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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 EXAMINATION IN 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 Second Language Proficiency Examinations: School Administrator's Manual, 2008 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/sam/secondary/home.html.

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 Regents Examination in Mathematics B, 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 print or photocopy this information booklet and distribute copies to all school personnel who will be scoring this examination.

SCORING THE EXAMINATIONS

The Regents Examination in Mathematics B is 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 total number of credits the student earned for Part I, awarding two credits for each multiple-choice question answered correctly.

If preferred, machine-scorable answer sheets may 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 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 the Regents Examination in Mathematics B, all student answer papers that receive a scaled score of 60 through 64 must be scored a second time. The principal may elect to have the scoring committee also score a second time those student answer papers that received a scaled score of 50 through 54, or all student answer papers. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper. However, ***no*** teacher may 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 ensure that the student's final examination score is based on a fair, accurate, and reliable scoring of the student's answer paper.

When the teacher scoring committee completes the scoring process, test scores must be considered final and must be entered onto students' permanent records.

Principals and other administrative staff in a school or district do not have the authority to set aside the scores arrived at by the teacher scoring committee and rescore student examination papers or to change any scores assigned through the procedures described in this manual and in the scoring materials provided by the Department. Any principal or administrator found to have done so, except in the circumstances described below, will be in violation of Department policy regarding the scoring of State examinations. Teachers and administrators who violate Department policy with respect to scoring State examinations may be subject to disciplinary action in accordance with Sections 3020 and 3020-a of Education Law or to action against their certification pursuant to Part 83 of the Regulations of the Commissioner of Education.

On rare occasions, an administrator may learn that an isolated error occurred in the calculation of a final score for a student or in recording students' scores in their permanent records. For example, the final score may have been based on an incorrect summing of the student's raw scores for parts of the test or from a misreading of the conversion chart. When such errors involve no more than five students' final scores on any Regents Examination and when such errors are detected within four months of the test date, the principal may arrange for the corrected score to be recorded in the student's permanent record. However, in all such instances, the principal must advise the Office of State Assessment in writing that the student's score has been corrected. The written notification to the Department must be signed by the principal or superintendent and must include the names of the students whose scores have been corrected, the name of the examination, the students' original and corrected scores, and a brief explanation of the nature of the scoring error that was corrected.

If an administrator has substantial reason to believe that the teacher scoring committee has failed to accurately score more than five student answer papers on any examination, the administrator must first obtain permission in writing from the Office of State Assessment before arranging for or permitting a rescoring of student papers. The written request to the Office of State Assessment must come from the superintendent of a public school district or the chief administrative officer of a nonpublic or charter school and must include the examination title, date of administration, and number of students whose papers would be subject to such rescoring. This request must also include a statement explaining why the administrator believes that the teacher scoring committee failed to score appropriately and, thus, why he or she believes rescoring the examination papers is necessary. As part of this submission, the school administrator must make clear his or her understanding that such extraordinary re-rating may be carried out only by a full committee of teachers constituted in accordance with the scoring guidelines presented above and fully utilizing the scoring materials for this test provided by the Department.

The Department sometimes finds it necessary to notify schools of a revision to the scoring key and rating guide for an examination. Should this occur after the scoring committee has completed its work, the principal is authorized to have appropriate members of the scoring committee review students' responses only to the specific question(s) referenced in the notification and to adjust students' final examination scores when appropriate. Only in such circumstances is the school not required to notify or obtain approval from the Department to correct students' final examination scores.

Specific Information for Scoring the Regents Examination in Mathematics B

The information below refers to the scoring of open-ended questions on the Regents Examination in Mathematics B 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 Regents Examination in Mathematics B 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 and 1 credit for a 2-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.

  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 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, a curve is drawn and labeled correctly, and a correct explanation is given.

or

[2] 13–27, and a statement explaining how to interpret the curve are given, but no curve is drawn.

