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The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Albany, New York 12234

INFORMATION BOOKLET FOR SCORING THE REGENTS EXAMINATIONS IN MATHEMATICS A AND MATHEMATICS B

(including a supplement to the *Guide for Rating Regents Examinations in Mathematics)*

GENERAL INFORMATION

The general procedures to be followed in administering Regents examinations are provided in the publications *Directions for Administering Regents Examinations* (DET 541), and *Regents Examinations, Regents Competency Tests, and Proficiency Examinations: School Administrator's Manual, 2001 Edition.* Copies of the *Directions* are shipped to schools prior to each Regents examination period and may also be accessed on the Department's web site at: http://www.emsc.nysed.gov/osa/hsgen.html. The *School Administrator's Manual* may be accessed on the Department's web site at: http://www.emsc.nysed.gov/osa/hsinfogen/hsinfogenarch/sam2001.pdf.

Questions about general administration procedures for Regents examinations should be directed to the Office of State Assessment at 518-474-8220 or 518-474-5902. For information about the rating of the Mathematics A or Mathematics B examination, contact the Office of State Assessment at 518-474-5900 or the Office of Curriculum, Instruction and Instructional Technology at 518-474-5922.

School administrators should photocopy this information booklet and distribute copies to all school personnel who will be scoring these examinations.

SCORING THE EXAMINATIONS

The Regents Examinations in Mathematics A and Mathematics B are to be scored by committees of mathematics teachers. No one teacher is to score all the questions on a student's paper. The committee must consist of at least three teachers. Each of these teachers is responsible for scoring a selected number of the open-ended questions. The more teachers serving on a committee, the fewer questions each teacher scores. This process yields consistent and reliable scores and allows scoring to proceed quickly.

Each examination is accompanied by a scoring key that includes the answers to the Part I multiple-choice questions and rubrics for scoring each of the open-ended questions. Teachers must become thoroughly familiar with the rubrics for the questions they are scoring before beginning to score student responses to examination questions.

The detachable answer sheet contains a table with spaces for recording the Part I score; the score for each question in Parts II, III, and IV; the total-test raw score; and the scaled score.

Scoring of Multiple-Choice Questions

Multiple-choice questions may be either hand scored or machine scored. When hand scoring, indicate by means of a check mark each incorrect or omitted answer to multiple-choice questions on the designated answer sheet. Do not place a check mark beside a correct answer. Use only red ink or red pencil. In the appropriate space on the student's answer sheet, record the number of multiple-choice questions the student answered correctly.

DET 541M (6-05—6,500)
95-90683

Machine-scorable answer sheets must be provided and scored by the school. Answer sheets supplied by the school must provide the same number of response options as are given in the examination questions, and the choices must be labeled 1, 2, 3, 4, not A, B, C, D. Instructions for using the answer sheets must be developed locally and provided to the proctors administering the examinations.

Before answer sheets can be machine scored, several samples must be both machine and manually scored to ensure the accuracy of the machine-scoring process. All discrepancies must be rectified before student answer sheets are machine scored. When machine scoring is completed, a sample of the scored answer sheets must be scored manually to verify the accuracy of the machine-scoring process.

DETERMINING THE STUDENT'S FINAL EXAMINATION SCORE

A chart for converting the student's total-test raw score to a scaled score is provided for each administration on the Department's web site at: http://www.emsc.nysed.gov/osa. Because the scaled scores corresponding to raw scores in the conversion chart change from one examination administration to another, it is *crucial* that, for each administration, you use *only* the conversion chart provided for that administration to determine the student's final score. Take extreme care in recording the student's scores on each part of the examination, adding these scores to determine the total-test raw score, and using the conversion chart to obtain the correct scaled score.

For a Regents diploma, a score of 65 on a Regents examination in mathematics is passing. Public school districts and nonpublic schools may establish a passing score no lower than 55 for awarding a local diploma to those students first entering Grade 9 in the 1997–98 through the 2004–05 school years.

Rescoring Student Answer Papers

All student answer papers for the Mathematics A and Mathematics B examinations that receive a scaled score of 60 through 64 must be scored a second time. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, but no teacher should score the same open-ended questions that he or she scored in the first rating of the paper. It is the responsibility of the school principal to assure that the student's final examination score is based on a fair, accurate, and reliable scoring of the student's answer paper.

Specific Information for Scoring the Regents Examinations in Mathematics A and Mathematics B

The information below refers to the scoring of open-ended questions on the Mathematics A and Mathematics B Regents Examinations and is intended as a supplement to the *Guide for Rating Regents Examinations in Mathematics.*

The open-ended questions (Parts II, III, and IV) on the Mathematics A and Mathematics B examinations should be scored in accordance with these guidelines:

- If the student gives one legible response, even if it is crossed out, teachers should score the response.
- If there are two or more responses with all but one crossed out, teachers should score only the response not crossed out.
- If there are one or more partial responses and one complete response, teachers should score the complete response. No credit is deducted for incorrect startups.
- If there are two or more complete responses, teachers should score each one. Credit will be allocated in the following way:

  If one response is completely correct and the others are completely incorrect, teachers should award 50% credit and round down (2 credits for a 4-credit question, 1 credit for a 2-credit question, and 1 credit for a 3-credit question).

  If each response warrants more than 50%, the lesser of the responses is awarded credit. (For example, if a 4-credit question is done two ways, with one worth 4 credits and another worth 3 credits, the student should be awarded 3 credits for the question.)
- If the question requires the student to include units of measure, full credit cannot be awarded if the student omits the unit. Students may include the appropriate unit of measure even if it is not required.

  Examples:

  If the question asks for the number of feet in the length of a figure, no unit is required in the answer.

  If the question asks for the dimensions of a figure, the proper unit of measure is required in the answer in order to receive full credit.

  The rubric will specify how much credit is awarded if units are not used when required.
- If a student gives only a correct numerical answer to a problem but does not show how he or she arrived at the answer, the student will be awarded only 1 credit. All constructed-response questions require the student to show work. If the question has only one part, this rule is straightforward, but this rule needs some clarification for multiple-part questions.

  A fully correct answer for a multiple-part question requires correct responses for all parts of the question. For example, if a 3-credit question has three parts, the correct response to one or two parts of the question that required work to be shown is *not* considered a fully correct response with no work shown and would receive 0 credits.

  The rubric of a multiple-part question will specify credit for various amounts of work shown.

- Students should receive 0 credits if the solution is completely incorrect, irrelevant, or incoherent or if a correct response was arrived at using an obviously incorrect procedure.

  This last statement is illustrated by a student who, when asked to find one leg of a right triangle if the hypotenuse is 5 and the other leg is 3, gives a correct response of 4 by showing that 4 is the average of 3 and 5.

  The method of solution must be obviously incorrect to warrant a score of 0.

