The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I

Monday, August 19, 2024 — 8:30 to 11:30 a.m., only

Student Name _____

School Name _____

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

Print your name and the name of your school on the lines above.

A separate answer sheet for **Part I** has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet.

This examination has four parts, with a total of 35 questions. You must answer all questions in this examination. Record your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in **Parts II**, **III**, and **IV** directly in this booklet. All work should be written in pen, except for graphs and drawings, which should be done in pencil. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale.

The formulas that you may need to answer some questions in this examination are found at the end of the examination. This sheet is perforated so you may remove it from this booklet.

Scrap paper is not permitted for any part of this examination, but you may use the blank spaces in this booklet as scrap paper. A perforated sheet of scrap graph paper is provided at the end of this booklet for any question for which graphing may be helpful but is not required. You may remove this sheet from this booklet. Any work done on this sheet of scrap graph paper will *not* be scored.

When you have completed the examination, you must sign the statement printed at the end of the answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet cannot be accepted if you fail to sign this declaration.

Notice ...

A graphing calculator and a straightedge (ruler) must be available for you to use while taking this examination.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

Part I

Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet. [48]

Use this space for computations.

1 What is the correct factorization of $x^2 + 4x - 12$?

(1) $(x + 3)(x - 4)$

(2) $(x - 3)(x + 4)$

(3) $(x + 2)(x - 6)$

(4) $(x - 2)(x + 6)$

2 Which situation can be modeled by a linear function?

(1) A printer can print one page every three seconds.

(2) A bank account earns 0.5% interest each year, compounded annually.

(3) The number of cells in an organism doubles every four days.

(4) The attendance at a professional sports team's games decreases by 1.5% each year.

3 Which expression is equivalent to $3(x^2 - 2x + 3) - (4x^2 + 3x - 1)$?

(1) $-x^2 + x + 2$

(2) $-x^2 - 8x + 7$

(3) $-x^2 - 3x + 8$

(4) $-x^2 - 9x + 10$

4 At Adelynn's first birthday party, each guest brought \$1 in coins for her piggy bank. Guests brought nickels, dimes, and quarters for a total of \$28. There were twice as many dimes as nickels and 12 more quarters than nickels. Which equation could be used to determine the number of nickels, x, that her guests brought to her party?

(1) $.05x + .10x + .25x = 28$

(2) $.05x + .10(2x) + .25(x + 12) = 28$

(3) $.05(2x) + .10x + .25(x + 12) = 28$

(4) $.05(x + 12) + .10(2x) + .25x = 28$

Use this space for computations.

5 A student creates a fourth-degree trinomial with a leading coefficient of 2 and a constant value of 5. The trinomial could be

(1) $2x^4 + 3x^2 + 5$

(2) $2x^4 + 5x + 3$

(3) $4x^2 - 3x + 5$

(4) $4x^3 - 5x^2 + 3$

6 When solving the equation $4x^2 - 16 = 0$, Laura wrote $4x^2 = 16$ as her first step. Which property justifies Laura's first step?

(1) distributive property of multiplication over addition

(2) multiplication property of equality

(3) commutative property of addition

(4) addition property of equality

7 Which expression results in an irrational number?

(1) $\sqrt{3} \cdot \sqrt{3}$

(2) $-\frac{2}{3} + \frac{1}{4}$

(3) $5 \cdot \sqrt{81}$

(4) $\frac{1}{3} + \sqrt{3}$

8 Which equation has the same solutions as $x^2 + 6x - 18 = 0$?

(1) $(x + 3)^2 = 24$

(2) $(x + 3)^2 = 27$

(3) $(x + 6)^2 = 24$

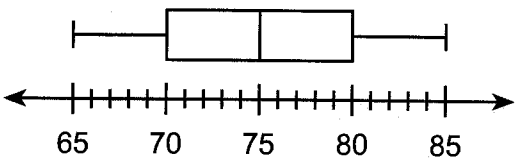
(4) $(x + 6)^2 = 27$

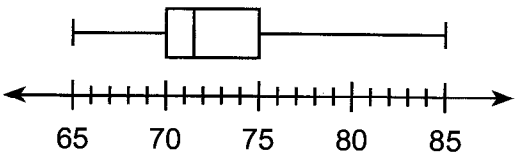
Use this space for computations.

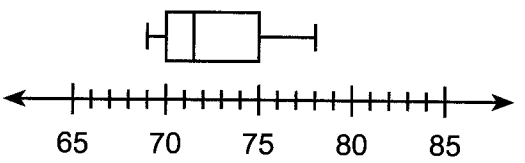
9 The heights, in inches, of eight football players are given below.

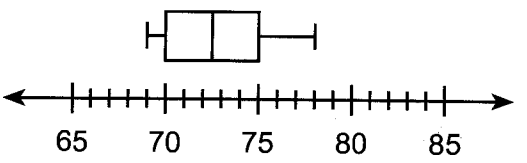
76, 70, 72, 70, 69, 71, 78, 74

Which box plot represents these data?

(1) 

(2) 

(3) 

(4) 

10 A bookstore owner recorded the number of books sold and the profit made selling the books.

Books Sold	Profit
100	$50.00
250	$275.00
300	$350.00
350	$425.00

What is the average rate of change, in dollars per book, between 100 and 350 books sold?

(1) 0.50

(2) 0.67

(3) 1.50

(4) 2.00

Use this space for computations.

11 If $f(x) = x^2$, then which function represents a shift of the graph of $f(x)$ 4 units to the right and 3 units down?

(1) $g(x) = (x + 4)^2 + 3$

(2) $j(x) = (x + 4)^2 - 3$

(3) $h(x) = (x - 4)^2 - 3$

(4) $k(x) = (x - 4)^2 + 3$

12 The amount of money a plumber charges is represented by the function $p(h) = 45 + 90h$. The best interpretation of the y-intercept of this function is that the plumber charges

(1) \$45 to come to the house

(2) \$45 per hour that he works

(3) \$90 to come to the house

(4) \$90 per hour that he works

13 What is the solution to the inequality $2m - 4 \leq 3(2m + 4)$?

(1) $m \leq -2$

(2) $m \geq -2$

(3) $m \leq -4$

(4) $m \geq -4$

14 A survey of students at West High School was taken to determine a theme for the prom. The results of the survey are summarized in the table below.

	Beach Party	Hollywood	Broadway
Girls	86	112	68
Boys	123	77	79

Approximately what percentage of the students who chose the Broadway theme were girls?

(1) 26

(2) 27

(3) 46

(4) 68

Use this space for computations.

15 The sum of $2\sqrt{54}$ and $2\sqrt{6}$ is

(1) $4\sqrt{60}$

(2) $8\sqrt{15}$

(3) $7\sqrt{6}$

(4) $8\sqrt{6}$

16 The functions $f(x) = x^2 - 5x - 14$ and $g(x) = x + 2$ are graphed on the same set of axes. What are the solutions to the equation $f(x) = g(x)$?

(1) -14 and 0

(2) 0 and 2

(3) -2 and 8

(4) -2 and 7

17 If $x = 4a^2 - a + 3$ and $y = a - 5$, then which polynomial is equivalent to the product of x and y?

(1) $-17a^2 - 2a - 15$

(2) $-17a^2 + 8a - 15$

(3) $4a^3 - 21a^2 - 2a - 15$

(4) $4a^3 - 21a^2 + 8a - 15$

18 What is an equation of the line that passes through (3,7) and has a slope of 2?

(1) $y - 7 = 2(x - 3)$

(2) $y - 3 = 2(x - 7)$

(3) $y + 7 = 2(x + 3)$

(4) $y + 3 = 2(x + 7)$

19 A geometric sequence with a common ratio of -3 is

(1) $-10,-7,-4,-1, \ldots$

(2) $14,11,8,5, \ldots$

(3) $-2,-6,-18,-54, \ldots$

(4) $4,-12,36,-108, \ldots$

Use this space for computations.

20 When the equation $6 - ax = ax - 2$ is solved for x in terms of a, and $a \neq 0$, the result is

(1) $4a$

(2) $\frac{4}{a}$

(3) $2a$

(4) $\frac{2}{a}$

21 Which function has the zeros -1, 3, and -4?

(1) $f(x) = (x + 1)(x - 3)(x - 4)$

(2) $g(x) = (x - 1)(x + 3)(x - 4)$

(3) $h(x) = (x + 1)(x - 3)(x + 4)$

(4) $k(x) = (x - 1)(x + 3)(x + 4)$

22 The expression $5^{a + 2b}$ is equivalent to

(1) $5^a \cdot 5^2 \cdot 5^b$

(2) $5^a \cdot 25^b$

(3) 25^{2ab}

(4) $25^{a + 2b}$

23 In an arithmetic sequence, the first term is 4 and the third term is -2. What is the common difference?

(1) -1

(2) -2

(3) -3

(4) -6

Use this space for computations.

24 Joe is ordering water for his swimming pool. He determines the volume of his pool to be about 3240 cubic feet. There are approximately 7.5 gallons of water in 1 cubic foot. A truck load holds 6000 gallons of water.

Which expression would allow Joe to correctly calculate the number of truck loads of water he needs to fill his pool?

(1) $\frac{3240\ \text{ft}^3}{1\ \text{pool}} \cdot \frac{1\ \text{ft}^3}{7.5\ \text{gal}} \cdot \frac{6000\ \text{gal}}{1\ \text{truck load}}$

(2) $\frac{3240\ \text{ft}^3}{1\ \text{pool}} \cdot \frac{1\ \text{ft}^3}{7.5\ \text{gal}} \cdot \frac{1\ \text{truck load}}{6000\ \text{gal}}$

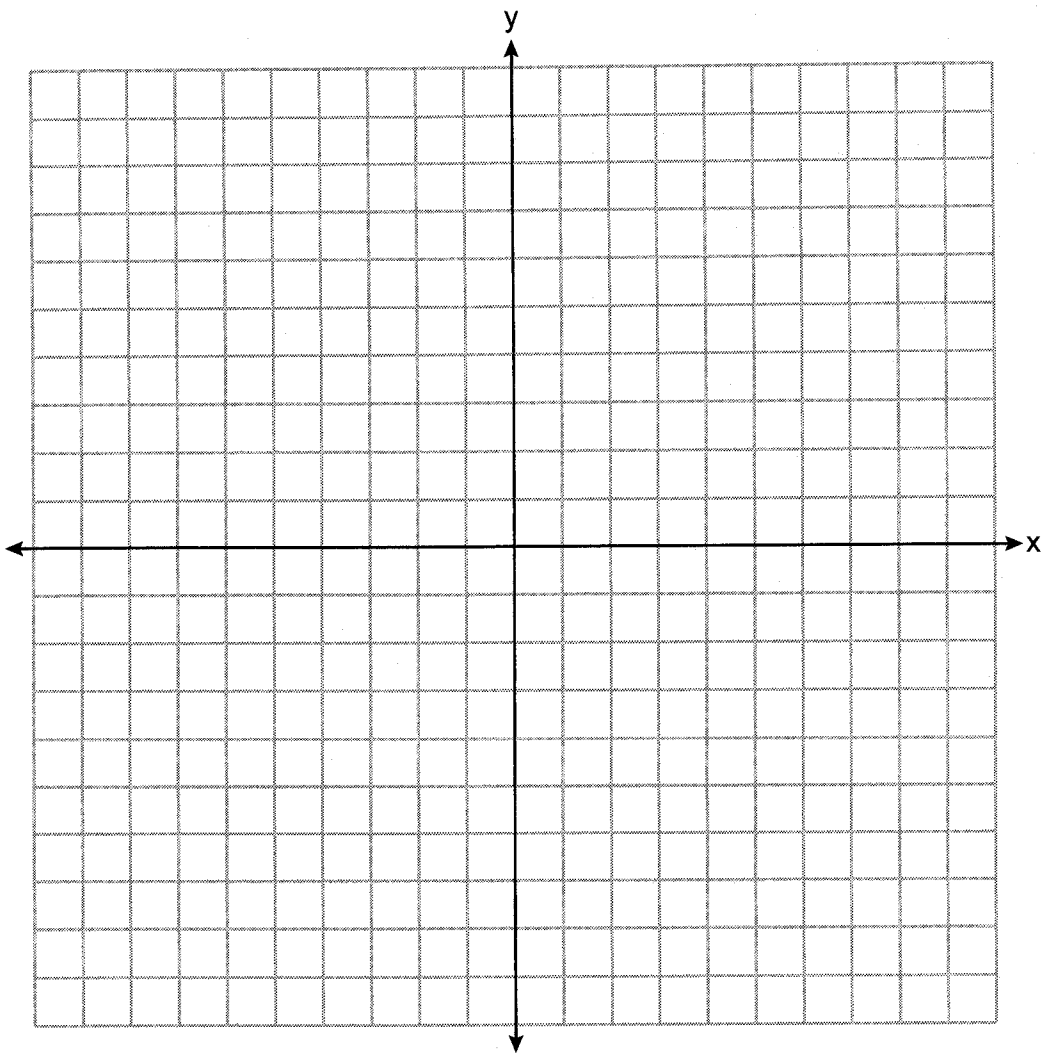
(3) $\frac{3240\ \text{ft}^3}{1\ \text{pool}} \cdot \frac{7.5\ \text{gal}}{1\ \text{ft}^3} \cdot \frac{6000\ \text{gal}}{1\ \text{truck load}}$

(4) $\frac{3240\ \text{ft}^3}{1\ \text{pool}} \cdot \frac{7.5\ \text{gal}}{1\ \text{ft}^3} \cdot \frac{1\ \text{truck load}}{6000\ \text{gal}}$

Part II

Answer all 6 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [12]

25 On the set of axes below, graph $f(x) = x^2 + 4x + 1$.



State the coordinates of the minimum.