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

or

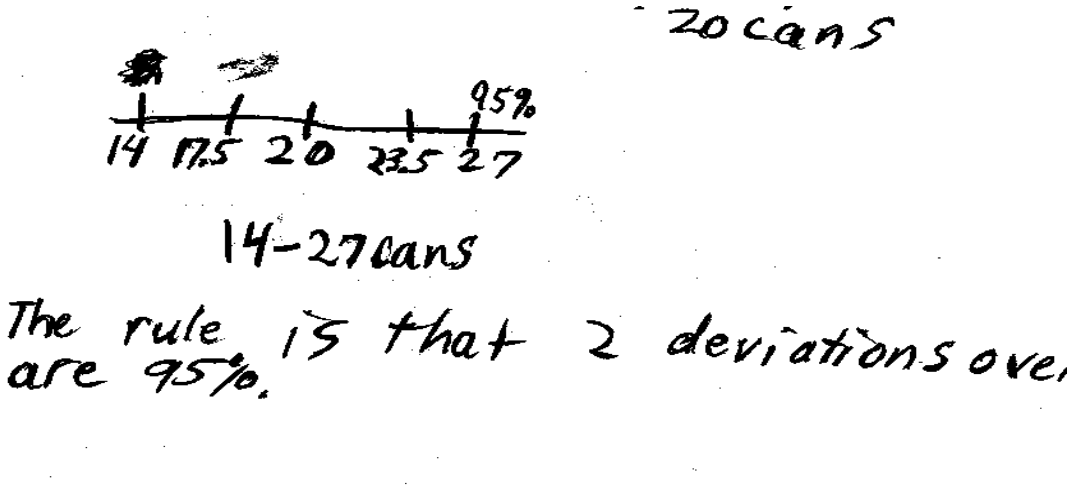
[1] A correct answer based on an incorrect curve is given.

or

[1] 13–27, but no further correct 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

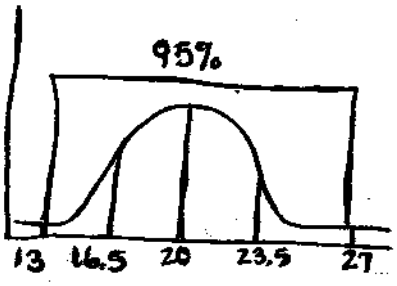


Comment

Score: 1

The student'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] 2004, and appropriate algebraic work is shown, such as solving the log problem algebraically.

[3] Appropriate algebraic work is shown to find 15.7, but the correct year is not determined.

or

[3] Appropriate algebraic work is shown, but one computational or rounding error is made.

[2] Appropriate work is shown, but two or more computational or rounding errors are made.

or

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

or

[2] A correct logarithmic equation is written, but no further correct work is shown.

or

[2] 2004, but a method other than an algebraic solution is used.

[1] Appropriate work is shown, but one conceptual and one computational or rounding error are made.

or

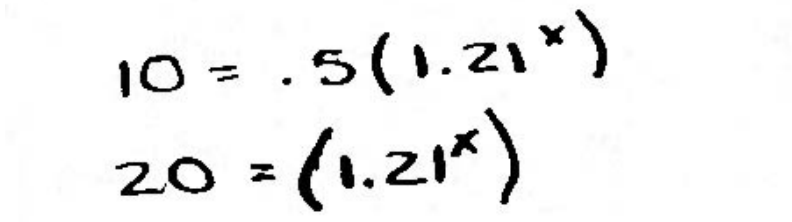
[1] The equation is set equal to 10 or 10,000,000, but it is not solved.