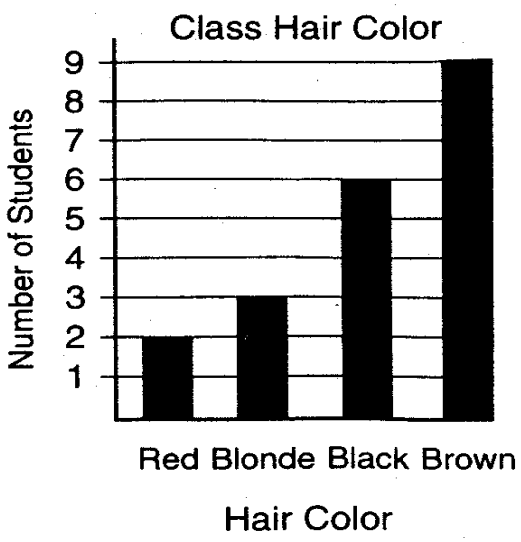
  In some cases, the rubric will specifically state which responses should receive a score of 0.

- Students who use trial and error to solve a problem must show their method. Merely showing that the answer checks or is correct is not considered a complete response for full credit. Most rubrics will address this issue directly. For more detail, teachers are encouraged to consult the *Guide for Rating Regents Examinations in Mathematics.*

Examples of Scored Student Responses with Comments

Sample Question 1 – Mathematics A

The graph below shows the hair colors of all the students in a class. What is the probability that a student chosen at random from this class has black hair?



Rubric

[2] 6/20, and appropriate work is shown.

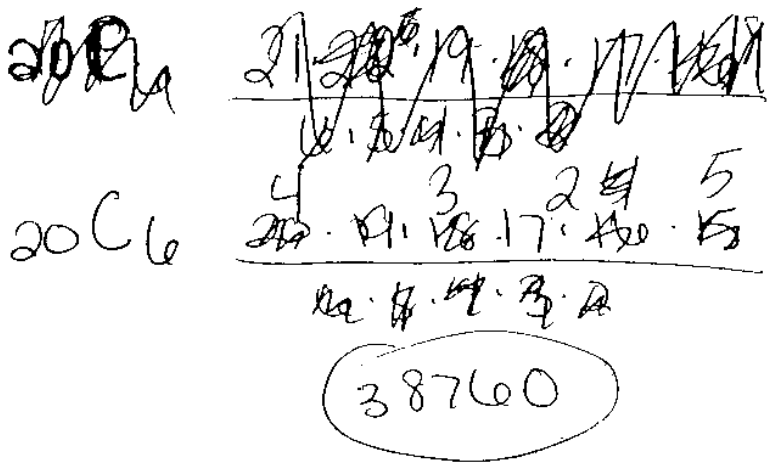
[1] A fraction with a correct numerator or denominator is given, and some work is shown.

or

[1] 6/20, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student Response

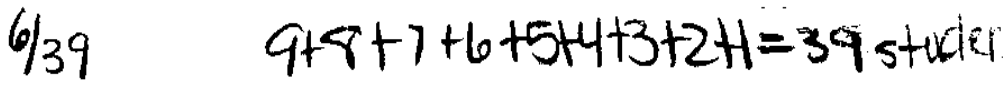


Comment

Score: 0

The student has crossed out the first part of the response, so only the second part is scored. The student has confused probability with combinations, which is irrelevant in this problem.

Student Response

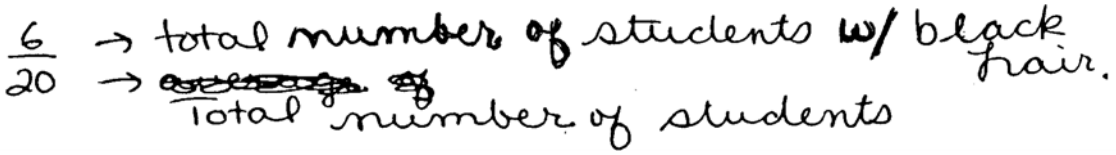


Comment

Score: 1

The student has a correct numerator but did not compute a proper denominator. The student has shown work and has an answer in fractional form.

Student Response



Comment

Score: 2

The student has a correct answer with appropriate work shown.

Sample Question 2 – Mathematics A

There are four students, all of different heights, who are to be randomly arranged in a line. What is the probability that the tallest student will be first in line and the shortest student will be last in line?

Rubric

[3] $\frac{2}{24}$ or an equivalent answer and an appropriate explanation are given or appropriate work is shown, such as a tree diagram, sample space, or permutations.

[2] Appropriate work is shown, but one computational error is made.

or

[2] Appropriate work is shown, but only a numerator or denominator is determined correctly.

or

[2] $\frac{2}{24}$ or an equivalent answer is given, but only work for either the numerator or denominator is shown.

[1] The probability of the tallest or the probability of the shortest student being in the proper position is correct, such as $\frac{1}{4}$.

or

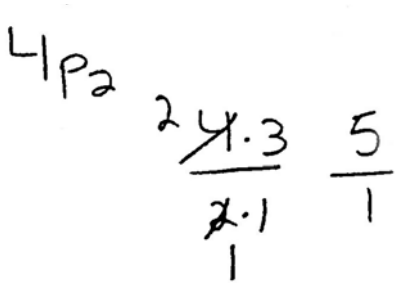
[1] Only a tree diagram, sample space, or permutations are shown.

or

[1] $\frac{2}{24}$ or an equivalent answer, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent, or is a correct response that was obtained by an obviously incorrect procedure.

Student Response



Comment

Score: 0

The student's response shows major misunderstanding of the problem.

Student Response

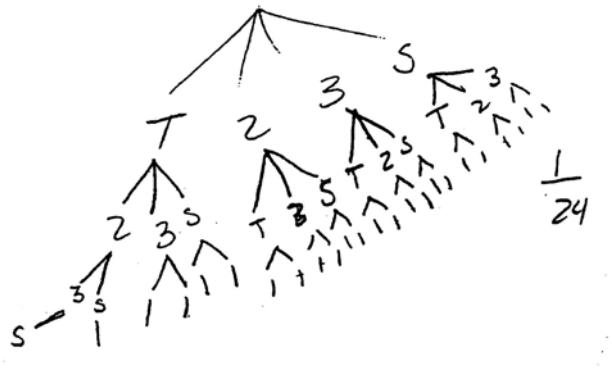
$\frac{2}{24}$

Comment

Score: 1

The student has given a correct answer but has not shown any work.