26 If $f(x) = \frac{30x^2}{x+2}$, determine the value of $f\left(\frac{1}{2}\right)$.

27 Explain why the relation shown in the table below is a function.

x	−1	0	1	2
y	2	4	4	5

Complete the table below with values for both x and y so that this new relation is *not* a function.

x	−1	0	1	2	
y	2	4	4	5	

28 Solve algebraically for x: $0.05(x - 3) = 0.35x - 7.5$

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

30 Factor $5x^3 - 80x$ completely.

Part III

Answer all 4 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

State the linear regression equation for these data, rounding all values to the *nearest hundredth*.

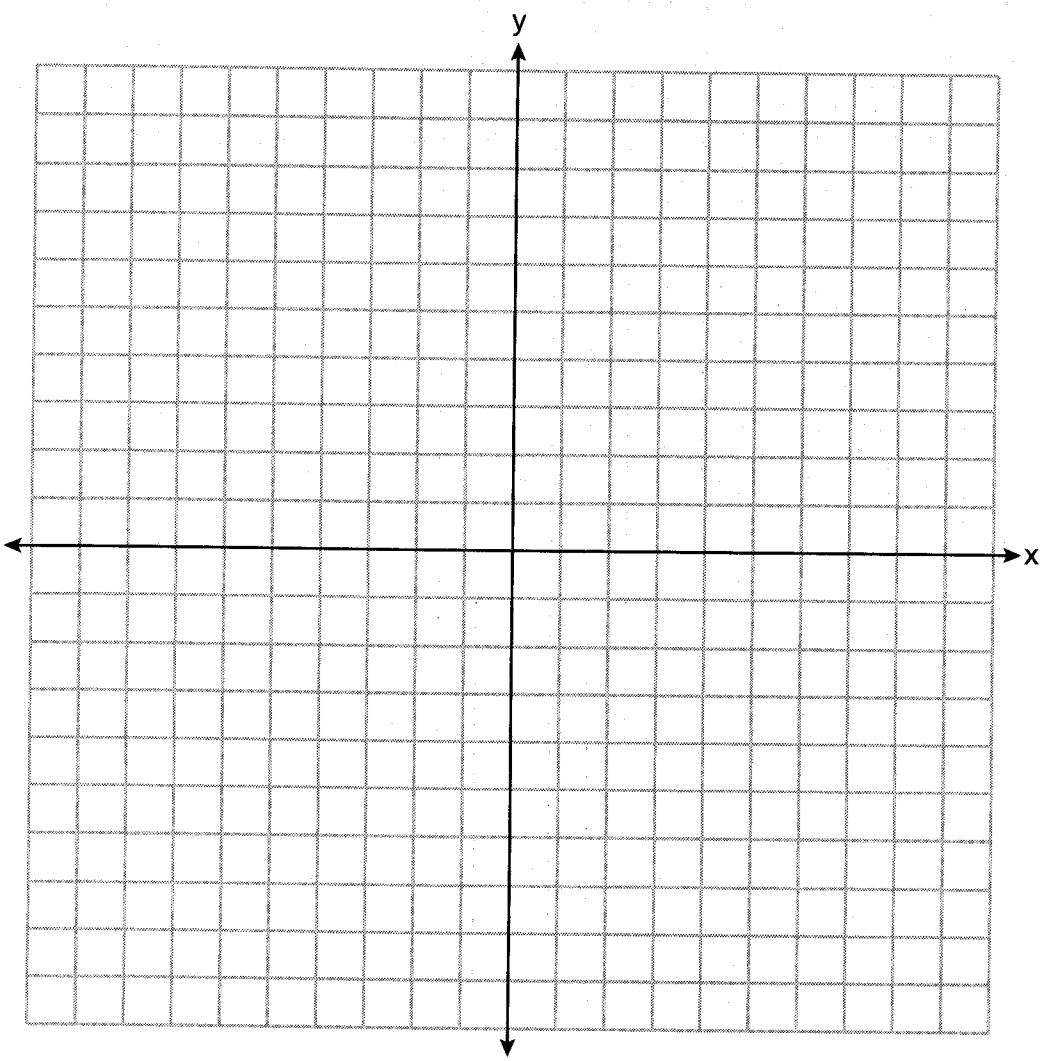
State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

State what this correlation coefficient indicates about the linear fit of the data.

32 Graph the system of inequalities on the set of axes below:

$$y > 3x - 4$$
$$x + 2y \leq 6$$

Label the solution set *S*.



Is the point (2,2) a solution to the system? Justify your answer.

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

34 Solve the system of equations algebraically for all values of x and y.

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

$$y = 2x + 7$$

Part IV

Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided to determine your answer. Note that diagrams are not necessarily drawn to scale. A correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [6]

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent \$38.50. In June, she went to 6 matinees and one regular-priced show and spent \$47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

Jen said she spent \$5.75 on each matinee and \$9 on each regular show. Is Jen correct? Justify your answer.

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

The State Education Department / The University of the State of New York

Regents Examination in Algebra I – August 2024

Scoring Key: Part I (Multiple-Choice Questions)

Examination	Date	Question Number	Scoring Key	Question Type	Credit
Algebra I	Aug. '24	**1**	4	MC	2
Algebra I	Aug. '24	**2**	1	MC	2
Algebra I	Aug. '24	**3**	4	MC	2
Algebra I	Aug. '24	**4**	2	MC	2
Algebra I	Aug. '24	**5**	1	MC	2
Algebra I	Aug. '24	**6**	4	MC	2
Algebra I	Aug. '24	**7**	4	MC	2
Algebra I	Aug. '24	**8**	2	MC	2
Algebra I	Aug. '24	**9**	3	MC	2
Algebra I	Aug. '24	**10**	3	MC	2
Algebra I	Aug. '24	**11**	3	MC	2
Algebra I	Aug. '24	**12**	1	MC	2
Algebra I	Aug. '24	**13**	4	MC	2
Algebra I	Aug. '24	**14**	3	MC	2
Algebra I	Aug. '24	**15**	4	MC	2
Algebra I	Aug. '24	**16**	3	MC	2
Algebra I	Aug. '24	**17**	4	MC	2
Algebra I	Aug. '24	**18**	1	MC	2
Algebra I	Aug. '24	**19**	4	MC	2
Algebra I	Aug. '24	**20**	2	MC	2
Algebra I	Aug. '24	**21**	3	MC	2
Algebra I	Aug. '24	**22**	2	MC	2
Algebra I	Aug. '24	**23**	3	MC	2
Algebra I	Aug. '24	**24**	4	MC	2

Regents Examination in Algebra I – August 2024

Scoring Key: Parts II, III, and IV (Constructed-Response Questions)

Examination	Date	Question Number	Scoring Key	Question Type	Credit
Algebra I	Aug. '24	**25**	-	CR	2
Algebra I	Aug. '24	**26**	-	CR	2
Algebra I	Aug. '24	**27**	-	CR	2
Algebra I	Aug. '24	**28**	-	CR	2
Algebra I	Aug. '24	**29**	-	CR	2
Algebra I	Aug. '24	**30**	-	CR	2
Algebra I	Aug. '24	**31**	-	CR	4
Algebra I	Aug. '24	**32**	-	CR	4
Algebra I	Aug. '24	**33**	-	CR	4
Algebra I	Aug. '24	**34**	-	CR	4
Algebra I	Aug. '24	**35**	-	CR	6

Key
MC = Multiple-choice question
CR = Constructed-response question

The chart for determining students' final examination scores for the **August 2024 Regents Examination in Algebra I** will be posted on the Department's web site at: https://www.nysedregents.org/algebraone/ on the day of the examination. Conversion charts provided for the previous administrations of the Regents Examination in Algebra I must NOT be used to determine students' final scores for this administration.

FOR TEACHERS ONLY

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I

Monday, August 19, 2024 — 8:30 to 11:30 a.m., only

RATING GUIDE

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations and select the link "Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents Examination period.

The Department is providing supplemental scoring guidance, the "Model Response Set," for the Regents Examination in Algebra I. This guidance is intended to be part of the scorer training. Schools are encouraged to incorporate the Model Response Sets into the scorer training or to use them as additional information during scoring. While not reflective of all scenarios, the model responses selected for the Model Response Set illustrate how less common student responses to constructed-response questions may be scored. The Model Response Set will be available on the Department's web site at https://www.nysedregents.org/algebraone/.

Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Regents Examination in Algebra I. More detailed information about scoring is provided in the publication *Information Booklet for Scoring the Regents Examination in Algebra I.*

Do *not* attempt to correct the student's work by making insertions or changes of any kind. In scoring the constructed-response questions, use check marks to indicate student errors. Unless otherwise specified, mathematically correct variations in the answers will be allowed. Units need not be given when the wording of the questions allows such omissions.

Each student's answer paper is to be scored by a minimum of three mathematics teachers. No one teacher is to score more than approximately one-third of the constructed-response questions on a student's paper. Teachers may not score their own students' answer papers. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

Schools are not permitted to rescore any of the constructed-response questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Raters should record the student's scores for all questions and the total raw score on the student's separate answer sheet. Then the student's total raw score should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations on Monday, August 19, 2024. Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score. The student's scale score should be entered in the box provided on the student's separate answer sheet. The scale score is the student's final examination score.

General Rules for Applying Mathematics Rubrics

I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents Examination in Algebra I are designed to provide a systematic, consistent method for awarding credit. The rubrics are not to be considered all-inclusive; it is impossible to anticipate all the different methods that students might use to solve a given problem. Each response must be rated carefully using the teacher's professional judgment and knowledge of mathematics; all calculations must be checked. The specific rubrics for each question must be applied consistently to all responses. In cases that are not specifically addressed in the rubrics, raters must follow the general rating guidelines in the publication *Information Booklet for Scoring the Regents Examination in Algebra I*, use their own professional judgment, confer with other mathematics teachers, and/or contact the State Education Department for guidance. During each Regents Examination administration period, rating questions may be referred directly to the Education Department. The contact numbers are sent to all schools before each administration period.

II. Full-Credit Responses

A full-credit response provides a complete and correct answer to all parts of the question. Sufficient work is shown to enable the rater to determine how the student arrived at the correct answer.