or

[1] 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

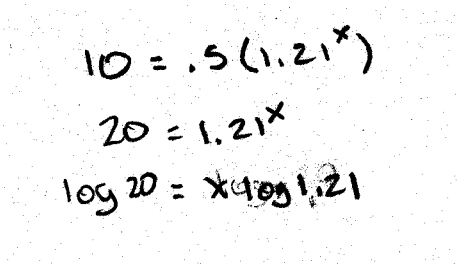


Comment

Score: 1

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

Student Response

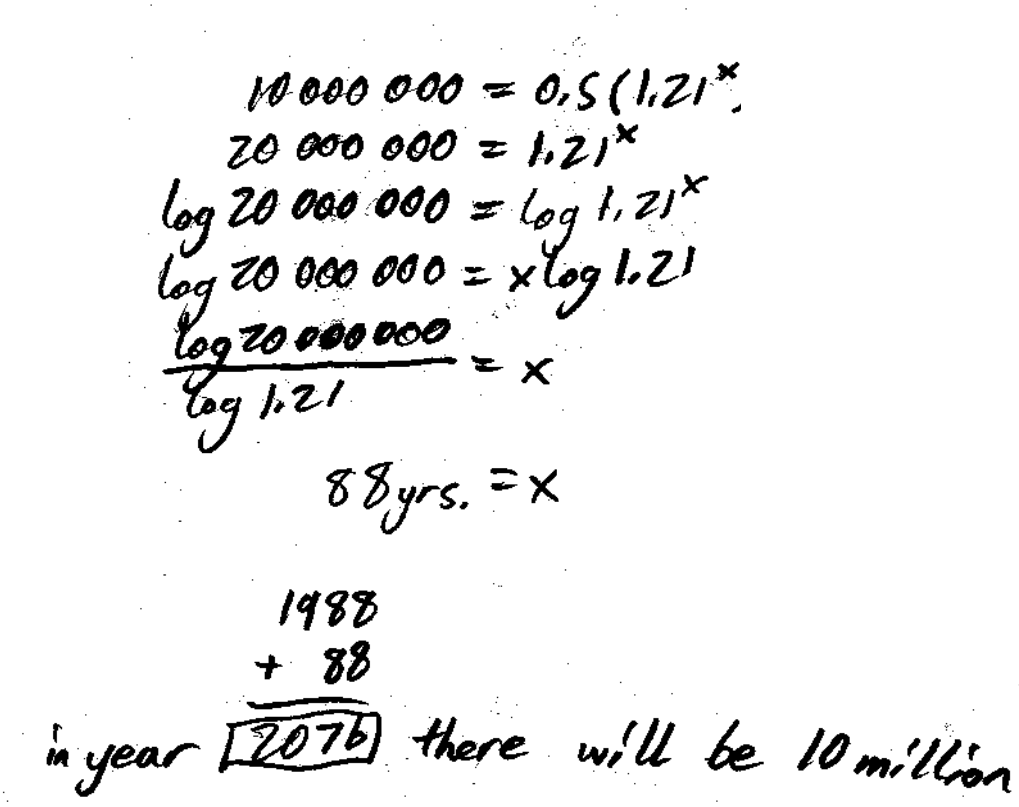


Comment

Score: 2

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

Student Response

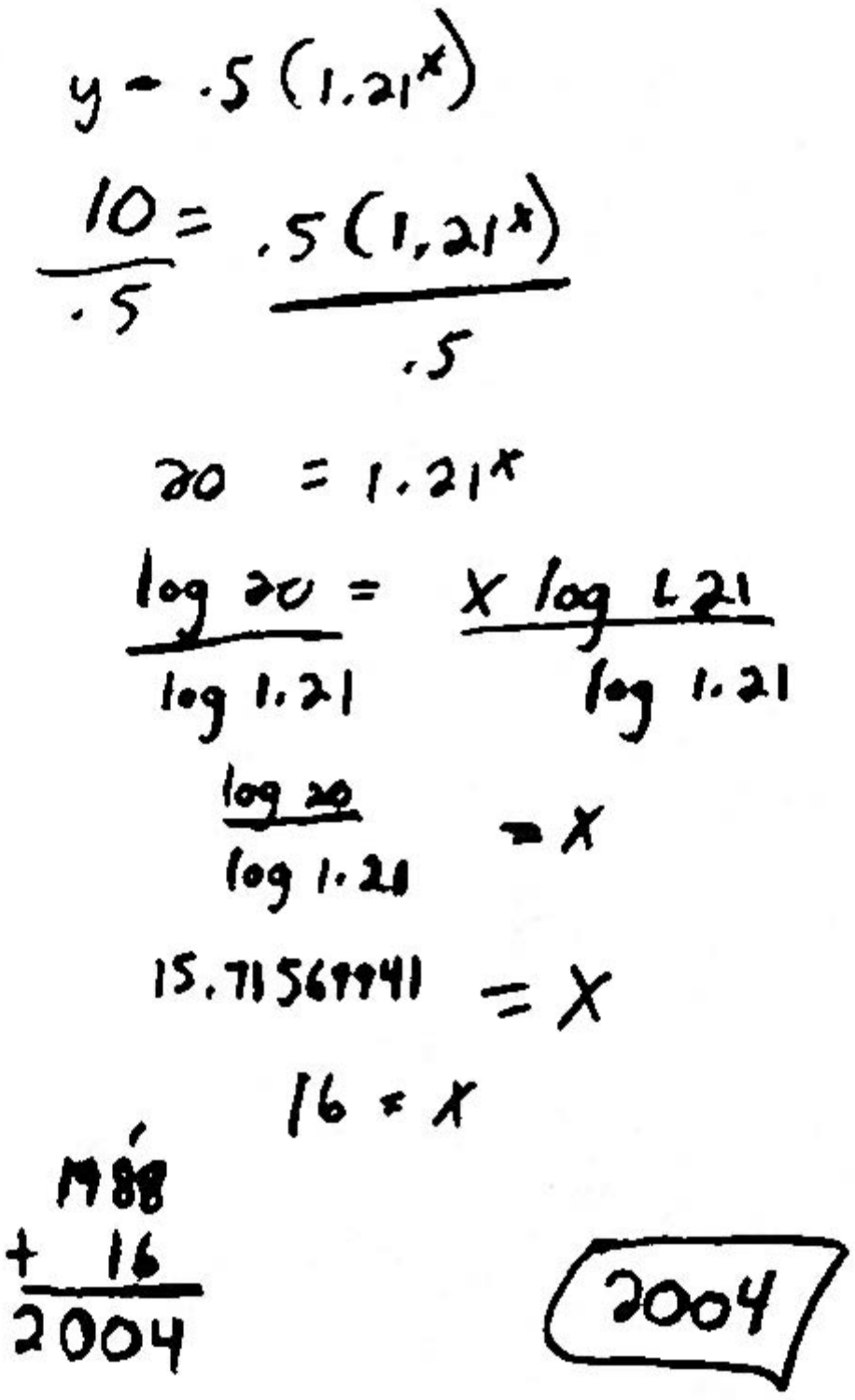


Comment

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, $V = 22.5\ P^{-1}$, and 9, and appropriate work is shown.

[5] Appropriate work is shown, but one computational or graphing error is made.

[4] Appropriate work is shown, but two or more computational or graphing errors are made.