Student Response

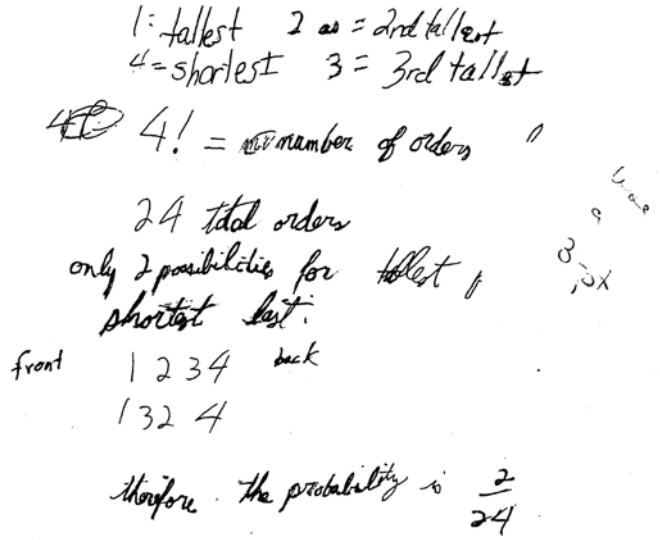


Comment

Score: 2

The student has shown appropriate work but has determined correctly only a numerator or a denominator.

Student Response



Comment:

Score: 3

The student has a complete and correct response.

Sample Question 3 – Mathematics A

Solve the following system of equations algebraically.

$y = x^2 + 4x - 2$
$y = 2x + 1$

Rubric

[4] (–3,–5), (1,3), and appropriate algebraic work is shown.

[3] Appropriate algebraic work is shown, but $x = -3$ and $x = 1$ are given as the solution.

or

[2] (–3,–5), (1,3), but a graphic solution is shown.

or

[2] Correct substitution and an algebraic equation set equal to zero are shown, but the result is not factored, such as $x^2 + 2x - 3 = 0$.

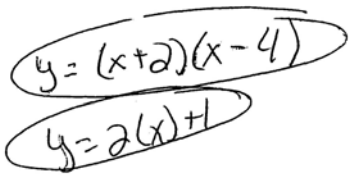
[1] Any correct substitution is shown, such as $2x + 1 = x^2 + 4x - 2$.

or

[1] (–3,–5), (1,3), but no algebraic work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent, or is a correct response that was obtained by an obviously incorrect procedure.

Student Response

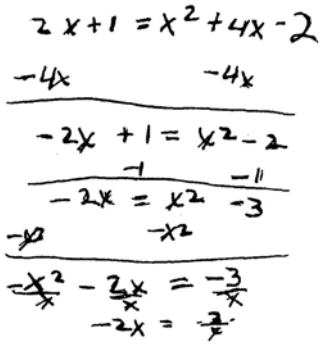


Comment

Score: 0

The student's response shows major misunderstanding of the problem.

Student Response

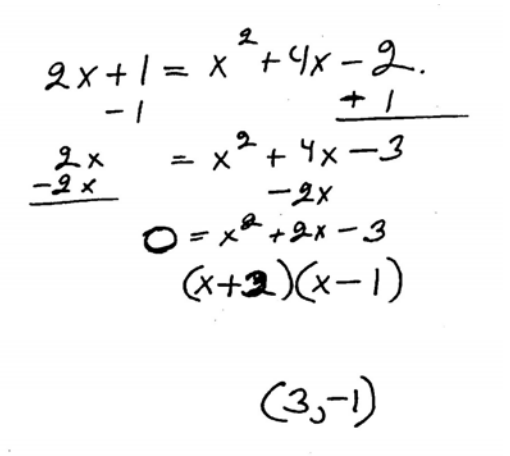


Comment

Score: 1

The student correctly substituted for *y*, but has shown no further correct work.

Student Response

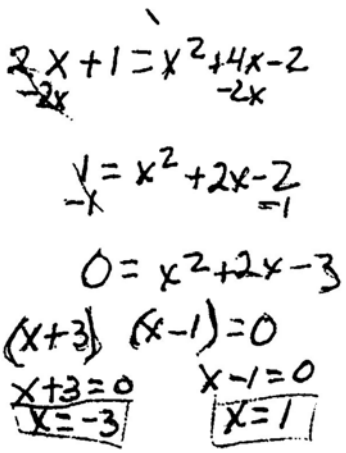


Comment

Score: 2

The student has put the equation in standard form (set equal to zero) but has shown no further correct work.

Student Response

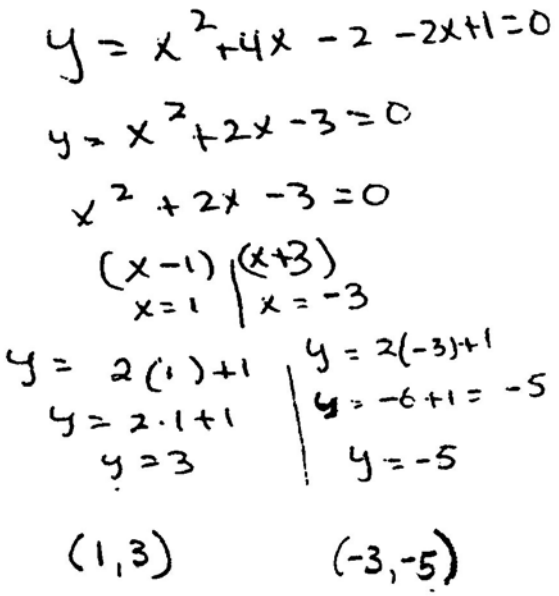


Comment

Score: 3

The student has shown appropriate algebraic work but has given only part of the correct solution.

Student Response



Comment

Score: 4

The student has a complete and correct answer.

Sample Question 1 – Mathematics B

A survey of the soda drinking habits of the population in a high school revealed the mean number of cans of soda consumed per person per week to be 20, with a standard deviation of 3.5. If a normal distribution is assumed, find an interval that contains the total number of cans per week that approximately 95% of the population of this school will drink.
Explain why you selected that interval.

Rubric

[2] 13–27, and a curve is drawn and labeled correctly, and a correct explanation is given.

or

[2] The correct answer and a statement explaining how to interpret the curve are given, but no curve is drawn.

[1] An appropriate method is used, but one mathematical error is made.

or

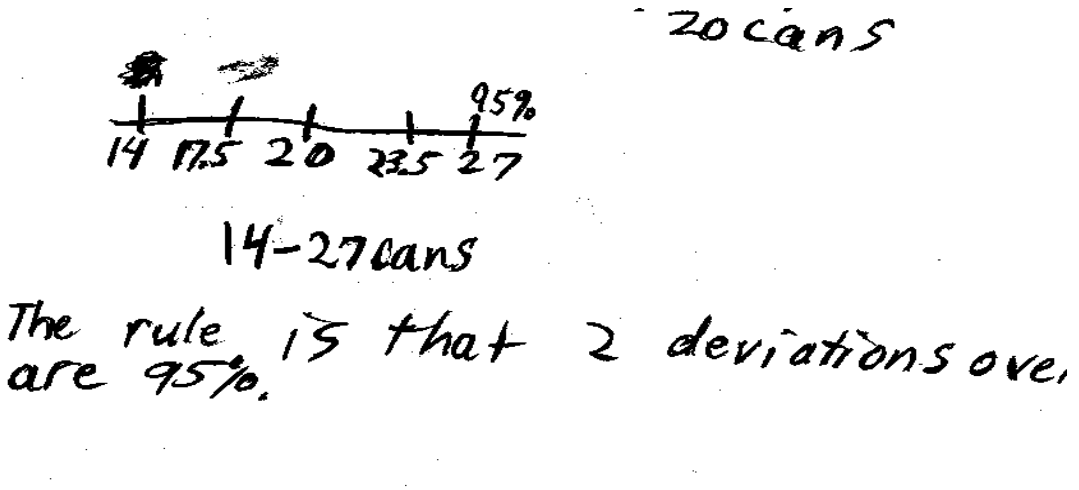
[1] A correct answer based on an incorrect curve is given.