When the rubric for the full-credit response includes one or more examples of an acceptable method for solving the question (usually introduced by the phrase "such as"), it does not mean that there are no additional acceptable methods of arriving at the correct answer. Unless otherwise specified, mathematically correct alternative solutions should be awarded credit. The only exceptions are those questions that specify the type of solution that must be used; e.g., an algebraic solution or a graphic solution. A correct solution using a method other than the one specified is awarded half the credit of a correct solution using the specified method.

III. Appropriate Work

Full-Credit Responses: The directions in the examination booklet for all the constructed-response questions state: "Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc." The student has the responsibility of providing the correct answer ***and*** showing how that answer was obtained. The student must "construct" the response; the teacher should not have to search through a group of seemingly random calculations scribbled on the student paper to ascertain what method the student may have used.

Responses With Errors: Rubrics that state "Appropriate work is shown, but…" are intended to be used with solutions that show an essentially complete response to the question but contain certain types of errors, whether computational, rounding, graphing, or conceptual. If the response is incomplete; i.e., an equation is written but not solved or an equation is solved but not all of the parts of the question are answered, appropriate work has ***not*** been shown. Other rubrics address incomplete responses.

IV. Multiple Errors

Computational Errors, Graphing Errors, and Rounding Errors: Each of these types of errors results in a 1-credit deduction. Any combination of two of these types of errors results in a 2-credit deduction. No more than 2 credits should be deducted for such mechanical errors in a 4-credit question and no more than 3 credits should be deducted in a 6-credit question. The teacher must carefully review the student's work to determine what errors were made and what type of errors they were.

Conceptual Errors: A conceptual error involves a more serious lack of knowledge or procedure. Examples of conceptual errors include using the incorrect formula for the area of a figure, choosing the incorrect trigonometric function, or multiplying the exponents instead of adding them when multiplying terms with exponents.

If a response shows repeated occurrences of the same conceptual error, the student should not be penalized twice. If the same conceptual error is repeated in responses to other questions, credit should be deducted in each response.

For 4- and 6-credit questions, if a response shows one conceptual error and one computational, graphing, or rounding error, the teacher must award credit that takes into account both errors. Refer to the rubric for specific scoring guidelines.

Part II

For each question, use the specific criteria to award a maximum of 2 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(25) **[2]** A correct graph is drawn, and $(-2,-3)$ is stated.

[1] Appropriate work is shown, but one graphing error is made.

or

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

or

[1] A correct graph is drawn, but no further correct work is shown.

or

[1] $(-2,-3)$, but no further correct work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(26) **[2]** 3, and correct work is shown.

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

or

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

or

[1] 3, but no work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(27) **[2]** A correct explanation is written, and correct values for x and y are written.

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

or

[1] A correct explanation is written, but no further correct work is shown.

or

[1] Correct values for x and y are written, but the explanation is missing, incomplete, or incorrect.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(28) **[2]** 24.5, and correct algebraic work is shown.

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

or

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

or

[1] Appropriate work is shown, but a method other than alebraic is used.

or

[1] 24.5, but no work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(29) **[2]** $\frac{-3 \pm \sqrt{33}}{2}$, and correct work is shown.

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

or

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

or

[1] Appropriate work is shown, but only one correct root is stated.

or

[1] $\frac{-3 \pm \sqrt{33}}{2}$, but no work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(30) **[2]** $5x(x + 4)(x - 4)$, and correct work is shown.

[1] Appropriate work is shown, but one computational or factoring error is made.

or

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

or

[1] $5x(x^2 - 16)$, but no further correct work is shown.

or

[1] $5x(x + 4)(x - 4)$, but no work is shown.

[0] $5(x^3 - 16x)$ or $x(5x^2 - 80)$ but no work is shown.

or

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

Part III

For each question, use the specific criteria to award a maximum of 4 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(31) **[4]** $y = 15.13x - 959.63$, 0.99, and strong is stated.

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

or

[3] The full display of the student's calculator showing incorrect values for a, b, and r is written, but used appropriately.

or

[3] Appropriate work is shown, but an expression is written instead of an equation.

[2] $y = 15.13x - 959.63$ is written, but no further correct work is shown.

[1] 0.99, but no further correct work is shown.

or

[1] Strong is stated, but no further correct work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(32) **[4]** Both inequalities are graphed correctly and at least one is labeled, the solution is labeled *S*, and a correct justification indicating a negative response is given.

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

or

[3] Appropriate work is shown, but the solution is not labeled *S*.

or

[3] Appropriate work is shown, but the justification is missing or incorrect.

or

[3] One inequality is graphed incorrectly, but the system is used appropriately.

[2] Both inequalities are graphed correctly with at least one labeled, but no further correct work is shown.

[1] A correct justification is given, but no further correct work is shown.

or

[1] One inequality is graphed and labeled correctly, but no further correct work is shown.

or

[1] $y = 3x - 4$ and $x + 2y = 6$ are graphed correctly, and at least one is labeled, but no further correct work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(33) **[4]** (2,144), and a correct explanation in context for each coordinate is written, and 5, and a correct justification is given.

[3] Appropriate work is shown, but the explanation is missing, incorrect, or not in context.

or

[3] Appropriate work is shown, but the justification is missing or incorrect.

[2] (2,144), and a correct explanation in context is written, but no further correct work is shown.

or

[2] 5, and a correct justification is given, but no further correct work is shown.

or

[2] (2,144), and 5, but no further correct work is shown.

[1] Only a correct explanation in context is written.

or

[1] (2,144), or 5, but no further correct work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(34) **[4]** $x = 2$, $y = 11$ and $x = -4$, $y = -1$ or (2,11) and (−4,−1), and correct algebraic work is shown.

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

or

[3] Appropriate work is shown to find both $x = 2$ and $x = -4$, but no further correct work is shown.

or

[3] Appropriate work is shown to find either $x = 2$, $y = 11$ or $x = -4$, $y = -1$, but no further correct work is shown.

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

or

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

or

[2] A correct substitution into the quadratic formula is made, but no further correct work is shown.

or

[2] Appropriate work is shown to find $(x - 2)(x + 4) = 0$, but no further correct work is shown.

or

[2] Appropriate work is shown to find $(x + 1)^2 = 9$, but no further correct work is shown.

or

[2] $x = 2$, $y = 11$ and $x = -4$, $y = -1$, but a method other than algebraic is used.

[1] $x^2 + 2x - 8 = 0$ is written, but no further correct work is shown.

or

[1] $x = 2$, $y = 11$ and $x = -4$, $y = -1$, but no work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

Part IV

For this question, use the specific criteria to award a maximum of 6 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(35) **[6]** A correct system of equations is written, a correct justification indicating a negative response is given, and correct algebraic work is shown to find $m = 6.50$ and $r = 8.50$.

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

or

[5] Appropriate work is shown, but only $m = 6.50$ or $r = 8.50$ is found.

or

[5] One equation is written incorrectly, but the system is used appropriately.

or

[5] Appropriate work is shown, but a method other than algebraic is used to find $m = 6.50$ and $r = 8.50$.

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

or

[4] A correct system of equations is written and solved correctly, but no further correct work is shown.

or

[4] A correct system of equations is written, and a correct justification is given, but no further correct work is shown.

[3] A correct system of equations is written, but the justification is incomplete, and no further correct work is shown.

[2] A correct system of equations is written, but no further correct work is shown.

or

[2] A correct justification is given, but no further correct work is shown.

[1] One correct equation is written, but no further correct work is shown.

or

[1] $m = 6.50$ and $r = 8.50$ are stated, but no work is shown.

[0] 6.50 and 8.50 are stated.

or

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

Map to the Learning Standards
Algebra I
August 2024

Question	Type	Credits	Cluster
1	Multiple Choice	2	A-SSE.A
2	Multiple Choice	2	F-LE.A
3	Multiple Choice	2	A-APR.A
4	Multiple Choice	2	A-CED.A
5	Multiple Choice	2	A-SSE.A
6	Multiple Choice	2	A-REI.A
7	Multiple Choice	2	N-RN.B
8	Multiple Choice	2	A-REI.B
9	Multiple Choice	2	S-ID.A
10	Multiple Choice	2	F-IF.B
11	Multiple Choice	2	F-BF.B
12	Multiple Choice	2	F-LE.B
13	Multiple Choice	2	A-REI.B
14	Multiple Choice	2	S-ID.B
15	Multiple Choice	2	N-RN.B
16	Multiple Choice	2	A-REI.D
17	Multiple Choice	2	A-APR.A
18	Multiple Choice	2	A-REI.D
19	Multiple Choice	2	F-IF.A
20	Multiple Choice	2	A-REI.B

21	Multiple Choice	2	A-APR.B
22	Multiple Choice	2	A-SSE.B
23	Multiple Choice	2	F-IF.A
24	Multiple Choice	2	N-Q.A
25	Constructed Response	2	F-IF.C
26	Constructed Response	2	F-IF.A
27	Constructed Response	2	F-IF.A
28	Constructed Response	2	A-REI.B
29	Constructed Response	2	A-REI.B
30	Constructed Response	2	A-SSE.A
31	Constructed Response	4	S-ID.C
32	Constructed Response	4	A-REI.D
33	Constructed Response	4	F-IF.B
34	Constructed Response	4	A-REI.C
35	Constructed Response	6	A-CED.A

Regents Examination in Algebra I

August 2024

Chart for Converting Total Test Raw Scores to Final Examination Scores (Scale Scores)

The *Chart for Determining the Final Examination Score for the August 2024 Regents Examination in Algebra I* will be posted on the Department's web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations by Monday, August 19, 2024. Conversion charts provided for previous administrations of the Regents Examination in Algebra I must NOT be used to determine students' final scores for this administration.

Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to https://www.nysed.gov/state-assessment/teacher-feedback-state-assessments.

2. Select the test title.

3. Complete the required demographic fields.

4. Complete each evaluation question and provide comments in the space provided.

5. Click the SUBMIT button at the bottom of the page to submit the completed form.

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I

Monday, August 19, 2024 — 8:30 to 11:30 a.m., only

MODEL RESPONSE SET

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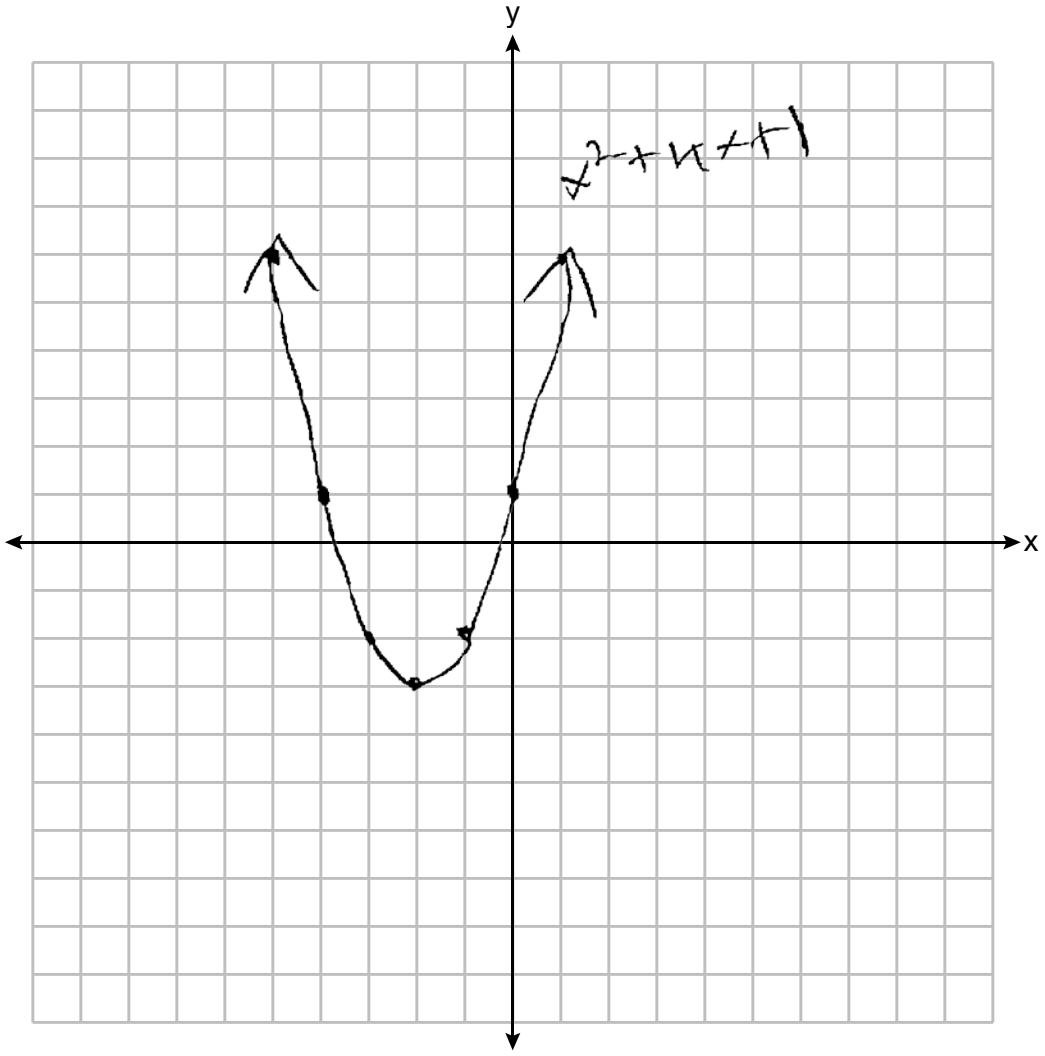
Question 25