or

[4] A correct scatter plot is drawn, but an incorrect type of function for the equation is used, but the volume is found based on the incorrect equation.

or

[4] A correct scatter plot is drawn, $V = 22.5\ P^{-1}$, but no further correct work is shown.

[3] $V = 22.5\ P^{-1}$ and 9, but no further correct work is shown.

or

[3] A correct scatter plot is drawn, but no further correct work is shown.

[2] $V = 22.5\ P^{-1}$, but no further correct work is shown.

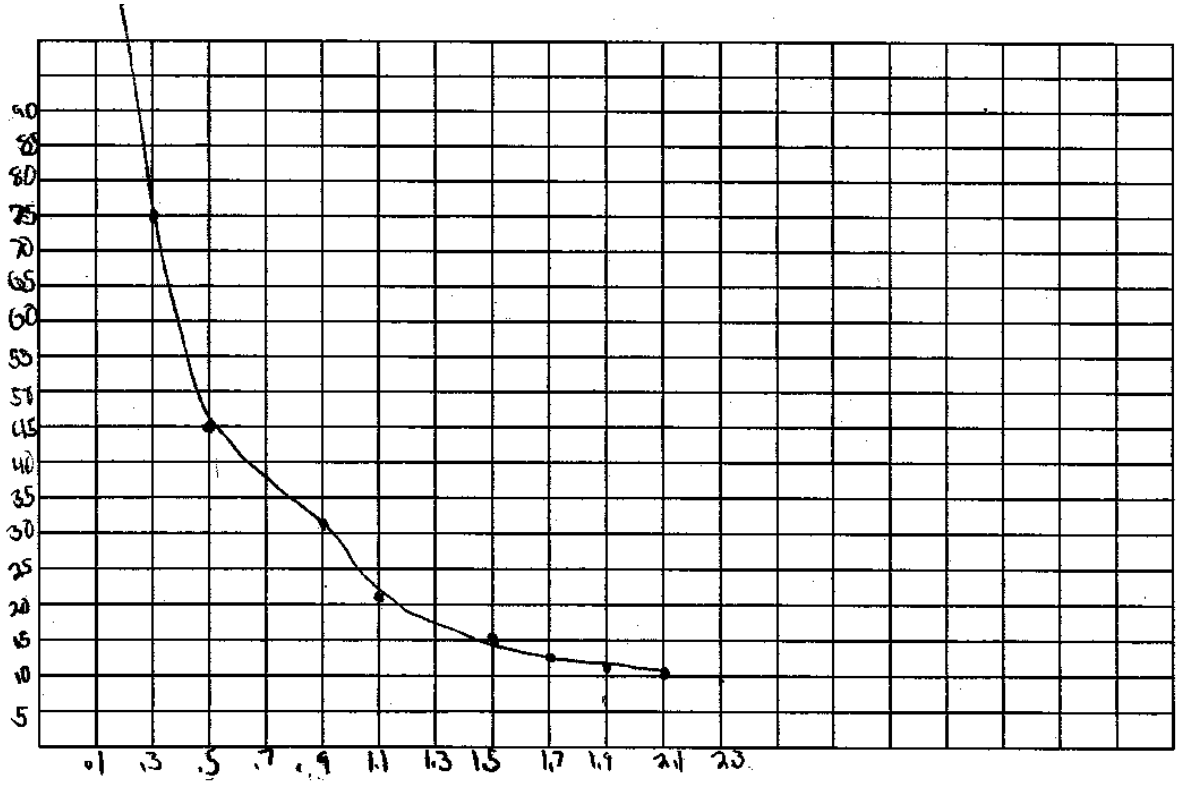
[1] A correct scatter plot is given, but minor errors on intervals of the axes are made.