or

[1] A correct answer is given, but no curve is drawn, and no explanation of the curve is given.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student Response

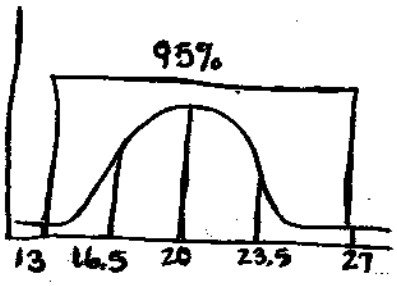


Comment

Score: 1

The student's answer shows partial understanding. The range is slightly off, and the explanation is somewhat vague.

Student Response



13-27

13-27 is the answer because 95% is two standard deviations away from the mean. 7 is subtracted and added to 20 ∴ the answer is 13-27.

Comment

Score: 2

The student has provided a correct answer and an appropriate explanation.

Sample Question 2 – Mathematics B

In the equation $y = .5(1.21^{x})$, y represents the number of snowboarders in millions and x represents the number of years since 1988. Find the first year in which the number of snowboarders will be 10 million. (Only an algebraic solution will be accepted.)

Rubric

[4] 2003 or 2004 (since the calculator yields 15.7, either year is acceptable), and appropriate work is shown, such as solving the log problem algebraically.

[3] An appropriate method is shown and 15.7 is determined algebraically, but the correct year is not determined.

or

[3] A computational error is made solving the log problem, but the answer is used correctly to find a year.

[2] A graph is sketched, and 15.7 is determined, and the year is found.

or

[2] A trial-and-error method (with at least 3 trials) is used, and the correct year is found.

or

[2] An attempt to use logs is made, but multiple computational errors are made, but a year is found.

or

[2] Only a correct log equation is set up.

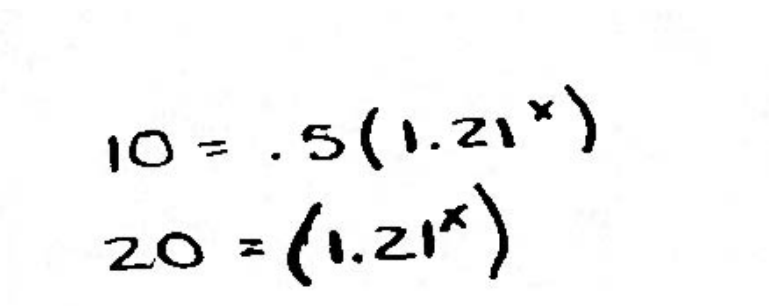
[1] The equation is set equal to 10 or 10,000,000, but it is not solved.

or

[1] 2003 or 2004, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student Response

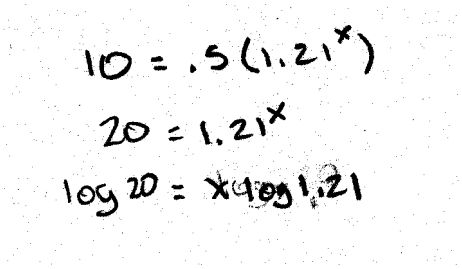


Comment

Score: 1

The student set the equation equal to 10 and properly divided by 0.5 but never showed log analysis.

Student Response

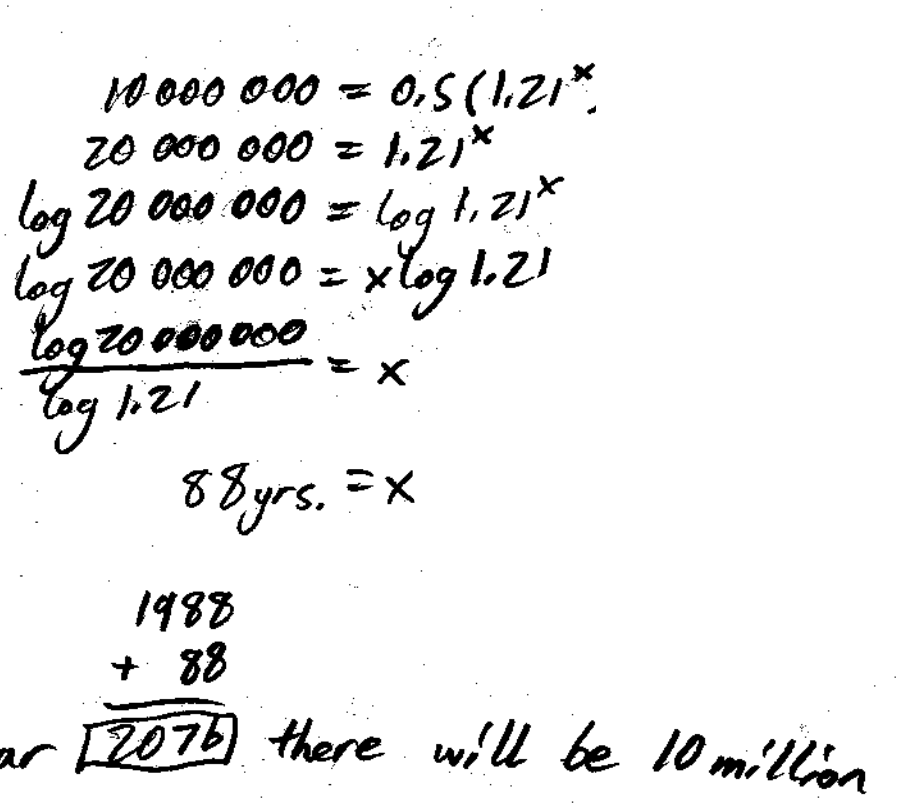


Comment

Score: 2

The student set up a correct log equation but went no further.