25 On the set of axes below, graph $f(x) = x^2 + 4x + 1$.



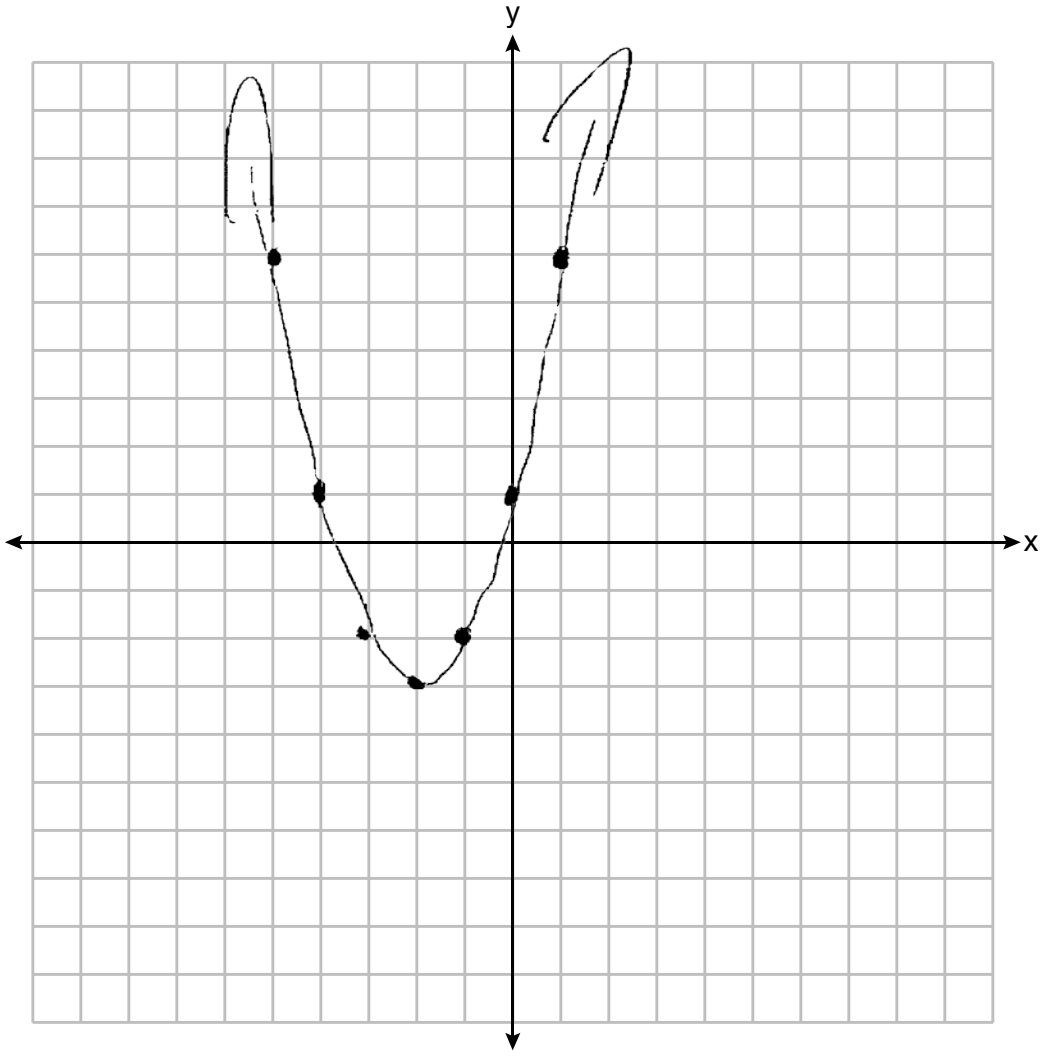
State the coordinates of the minimum.

(-2, -3)

Score 2: The student gave a complete and correct response.

Question 25

25 On the set of axes below, graph $f(x) = x^2 + 4x + 1$.

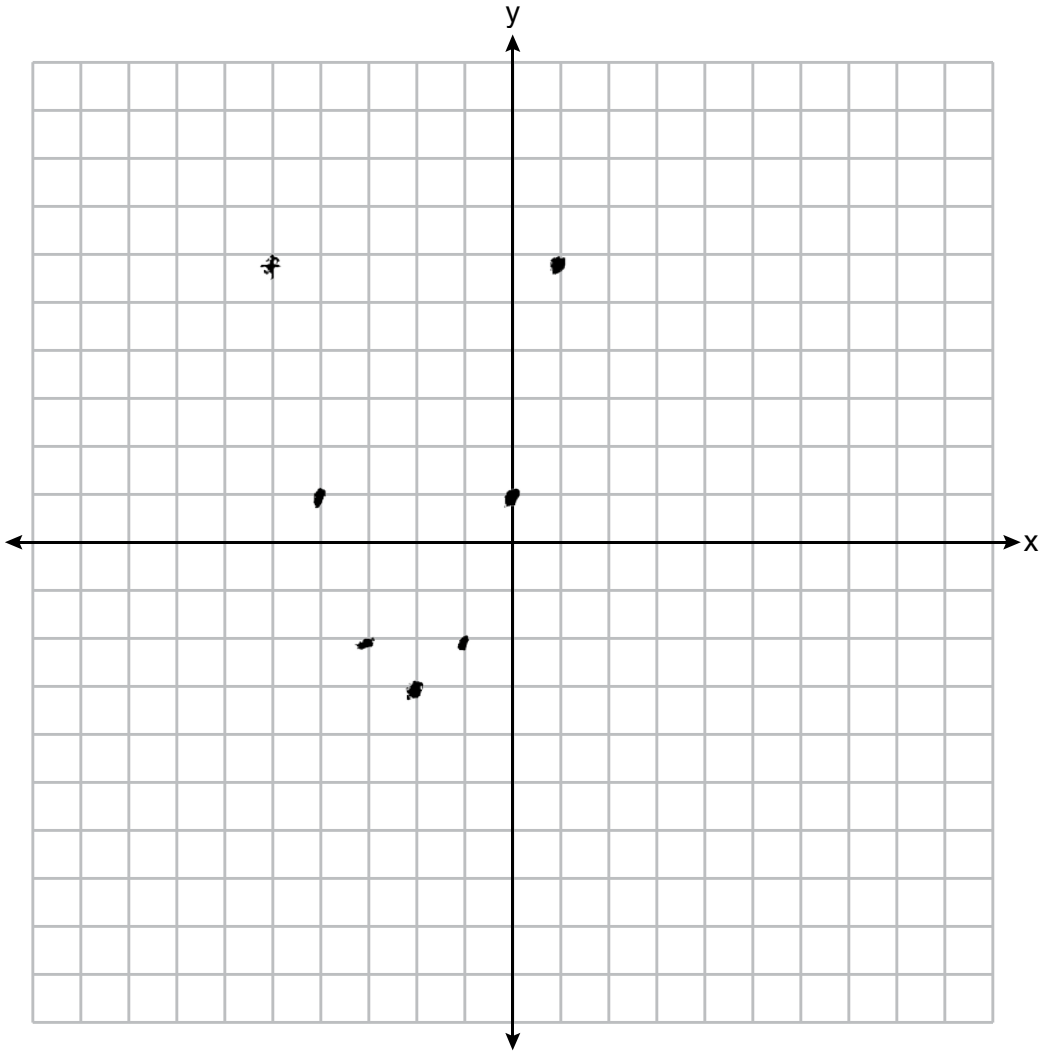


State the coordinates of the minimum.

Score 1: The student graphed $f(x)$ correctly.

Question 25

25 On the set of axes below, graph $f(x) = x^2 + 4x + 1$.



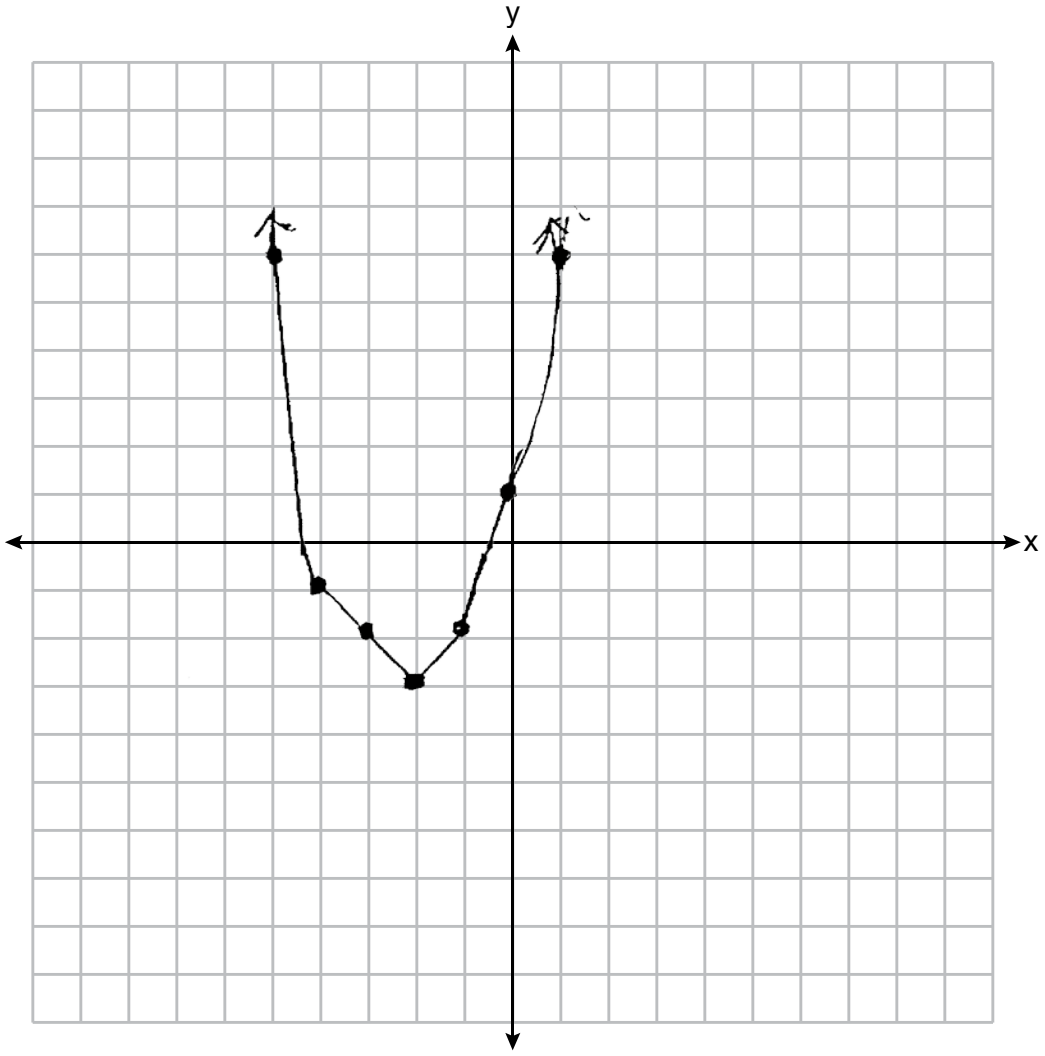
State the coordinates of the minimum.

