratios represents the student reflecting on their claim.

Scores and Commentary: Homework & Grades, Paper #M-29

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
4	4	3	3	2

MS 4: The student correctly interprets the task and computes and displays all of the joint and marginal probabilities.

RS 4: The strategy selected is effective, complete and could lead to a correct solution.

CR 3: The communication of the reasoning has significant gaps and is only partially displayed forcing the reader to assemble the solution path.

AC 3: The solution is partially correct and not justified with mathematics.

RE 2: The initial work is repeated, but it is not clear if this is done as a review making the reflection very sketchy.

Scores and Commentary: Don't Hit the Ceiling, Paper #B-1

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
2	3	3	2	1

MS 2: The student inappropriately uses b/2a to find the t coordinate of the vertex instead of –b/2a. The student does not address the computation of negative heights in the context of the problem.

RS 3: A correct formula would have generated a strategy that would be effective. As it is, the strategy is only partially effective.

CR 3: The student work is easy to follow and the computations shown are complete and done correctly, but the student never addresses the question asked.

AC 2: The solution is incorrect and incomplete.

RE 1: The solution is not stated within the context of the problem and no reflection is evident.

Scores and Commentary: Don't Hit the Ceiling, Paper #B-7

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
3	4	4	2	2

MS 3: The translation into mathematics is partially developed. The student never gains an awareness of transposing height and time.

RS 4: The strategy is effective and would lead to a correct solution had the student not transposed height and time.

CR 4: The communication is clear and coherent and leads to a clearly identified solution.

AC 2: The solution is incorrect. The ceiling is 30 feet high and the identified solution has Jake throwing the ball 2 feet above the ground.

RE 2: The student restates the vertices found earlier making the reflection minimal.

Scores and Commentary: Don't Hit the Ceiling, Paper #B-11

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
5	4	5	4	5

MS 5: The interpretation is enhanced by the student recognizing that the mathematical model is the center of the ball's path. To eliminate the effect of the radius one must consider the ball to have an infinitesimally small radius.

RS 4: The strategy is effective and will lead to a correct solution.

CR 5: The communication of the reasoning is clear, insightful and leads to a clearly identified solution.

AC 4: The given solution is correct and supported by the work.

RE 5: The student solves the problem explicitly and graphically. The graphical solution would have been stronger had the student graphed y = 30 to represent the ceiling. This is an example of a weak 5.

Scores and Commentary: Don't Hit the Ceiling, Paper #B-24

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
3	4	4	3	2

MS 3: The interpretation of the task is only partially developed. The student does not address the 30 foot ceiling height.

RS 4: The strategy selected is both effective and complete. The strategy would have led to a correct solution had the results been interpreted correctly.

CR 4: The student work follows a clear path throughout. The reasoning is questionable with the statement "times by 2 because of the square root". This flaw is minor compared to the rest of the work.

AC 3: The solution is partially correct. All work leading to the final answer is correct, but the results are misinterpreted in the end.

RE 2: There is some justification evident in the commentary, but it only addresses part of the strategy and does not review concepts, calculations or reasonableness.

Scores and Commentary: Don't Hit the Ceiling, Paper #B-28

Making Sense of the Task (MS)	Representing and Solving the Task (RS)	Communicating Reasoning (CR)	Accuracy (AC)	Reflecting and Evaluating (RE)
3	3	3	3	1

MS 3: The interpretation of the task is partially developed. The student creates a table of values from the given equations but then incorrectly graphs Hannah's equation. The ceiling constraint is misrepresented by the student.

RS 3: The strategy is partially effective. The graph representing Hannah's throw is incorrect and does not match the table.

CR 3: The communication of the reasoning contains gaps. No computations are shown and the graph of Hannah's throw is not helpful, nor is it connected to the solution.

AC 3: The solution is partially correct. The student correctly computes both the y coordinates of the vertices, but states that Hannah won with a height of 32 feet.

RE 1: The reflection is not evident.