Student Response

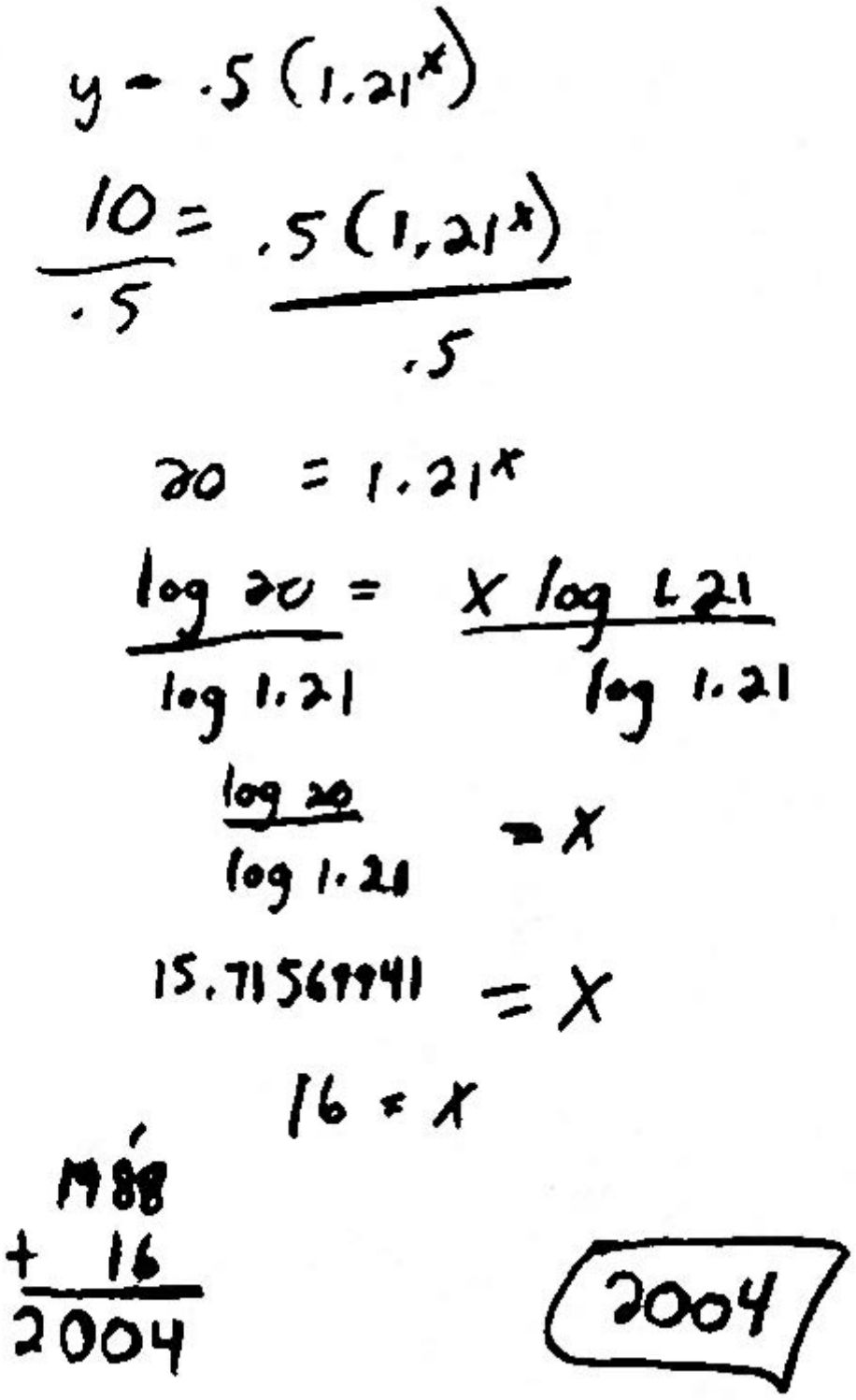


Comment

Score: 3

The student has made only one minor error, using 10,000,000 instead of 10.

Student Response



Comment

Score: 4

The student has a complete and correct response.

Sample Question 3 – Mathematics B

The volume of a particular gas was determined at various pressures. *P* represents the pressure (in atmospheres) and is the independent variable on the horizontal axes, and *V* represents the volume (in liters) and is the dependent variable on the vertical axes. Create a scatter plot and find the curve of best fit. (Round answer constants to the *nearest tenth*.) Using the regression equation found, estimate *V* if *P* = 2.5.

P	V
0.1	225
0.3	74.999
0.5	45
0.7	32.139
0.9	25
1.1	20.45
1.5	15
1.7	13.24
1.9	11.84
2.1	10.71
2.3	9.78

Rubric

[6] A correct scatter plot, including labeled axes, and an equation of best fit with $V = 22.5\ P^{-1}$, $P = 2.5$, and $V = 9$ are shown.

[5] An appropriate method is shown, but points are plotted incorrectly.

or

[5] An appropriate method is shown, but one computational error is made finding the equation or *V*.

[4] An appropriate method is shown, but an incorrect type of function for the equation is used.

or

[4] An appropriate method is shown, but the axes are not labeled and some points are plotted incorrectly.

or

[4] An appropriate method is shown, but no functional value of 2.5 is determined and one graphing error is made.

[3] A completely incorrect graph is shown, but a correct equation and functional value of 2.5 are given.

or

[3] A correctly drawn graph is shown, but no equation or an incorrect equation is given, and no equation or an incorrect functional value at 2.5 is given.

[2] A correct scatter plot is given, but the axes are not labeled.

or

[2] Only a correct equation is given.

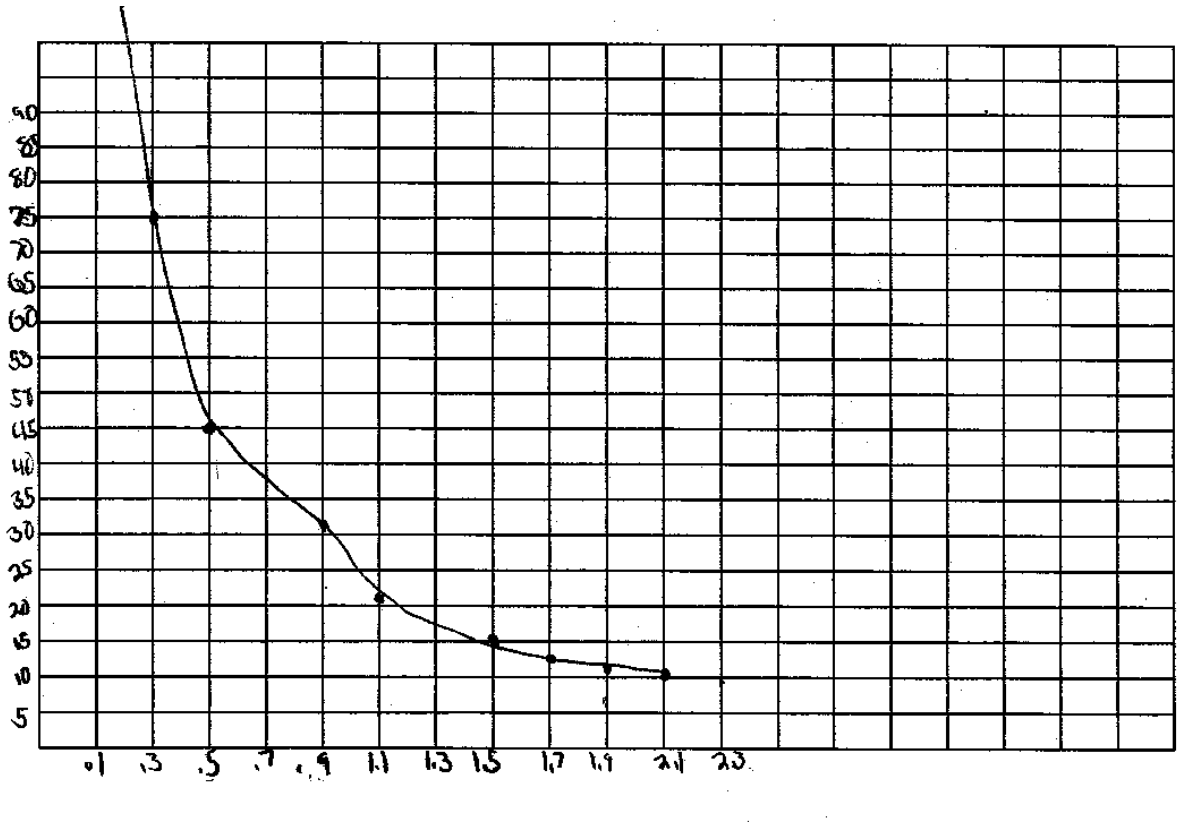
[1] A correct scatter plot is given, but minor errors on intervals of the axes are made.