(-2, -3)

Score 1: The student correctly stated the coordinates of the minimum.

Question 25

25 On the set of axes below, graph $f(x) = x^2 + 4x + 1$.



State the coordinates of the minimum.

-2,-3

Score 0: The student made one graphing error and did not use parentheses on the coordinates of the minimum.

Question 26

26 If $f(x) = \frac{30x^2}{x+2}$, determine the value of $f\left(\frac{1}{2}\right)$.

$$f\left(\tfrac{1}{2}\right) = \frac{30\left(\tfrac{1}{2}\right)^2}{\tfrac{1}{2}+2}$$

$$f\left(\tfrac{1}{2}\right) = \frac{30(0.25)}{2.5}$$

$$f\left(\tfrac{1}{2}\right) = \frac{7.5}{2.5}$$

$$\boxed{f\left(\tfrac{1}{2}\right) = 3}$$

Score 2: The student gave a complete and correct response.

Question 26

26 If $f(x) = \frac{30x^2}{x+2}$, determine the value of $f\left(\frac{1}{2}\right)$.

$\frac{7.5}{2.5}$

3

Score 2: The student gave a complete and correct response.

Question 26

26 If $f(x) = \frac{30x^2}{x+2}$, determine the value of $f\left(\frac{1}{2}\right)$.

$f\left(\frac{1}{2}\right) = \frac{30\left(\frac{1}{2}\right)^2}{\left(\frac{1}{2}\right)+2}$ $\frac{30\left(\frac{1}{4}\right)}{\frac{3}{2}}$ $\frac{\frac{15}{2}}{\frac{3}{2}}$

$f\left(\frac{1}{2}\right) = 5$

Score 1: The student made one conceptual error.

Question 26

26 If $f(x) = \frac{30x^2}{x + 2}$, determine the value of $f\left(\frac{1}{2}\right)$.

$f(\frac{1}{2}) = \frac{30(\frac{1}{2})^2}{\frac{1}{2} + 2}$

$f(\frac{1}{2}) = \frac{15^2}{\frac{1}{2} + 2}$

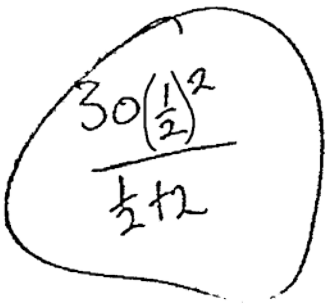
$f(\frac{1}{2}) = \frac{225}{2.5}$

$f(\frac{1}{2}) = 90$

Score 1: The student made one computational error.

Question 26

26 If $f(x) = \frac{30x^2}{x + 2}$, determine the value of $f\left(\frac{1}{2}\right)$.



Score 0: The student did not show enough grade-level work to receive any credit.

Question 27

27 Explain why the relation shown in the table below is a function.

x	−1	0	1	2
y	2	4	4	5

Every x value has only one y value which allows the relation to be a function.

Complete the table below with values for both x and y so that this new relation is *not* a function.

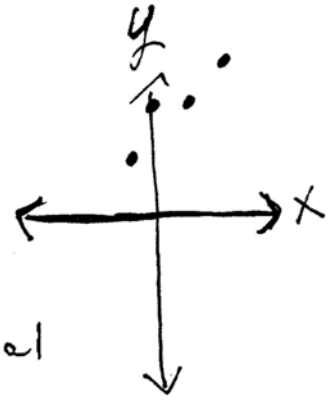
x	−1	0	1	2	1
y	2	4	4	5	5

Score 2: The student gave a complete and correct response.

Question 27

27 Explain why the relation shown in the table below is a function.

x	−1	0	1	2
y	2	4	4	5



It passes the vertical line test

Complete the table below with values for both x and y so that this new relation is *not* a function.

x	−1	0	1	2	2
y	2	4	4	5	4

Score 2: The student gave a complete and correct response.

Question 27

27 Explain why the relation shown in the table below is a function.

x	−1	0	1	2
y	2	4	4	5

The relation shown is a function because the X or Y values do not repeat.

Complete the table below with values for both x and y so that this new relation is *not* a function.

x	−1	0	1	2	0
y	2	4	4	5	6

Score 1: The student completed the table correctly.

Question 27

27 Explain why the relation shown in the table below is a function.

x	−1	0	1	2
y	2	4	4	5

It is a function because every input has an output.

Complete the table below with values for both x and y so that this new relation is *not* a function.

x	−1	0	1	2	0
y	2	4	4	5	4

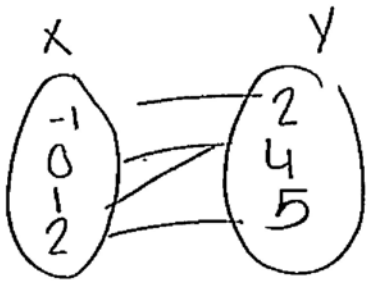
Score 0: The student gave an incomplete explanation and repeated a point from the given relation.

Question 27

27 Explain why the relation shown in the table below is a function.

domain / range

x	−1	0	1	2
y	2	4	4	5



No, this is not a function because the domain has 2 ranges the same.

Complete the table below with values for both x and y so that this new relation is *not* a function.

x	−1	0	1	2	3
y	2	4	4	5	10

×2 +0 +1

Score 0: The student did not show enough grade-level work to receive any credit.

Question 28

28 Solve algebraically for x: $0.05(x - 3) = 0.35x - 7.5$

$0.05(x-3)=0.35x-7.5$

$0.05x-0.15=0.35x-7.5$

$-0.3x-0.15=-7.5$

$-0.3x=-7.35$

$x=24.5$

Score 2: The student gave a complete and correct response.

Question 28

28 Solve algebraically for x: $0.05(x - 3) = 0.35x - 7.5$

$x - 3 = 7x - 150$

$6x = 147$

$x = \frac{147}{6}$

Score 2: The student gave a complete and correct response.

Question 28

28 Solve algebraically for x: $0.05(x - 3) = 0.35x - 7.5$

$0.05(x - 3) = 0.35x - 7.5$

$0.05x - 0.15 = 0.35x - 7.5$

$+7.5 \qquad +7.5$

$0.05x + 7.35 = 0.35x$

$-0.05x \qquad -0.05x$

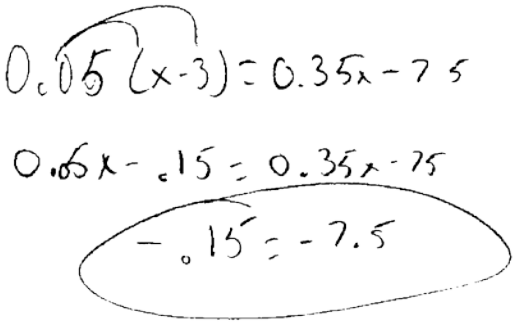
$\frac{7.35}{0.3} = \frac{0.3x}{0.3}$

$2.45 = x$

Score 1: The student made one computational error.

Question 28

28 Solve algebraically for x: $0.05(x - 3) = 0.35x - 7.5$



Score 0: The student did not show enough grade-level work to receive any credit.

Question 29

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

$y = ax^2 + bx + c$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-3 \pm \sqrt{3^2 - 4(1)(-6)}}{2(1)}$

$x = \frac{-3 + \sqrt{9 + 24}}{2}$ $\quad x = \frac{-3 - \sqrt{9 + 24}}{2}$

$x = \frac{-3 - \sqrt{33}}{2}$ $\quad x = \frac{-3 + \sqrt{33}}{2}$

Score 2: The student gave a complete and correct response.

Question 29

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

$$x = \frac{-3 \pm \sqrt{3^2 - 4(1)(-6)}}{2(1)}$$

$$x = \frac{-3 \pm \sqrt{33}}{2}$$

$$x = \frac{-3}{2} \pm \frac{\sqrt{33}}{2}$$

Score 2: The student gave a complete and correct response.

Question 29

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$a = 1$
$b = 3$
$c = -6$

$x = \frac{-3 \pm \sqrt{(3)^2 - 4(1)(-6)}}{2(1)}$

$x = \frac{-3 \pm \sqrt{9 + 24}}{2}$

$x = \frac{-3 \pm \sqrt{9 + 24}}{2}$

$x = \frac{-3 \pm \sqrt{33}}{2}$

$x = \frac{-3 + \sqrt{33}}{2}$

$x = 1.372281323$

$x = \frac{-3 - \sqrt{33}}{2}$

$x = -4.372281323$

Score 1: The student expressed the answers as decimals.

Question 29

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

$x^2 + 3x - 6 = 0$

$+6 \quad +6$

$x^2 + 3x + 2.25 = 6 + 2.25$

$\left(\frac{3}{2}\right)^2 = (1.5)^2 = 2.25$

$\sqrt{(x + 1.5)^2} = \pm\sqrt{8.25}$

$x + 1.5 = \pm\sqrt{8.25}$

$-1.5 = \quad -1.5$

$x = -1.5 \pm \sqrt{8.25}$

Score 1: The student used a method other than the quadratic formula.

Question 29

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

a

$$\frac{-3\sqrt{3^2-4(1)(-6)}}{2(1)} =$$

$$\frac{-3\sqrt{9+24}}{2} =$$

$$\frac{-3\sqrt{33}}{2} =$$

$$= -9.62$$

Score 0: The student did not include ± sign in the formula and wrote the answer as a decimal.

Question 29

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$a = 1$
$b = 3$
$c = -6$

$x = \frac{6 \pm \sqrt{3^2 - 4(1)(-6)}}{2(1)}$

$x = \frac{6 \pm \sqrt{33}}{2}$

$x = 3 \pm \sqrt{33}$

$x = 3 + \sqrt{33}$ $x = 3 - \sqrt{33}$

Score 0: The student made multiple errors.

Question 30

30 Factor $5x^3 - 80x$ completely.

$5x^3-80x$

$5x(x^2-16)$

$(x)^2 \quad (4)^2$

$5x(x-4)(x+4)$

Score 2: The student gave a complete and correct response.

Question 30

30 Factor $5x^3 - 80x$ completely.

$5x(x^2 - 16)$

$5x(x+4)(x-4)$

$x=0 \mid x=-4 \mid x=4$

$\{0, -4, 4\}$

Score 1: The student factored the polynomial completely, but solved it as an equation.

Question 30

30 Factor $5x^3 - 80x$ completely.

$5x^3 - 80x$

$5x(x^2 - 16)$

$5x(x-4)(x+4)$

$5x(x-2)(x+2)(x+4)$

Score 1: The student made one factoring error.

Question 30

30 Factor $5x^3 - 80x$ completely.

$x(5x^2 - 80)$

Score 0: The student did not factor out $5x$.

Question 31

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

State the linear regression equation for these data, rounding all values to the *nearest hundredth*.

$y = 15.13x - 959.63$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

0.99

State what this correlation coefficient indicates about the linear fit of the data.

This correlation coefficient indicates that the data has a strong positive linear fit.

Score 4: The student gave a complete and correct response.

Question 31

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

State the linear regression equation for these data, rounding all values to the *nearest hundredth*.

$y = 15.13x - 959.63$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

$r = .99$

State what this correlation coefficient indicates about the linear fit of the data.

As the temperature goes up the amount of ice creams go up.

Positive

Score 3: The student did not state the strength of the correlation coefficient.