or

[1] 9, 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



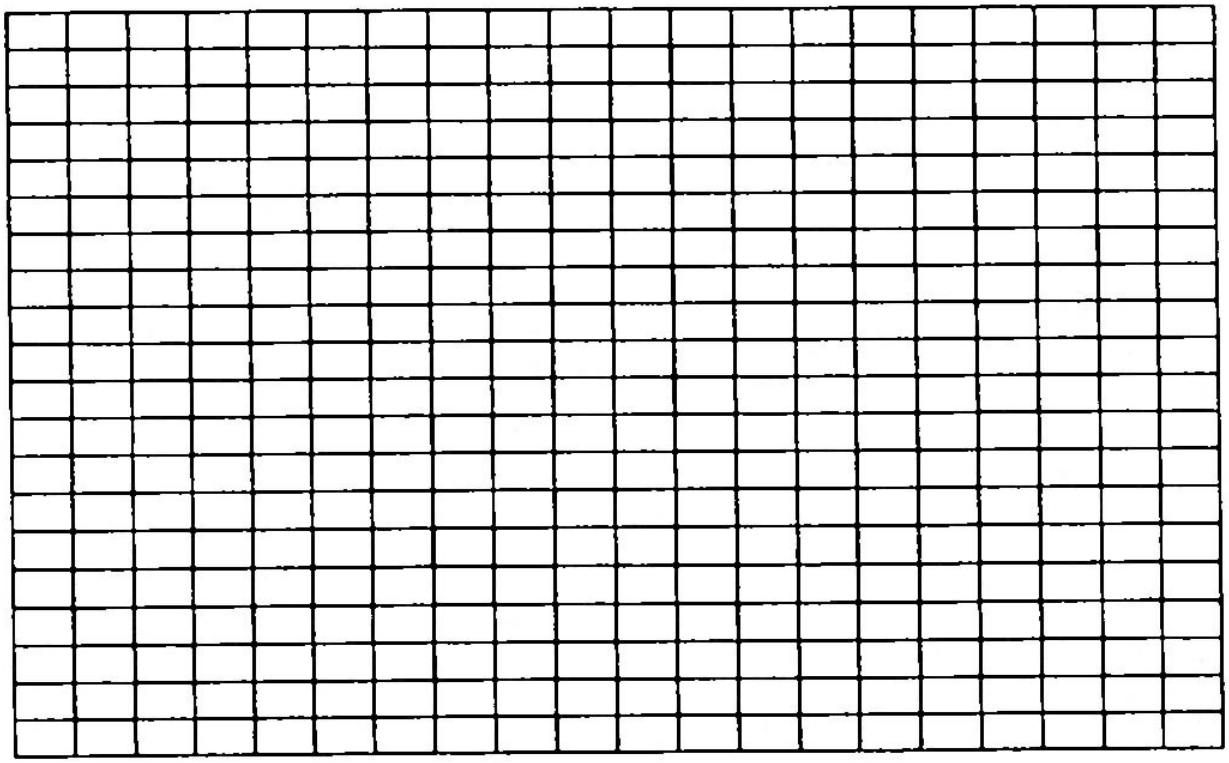
Comment

Score: 1

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