or

[1] Only a correct value at 2.5 is given, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student Response



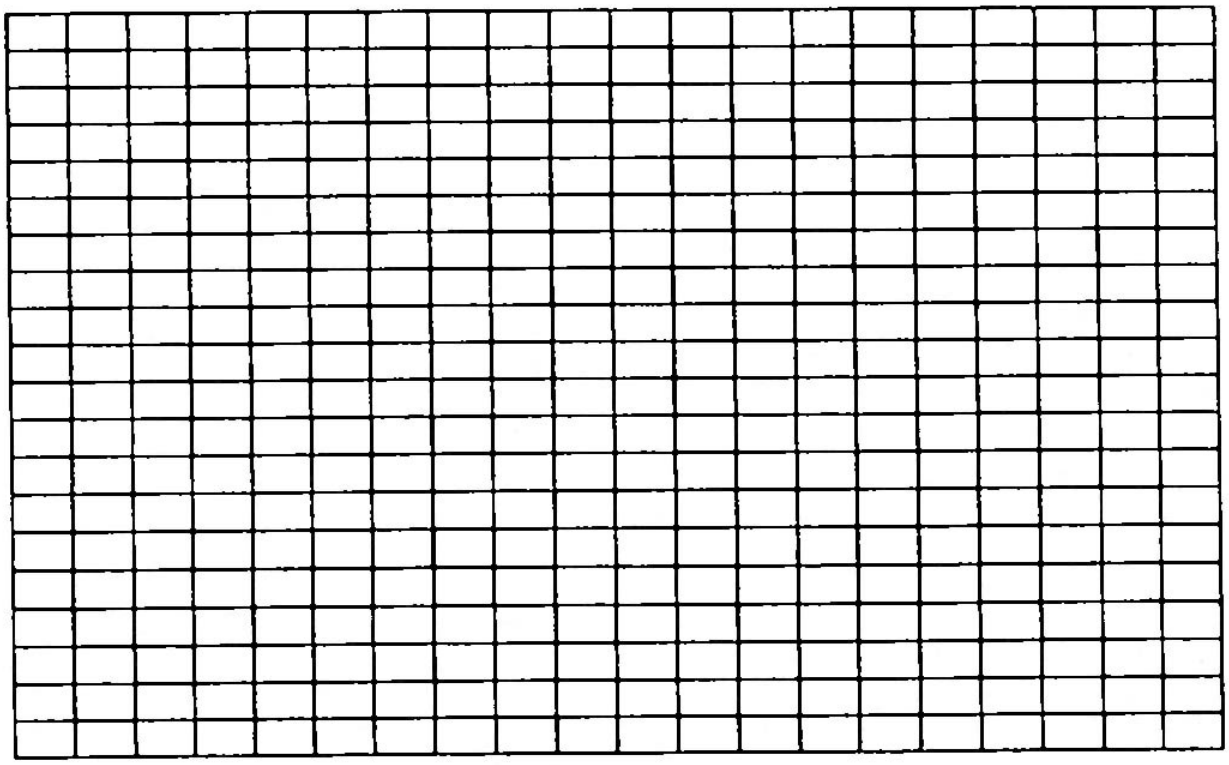
Comment

Score: 1

The student has shown minimal work in an attempt to draw a scatter plot.