Question 31

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

State the linear regression equation for these data, rounding all values to the *nearest hundredth*.

$y = ax + b$

$y = 15.125x - 959.625$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

$r = 0.992$

State what this correlation coefficient indicates about the linear fit of the data.

it's a very good fit

Score 3: The student rounded to the thousandths place.

Question 31

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

State the linear regression equation for these data, rounding all values to the *nearest hundredth*.

Slope = 15.13x
y int = -959.63

y = 15.13x - 959.63

y = ax + b

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

15.13

State what this correlation coefficient indicates about the linear fit of the data.

Every degree in temperature the average goes up daily, 5.13 more ice creams are purchased.

Score 2: The student wrote a correct linear regression equation, but no further correct work was shown.

Question 31

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

State the linear regression equation for these data, rounding all values to the *nearest hundredth*.

$y = 15.13 - 959.63$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

1

State what this correlation coefficient indicates about the linear fit of the data.

There is a strong relationship between the Average Daily Temp and Daily Ice Cream Cone sales

Score 2: The student left out *x* in the equation and did not state a correct correlation coefficient.

Question 31

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

State the linear regression equation for these data, rounding all values to the *nearest hundredth*.

.9917

.992

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

R= .9

strong linear

State what this correlation coefficient indicates about the linear fit of the data.

It is a strong linear

Score 1: The student indicated strong, but no further correct work was shown.

Question 31

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

State the linear regression equation for these data, rounding all values to the *nearest hundredth*.

15.1x − 959.6

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

.99

State what this correlation coefficient indicates about the linear fit of the data.

it indicates that the amount of ice cream and Average temp is close together, everytime its hotter more people buy ice cream.

Score 1: The student gave the correct correlation coefficient, but no further correct work was shown.

Question 31

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

State the linear regression equation for these data, rounding all values to the *nearest hundredth*.

y 2.6x + 14

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

22.8

State what this correlation coefficient indicates about the linear fit of the data.

The average coefficient of the data

Score 0: The student did not show enough grade-level work to receive any credit.

Question 31

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

State the linear regression equation for these data, rounding all values to the *nearest hundredth*.

$y = 0.57x$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

The correlation coefficient for the line of best fit for these data is 0.57.

State what this correlation coefficient indicates about the linear fit of the data.

This correlation coefficient indicates an increase in the average daily temperature.

Score 0: The student did not show enough grade-level work to receive any credit.

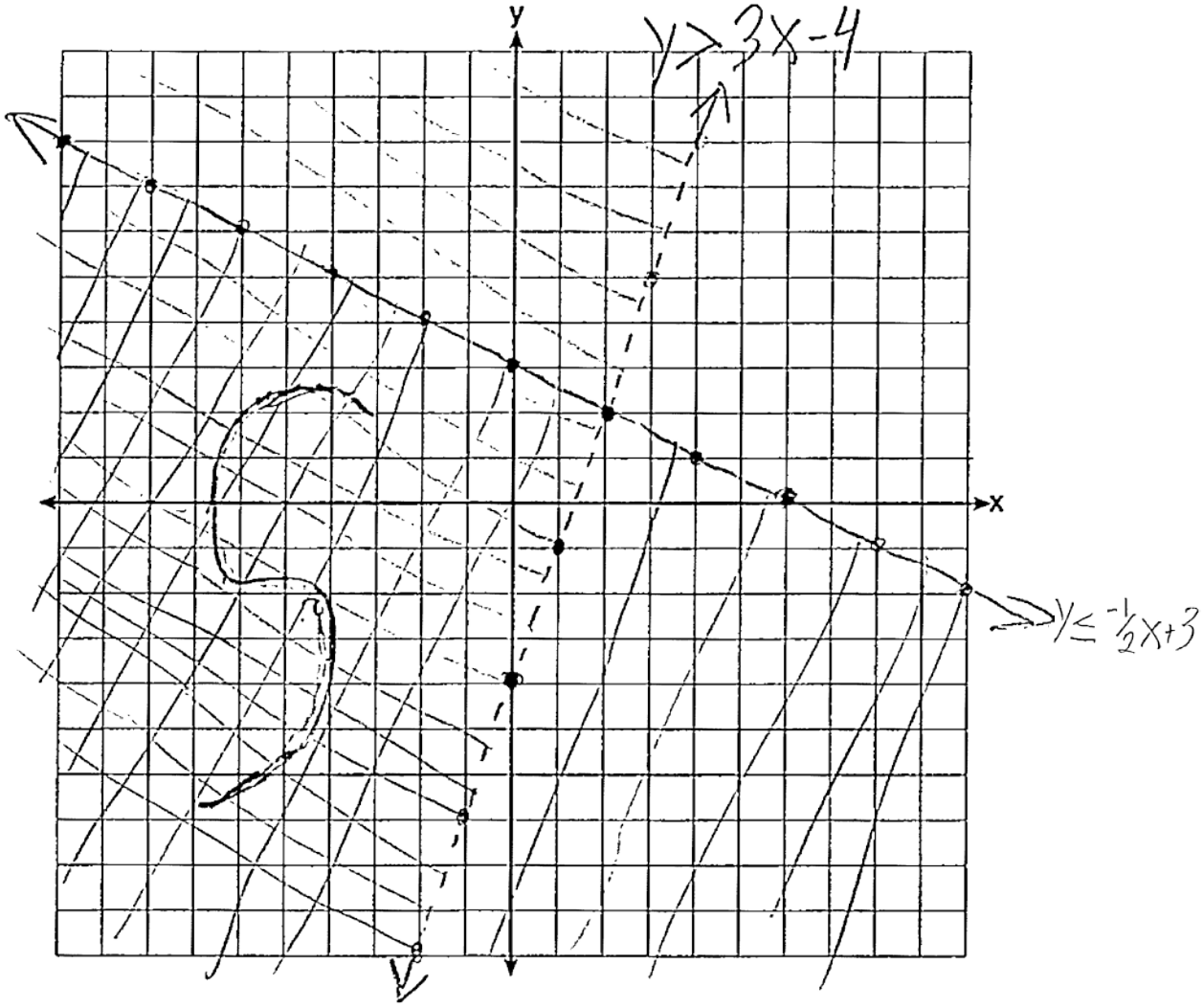
Question 32

32 Graph the system of inequalities on the set of axes below:

$y > 3x - 4$

$x + 2y \leq 6$

Label the solution set *S*.



Is the point (2,2) a solution to the system? Justify your answer.

No Because it is on the dotted line.

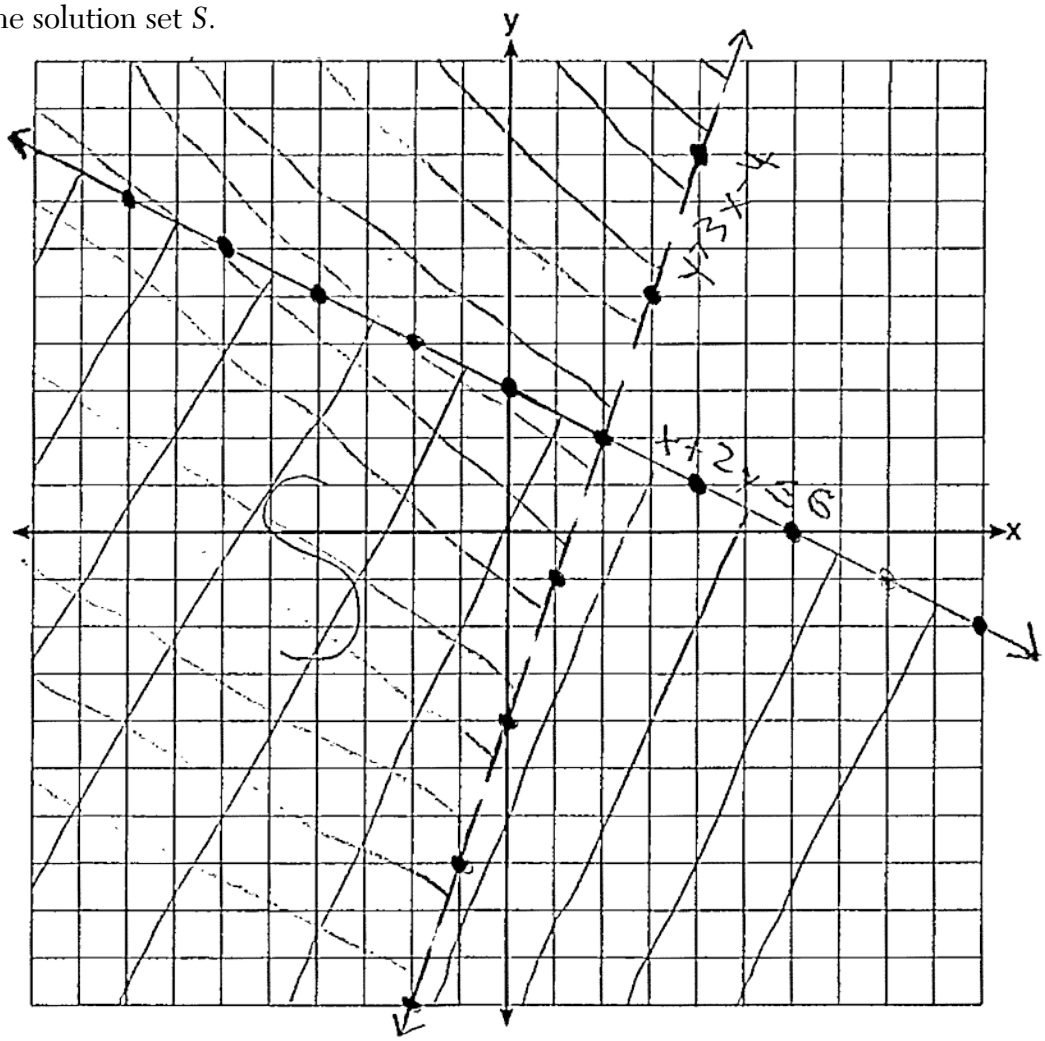
Score 4: The student gave a complete and correct response.

Question 32

32 Graph the system of inequalities on the set of axes below:

$$y > 3x - 4$$
$$x + 2y \leq 6$$

Label the solution set *S*.



Is the point (2,2) a solution to the system? Justify your answer.

$y > 3x - 4$
$2 > 3(2) - 4$
$2 > 6 - 4$
$2 \not> 2$
X

$x + 2y \leq 6$
$2 + 2(2) \leq 6$
$2 + 4 \leq 6$
$6 \leq 6$
✓

No

Score 4: The student gave a complete and correct response.