Student Response

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

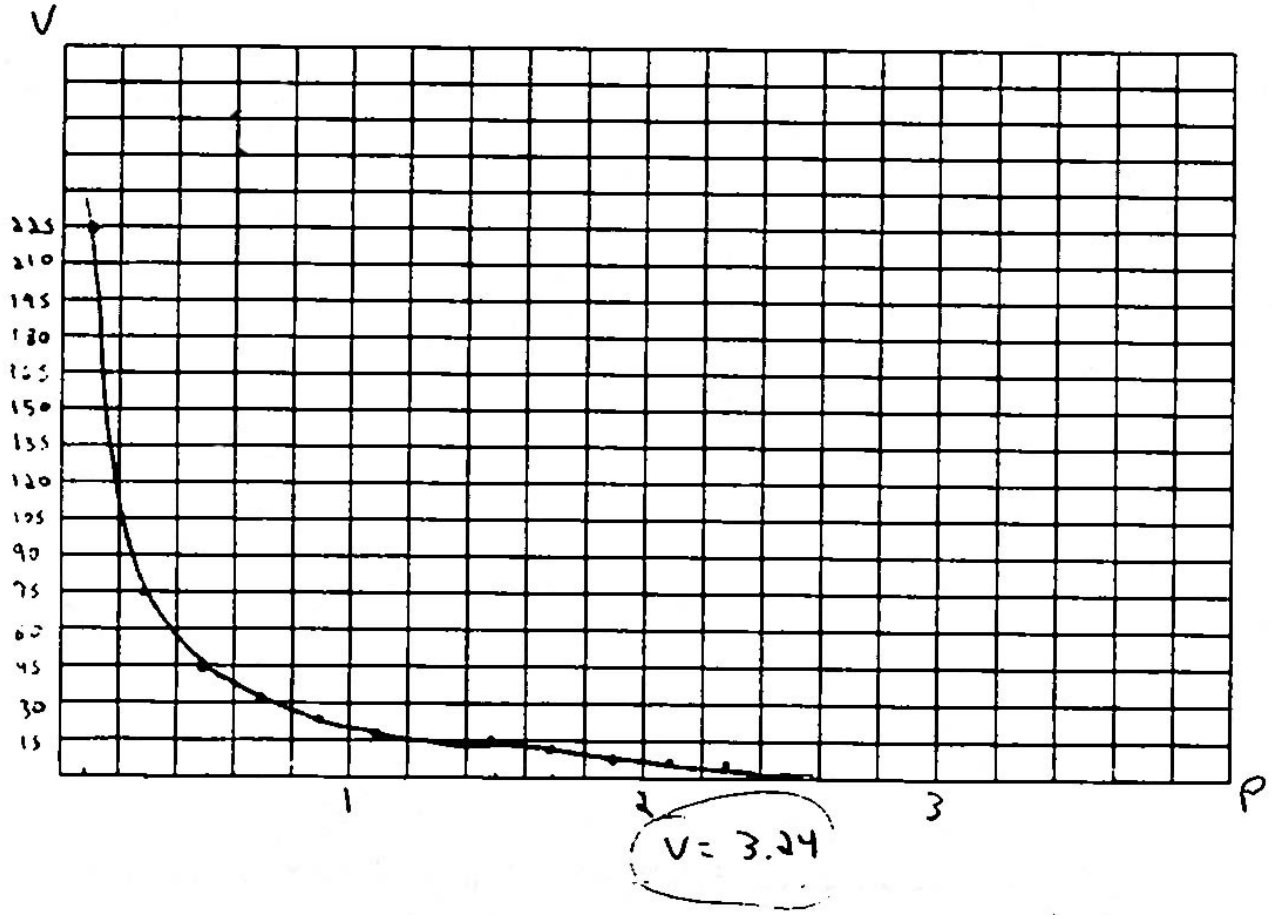


Comment

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.