Student Response

$V = 22.498\bar{\rho}^{-1}$

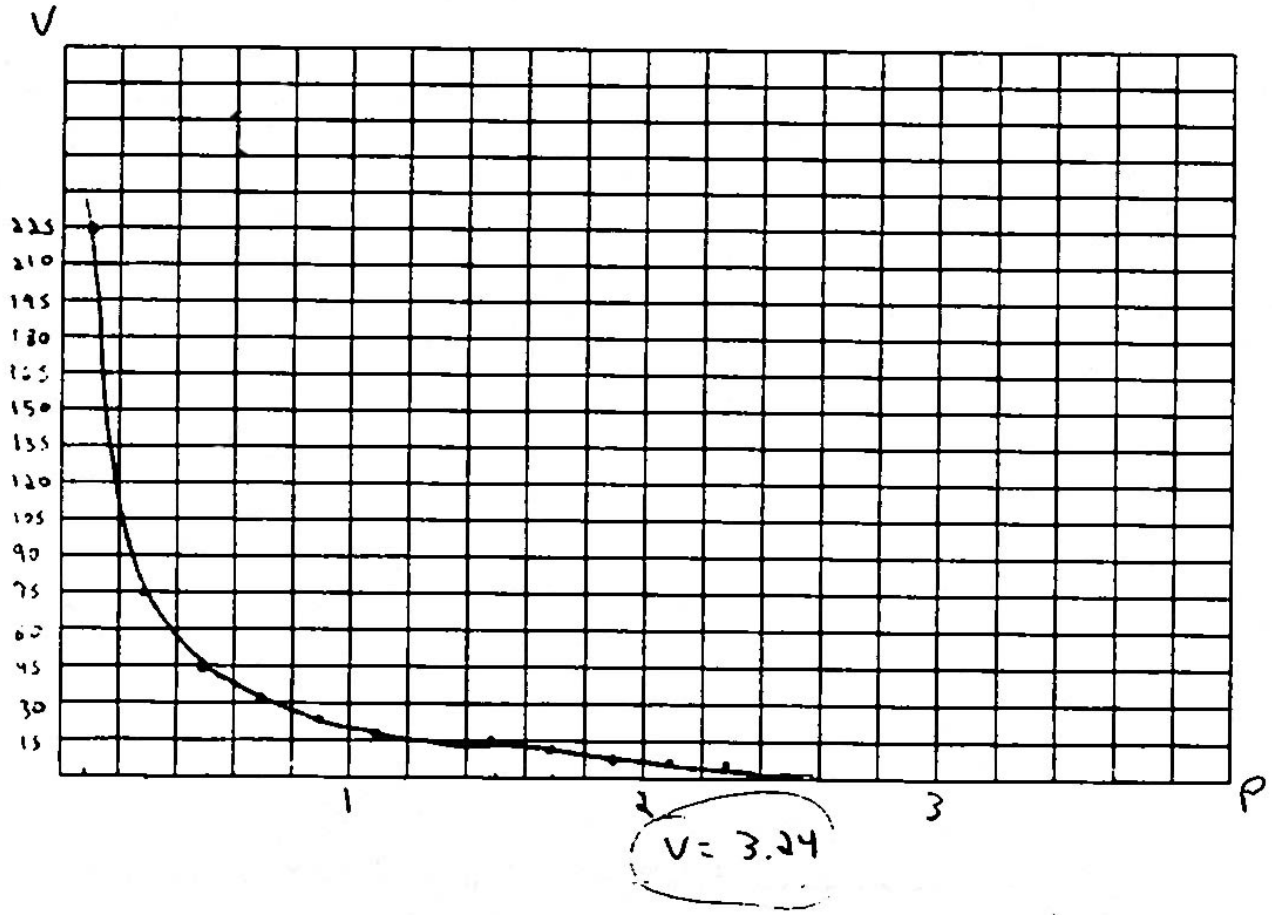


Comment

Score: 2

The student has shown only a correct equation.

Student Response



Comment

Score: 3

The student has drawn an acceptable graph but has not shown any regression equation.