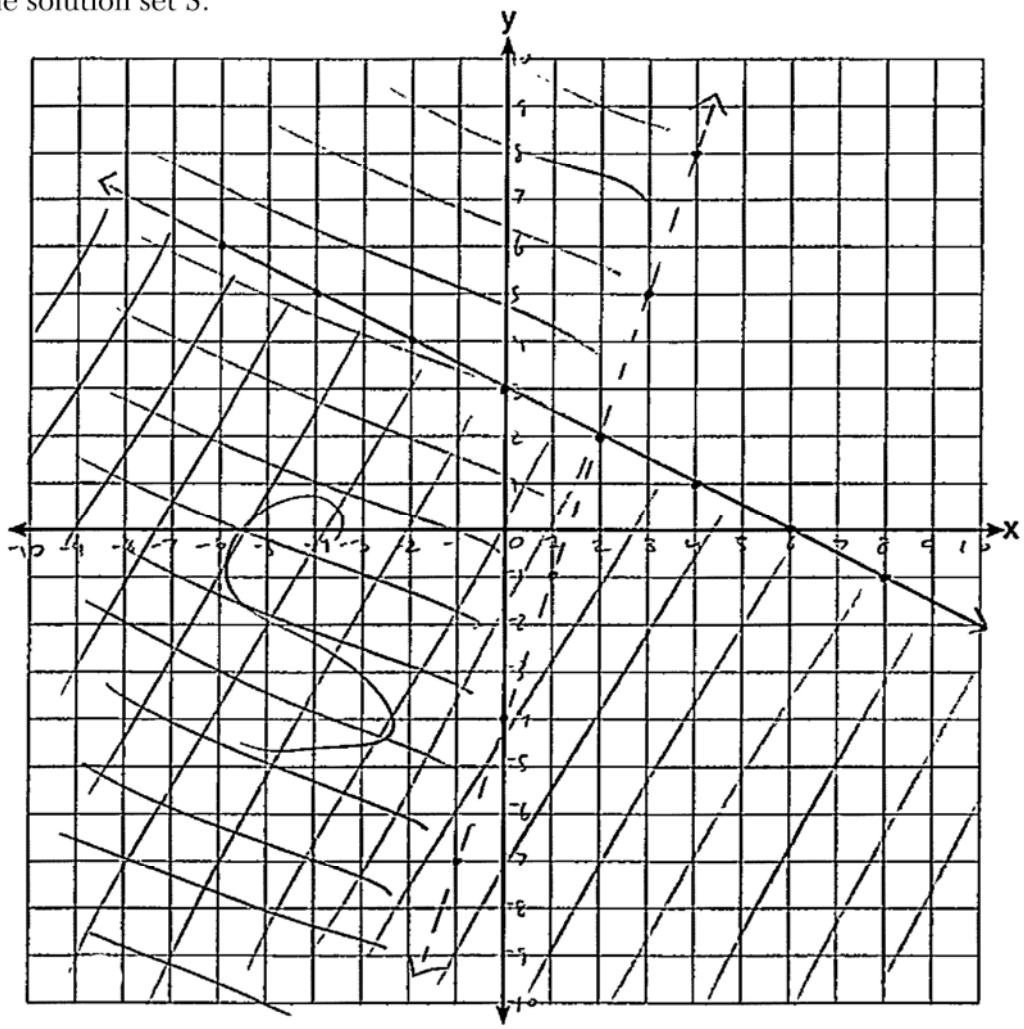
Question 32

32 Graph the system of inequalities on the set of axes below:

$y > 3x - 4$

$x + 2y \leq 6$ $\quad \frac{2y}{2} \leq \frac{6-x}{2}, \quad y \leq 3 - \frac{1}{2}x$

Label the solution set S.



Is the point (2,2) a solution to the system? Justify your answer.

The point (2,2) isn't a solution to the system because it falls on a dotted line which is shown by the graph above. Dotted lines are exclusive so (2,2) wouldn't count.

Score 3: The student did not label at least one line.

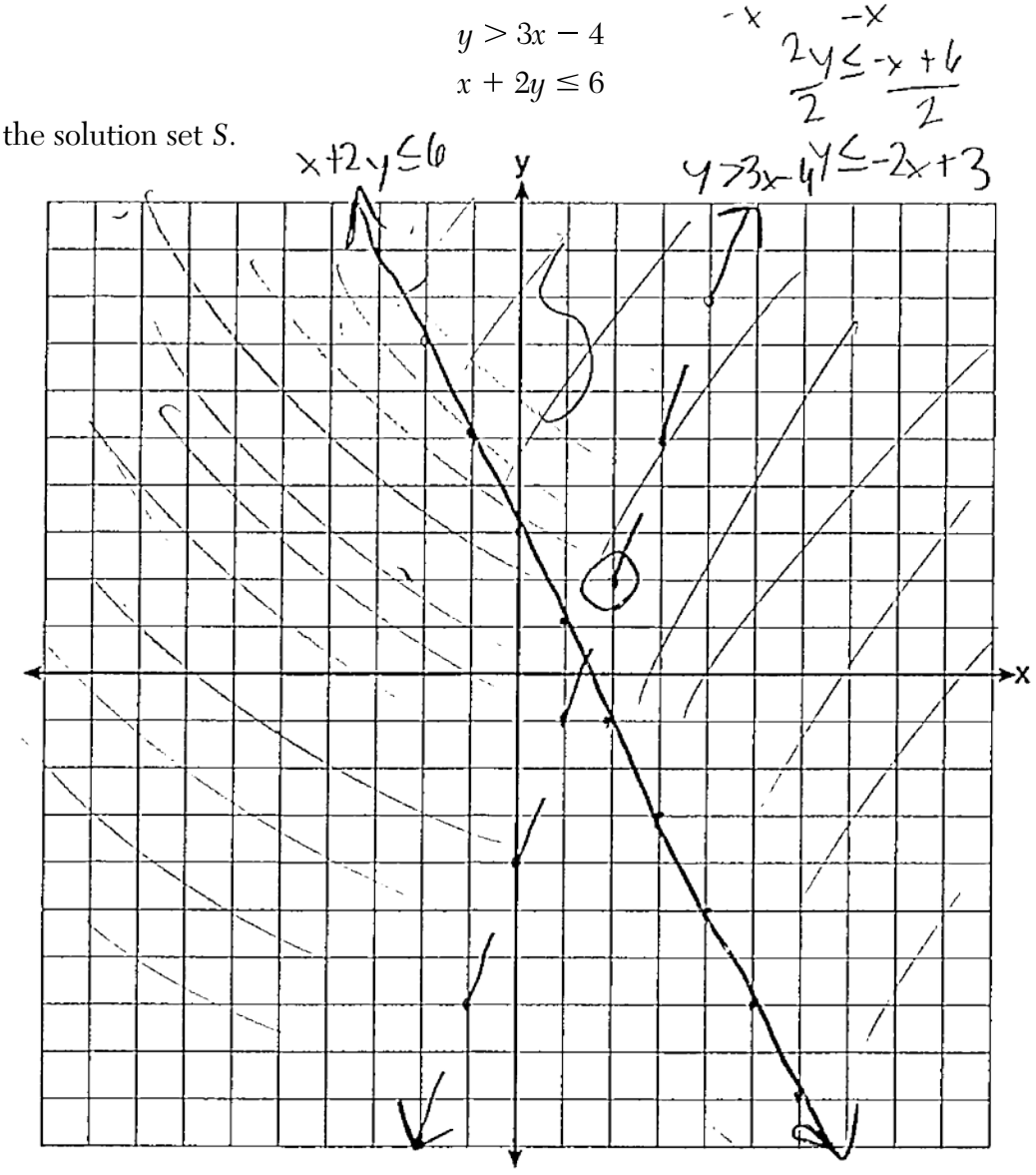
Question 32

32 Graph the system of inequalities on the set of axes below:

$y > 3x - 4$

$x + 2y \leq 6$

Label the solution set S.



Is the point (2,2) a solution to the system? Justify your answer.

no, because (2,2) is on a dotted line.

Score 3: The student graphed $x + 2y \leq 6$ incorrectly.

Question 32

32 Graph the system of inequalities on the set of axes below:

$y > 3x - 4$

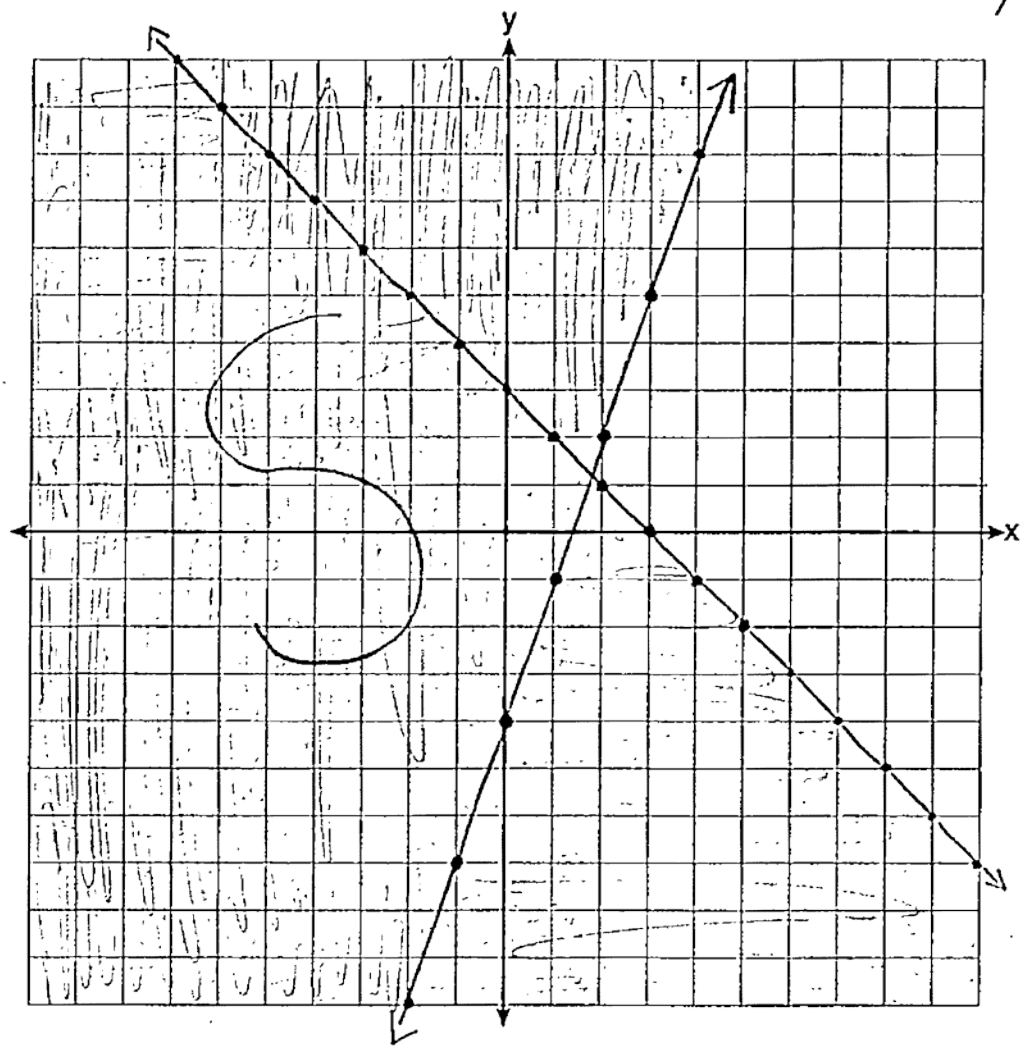
$x + 2y \leq 6$

$-x \quad -x$

$\frac{2y}{2} \leq \frac{6-x}{2}$

$y \leq 3-x$

Label the solution set S.



Is the point (2,2) a solution to the system? Justify your answer.

(2,2) is not in the solution set because it isn't in the shaded section labeled S

Score 2: The student graphed both inequalities incorrectly, but labeled the solution set and wrote a correct justification.