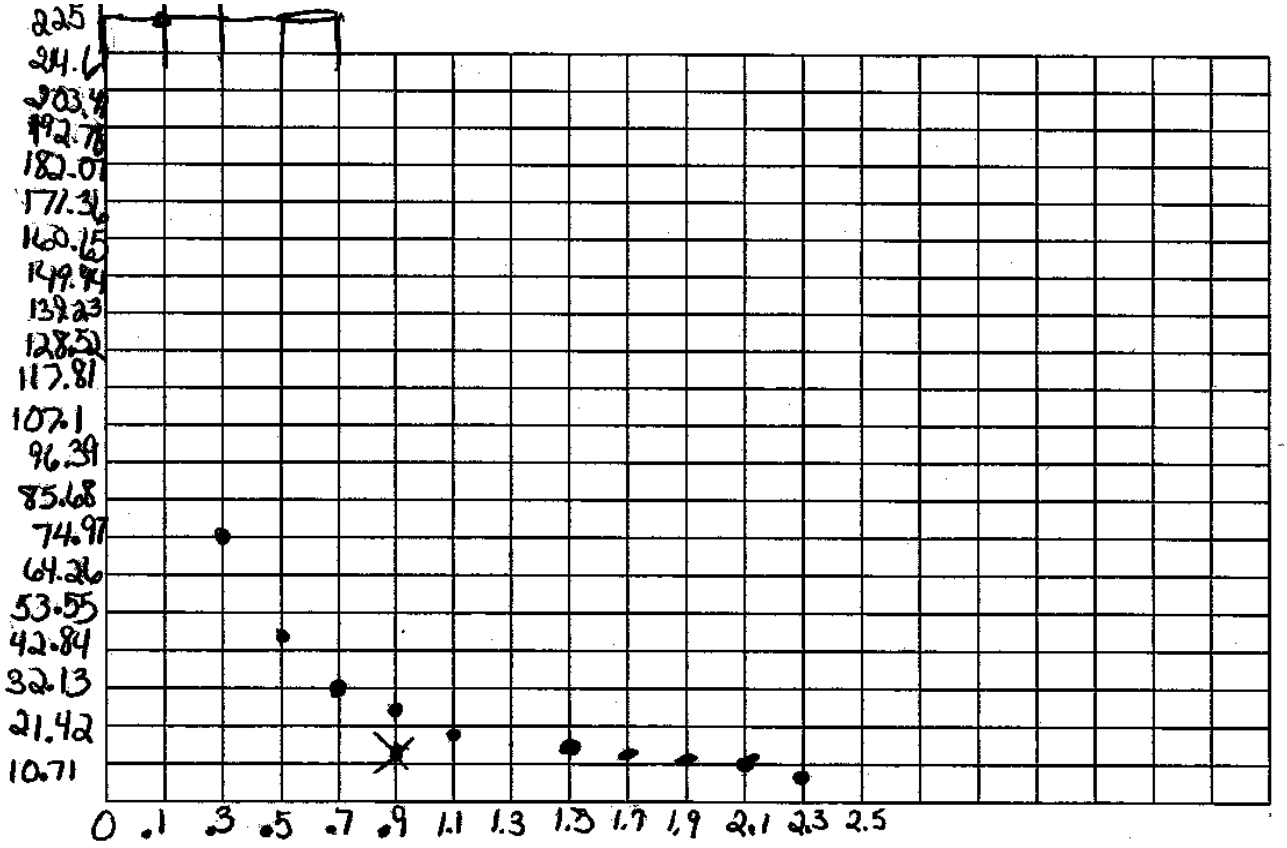
Student Response

cubic regression

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

$x = 2.5$

$Y = -38.4375$

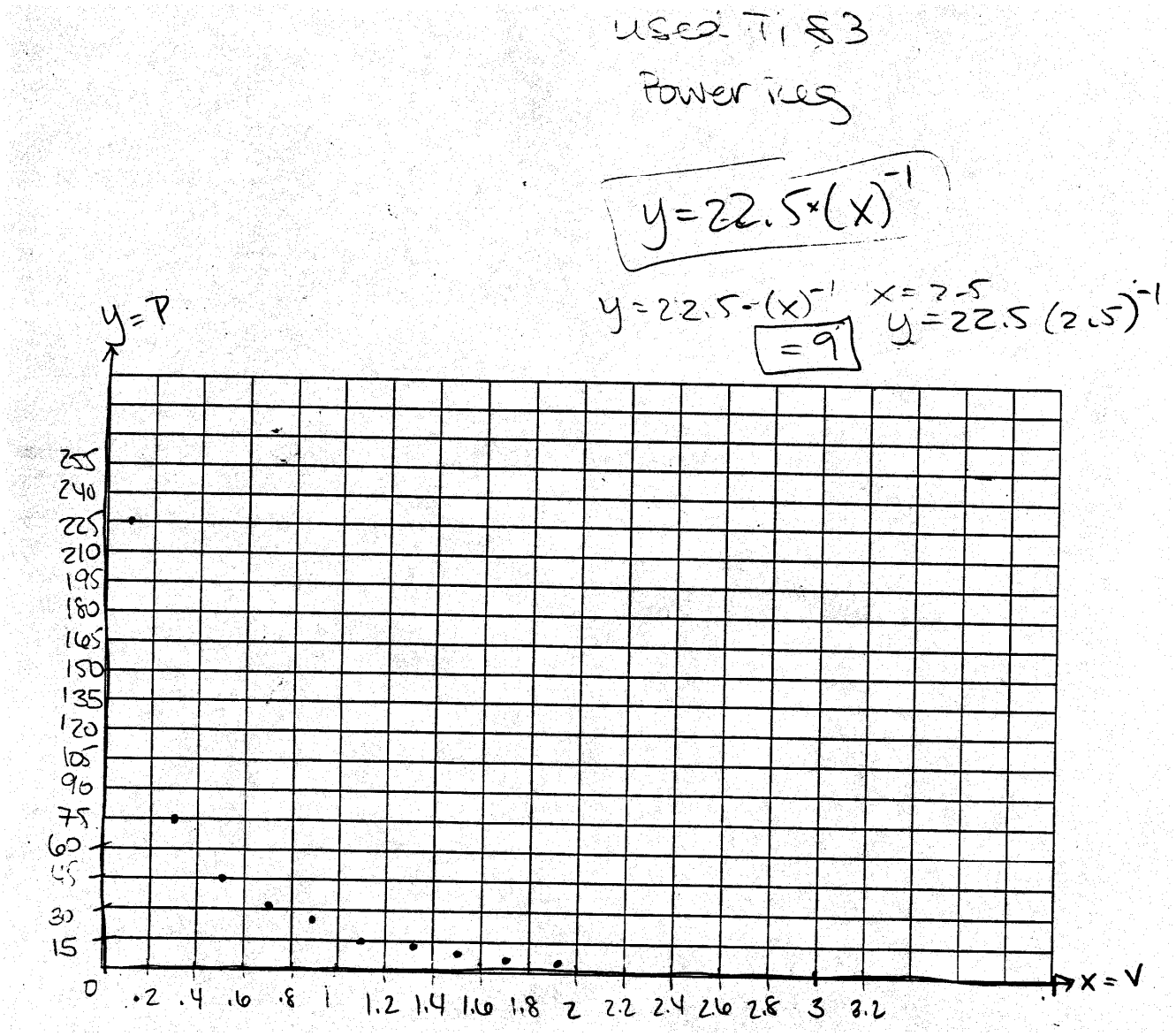


Comment

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 ($r = -.9$)
$y = 36.3 + -57.4 \ln x$