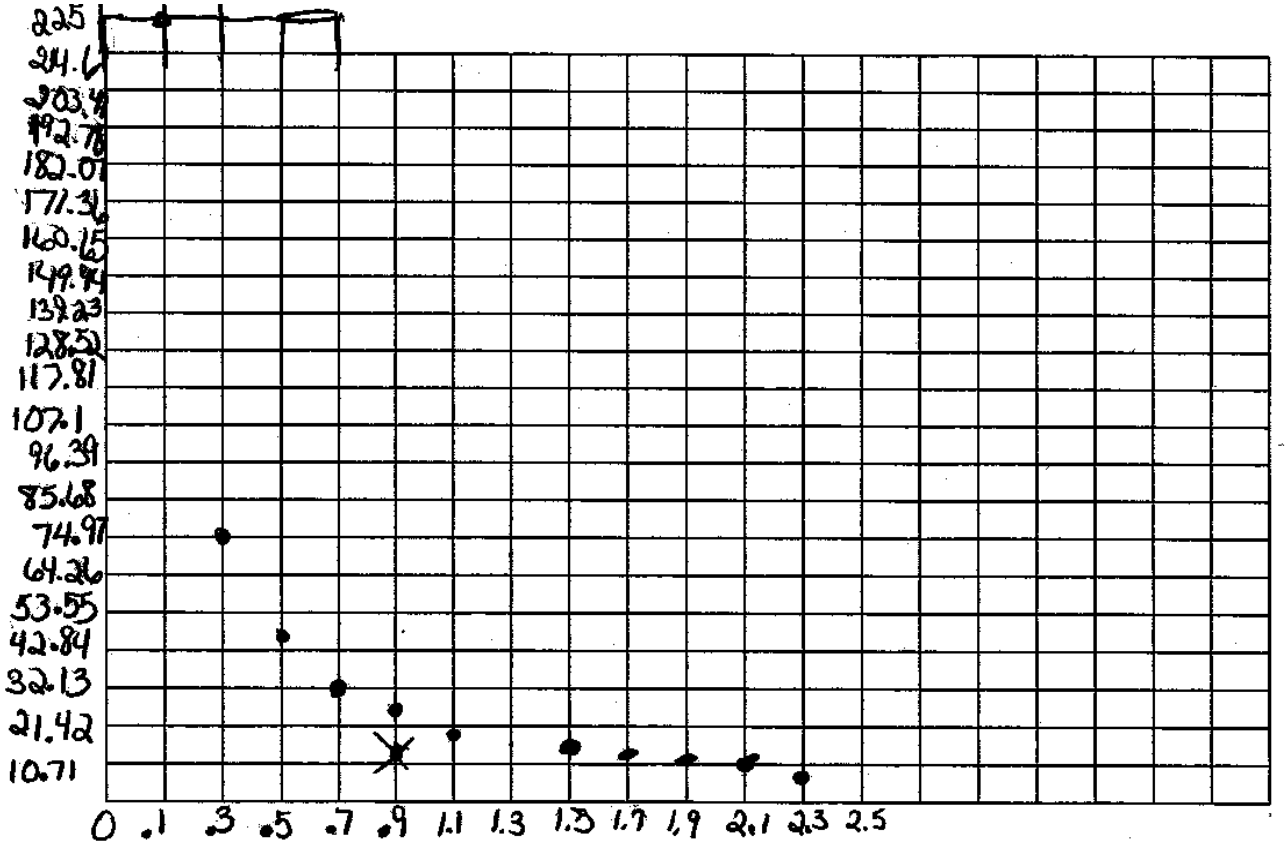
Student Response

cubic regression

$Y = -88.3x^3 + 394.2x^2 - 547.6x + 246.$

$x = 2.5$

$Y = -38.4375$

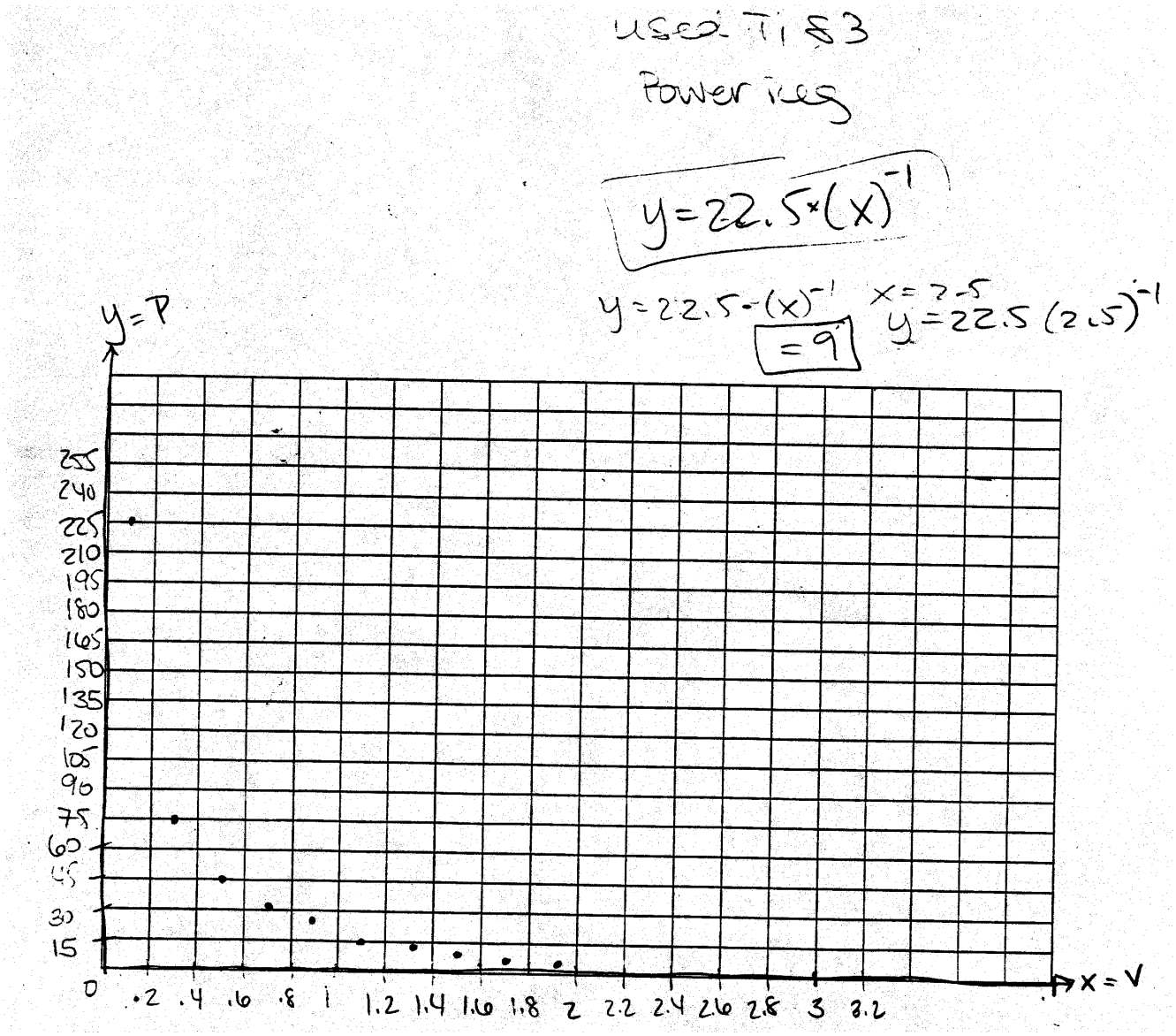


Comment

Score: 4

The student has shown an incorrect regression line but has continued to find an appropriate value for y (V). Also, no labels appear on the axes.

Student Response



Comment

Score: 5

The student has made a minor error labeling the axes, showing the *y*-axis equal to *P* when it should be *V*.

Student Response

quadratic ($R^2 = .7$)
$y = 78.3x^2 - 246.1x + 185.3$
logarithmic ($r = -.9$)
$y = 36.3 + -59.4 \ln x$

linear $r = -.7$
$y = -57.4x + 112.3$
*power ($r = -.9999\ldots$
$y = 22.5x^{-1}$

$V = 22.5P^{-1}$

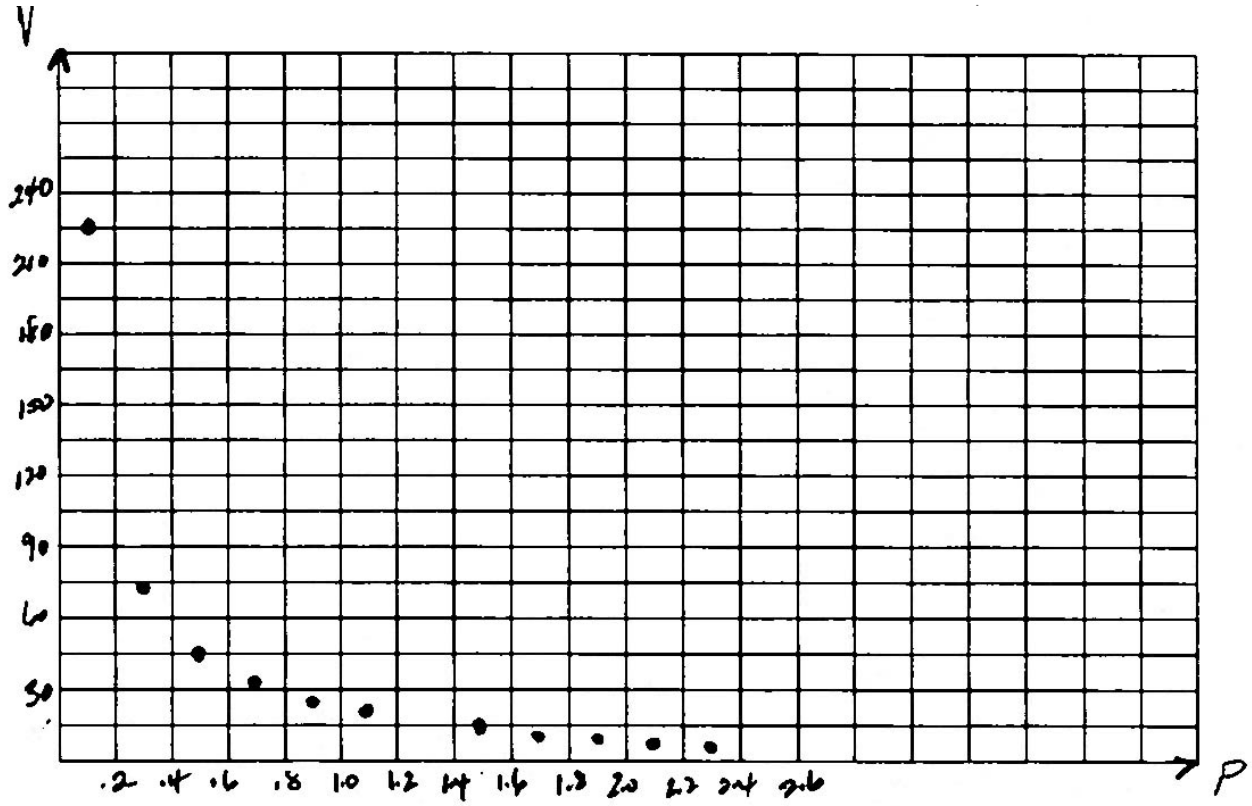
$V = 22.5(2.5)^{-1}$

$V = 9$

P → L1
V → L2

[-.12, 2.52] by [-26.8074, 261.5874]

STATPLOT



Comment

Score: 6
The student's response is correct and complete.