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

$V = 22.5P^{-1}$

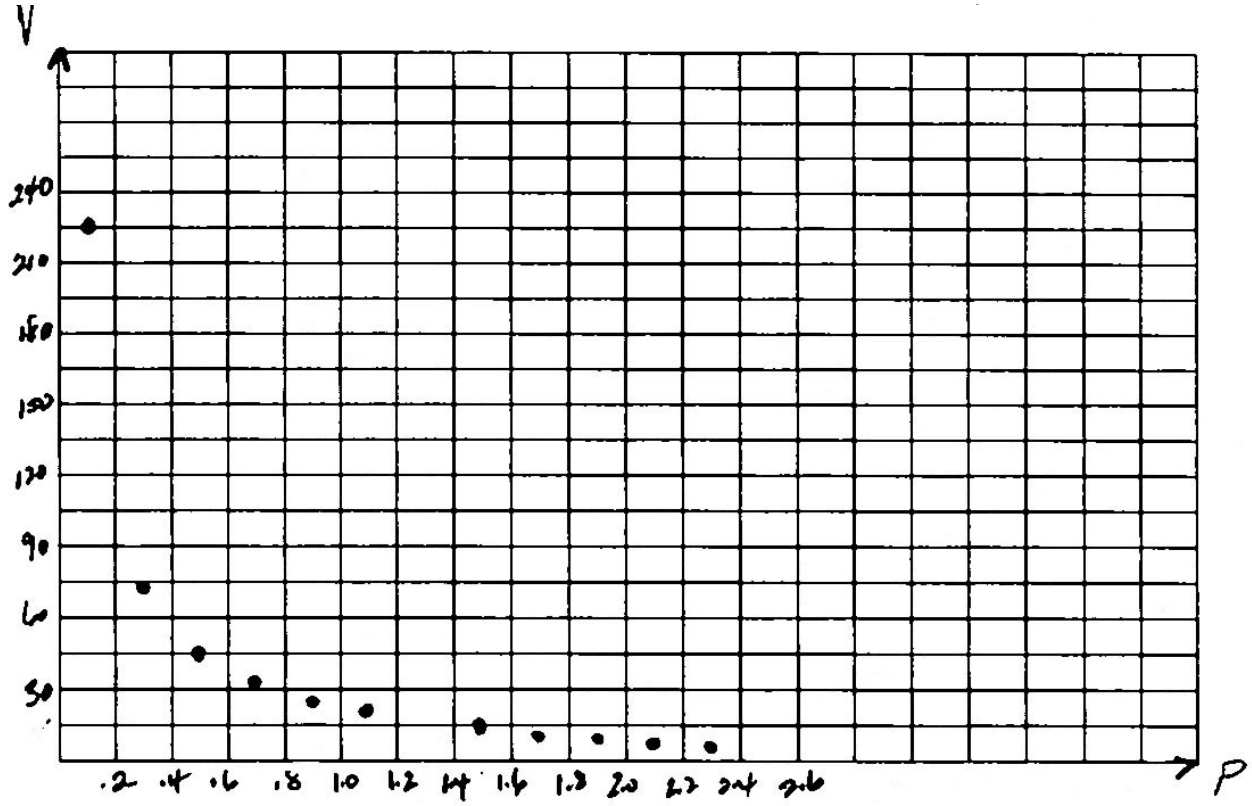
$V = 22.5(2.5)^{-1}$

$V = 9$

P → L1
V → L2

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

STATPLOT



Comment

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