Question 32

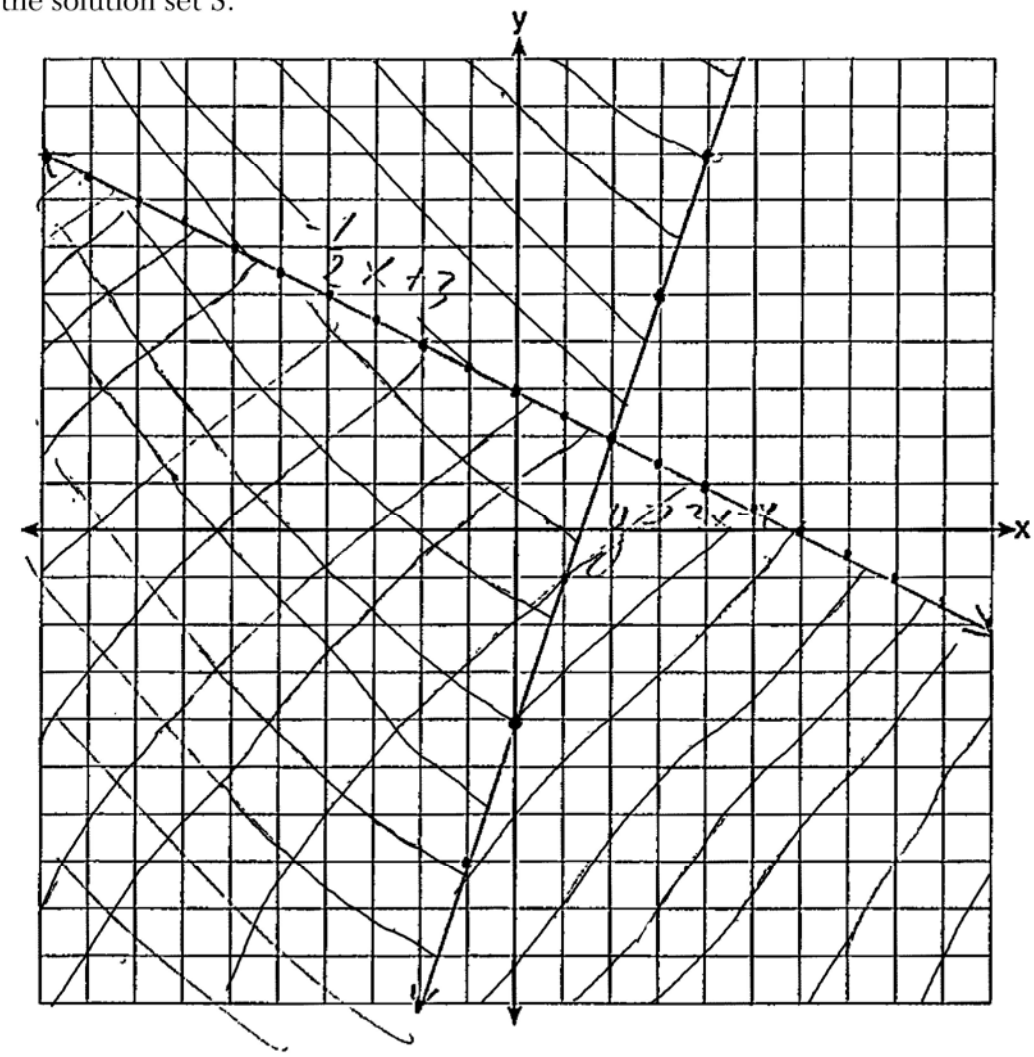
32 Graph the system of inequalities on the set of axes below:

$$y > 3x - 4$$
$$x + 2y \leq 6$$

$2y \leq -x + 6$

$y \leq -\frac{1}{2}x + 3$

Label the solution set S.



Is the point (2,2) a solution to the system? Justify your answer.

I think point (2,2) is a solution to the system because it's where two lines meet each other.

Score 2: The student graphed one inequality correctly and gave an appropriate justification.

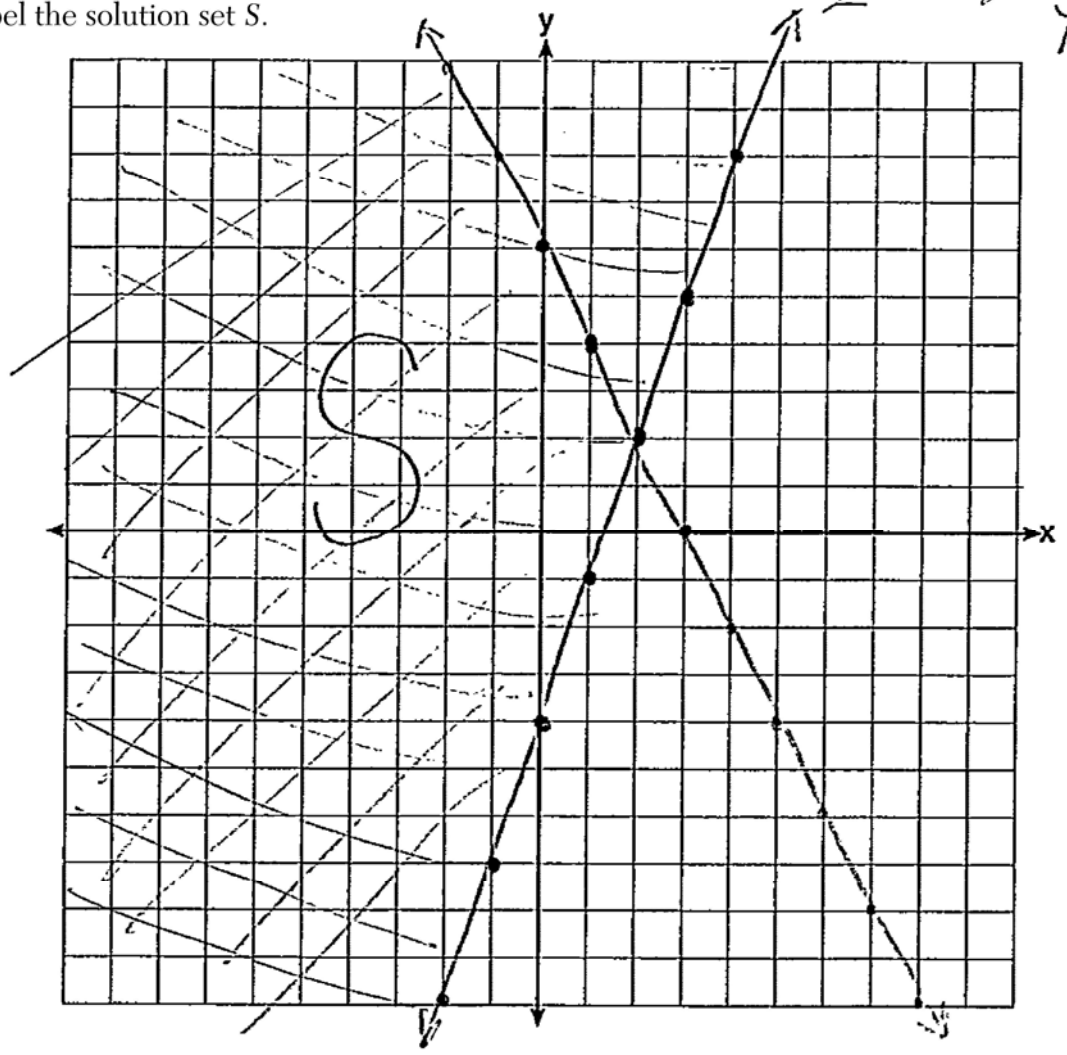
Question 32

32 Graph the system of inequalities on the set of axes below:

$y > 3x - 4$

$x + 2y \leq 6$

Label the solution set S.



Is the point (2,2) a solution to the system? Justify your answer.

yes because its on the line

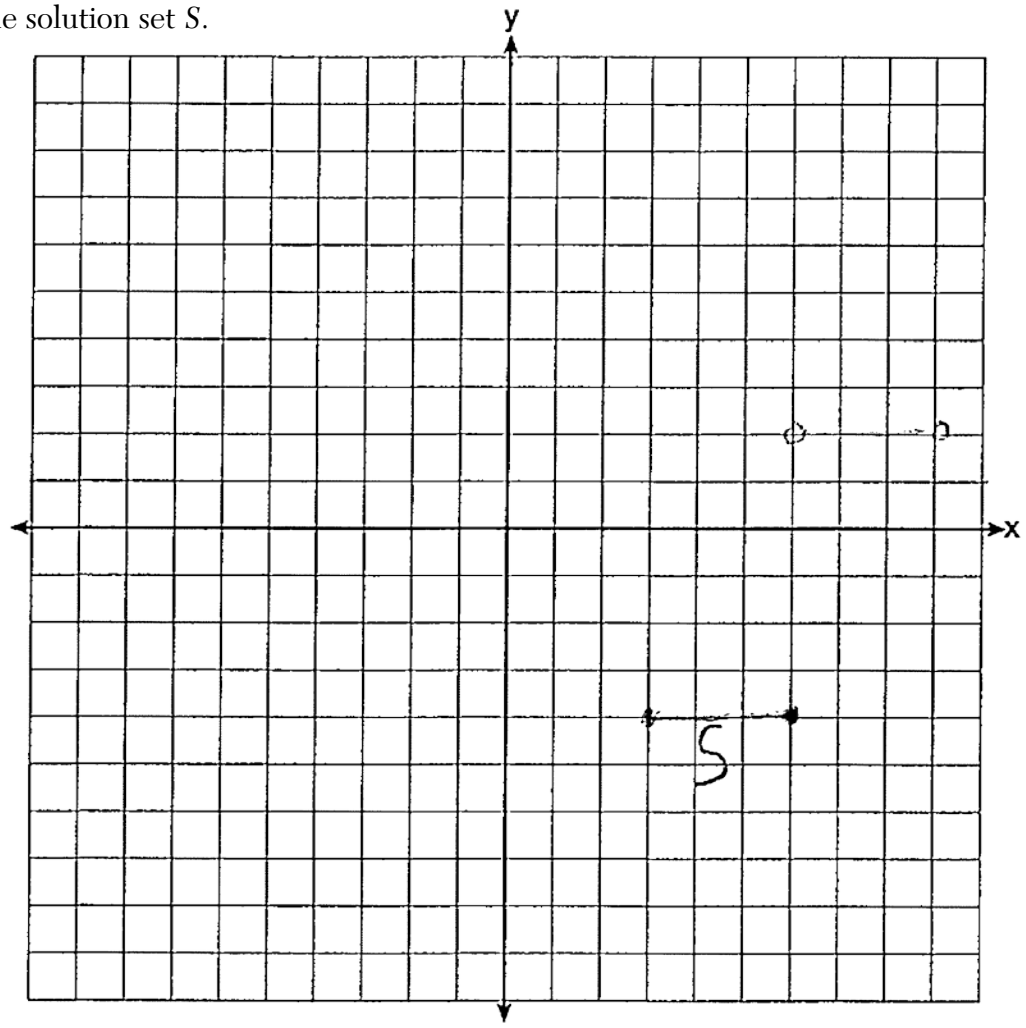
Score 1: The student labeled an appropriate solution set S.

Question 32

32 Graph the system of inequalities on the set of axes below:

$$y > 3x - 4$$
$$x + 2y \leq 6$$

Label the solution set *S*.



Is the point (2,2) a solution to the system? Justify your answer.

The point (2,2) is not a solution to the system.

Score 0: The student did not show enough grade-level work to receive any credit.

Question 33

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

(2,144) This coordinate means that the object reached its highest point (144 ft.) in the air at 2 seconds.

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

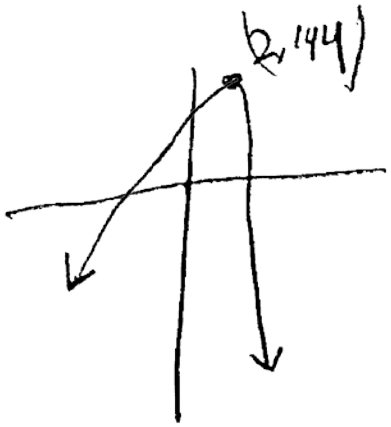
The object takes 5 seconds to hit the ground because the x-intercept is the point (5,0).

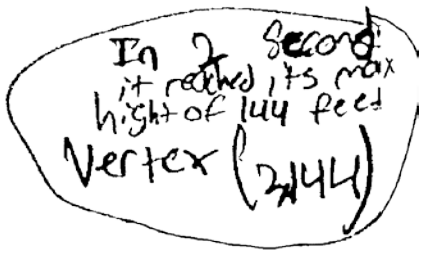
Score 4: The student gave a complete and correct response.

Question 33

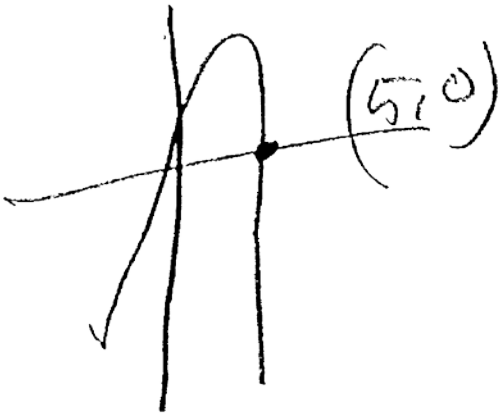
33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

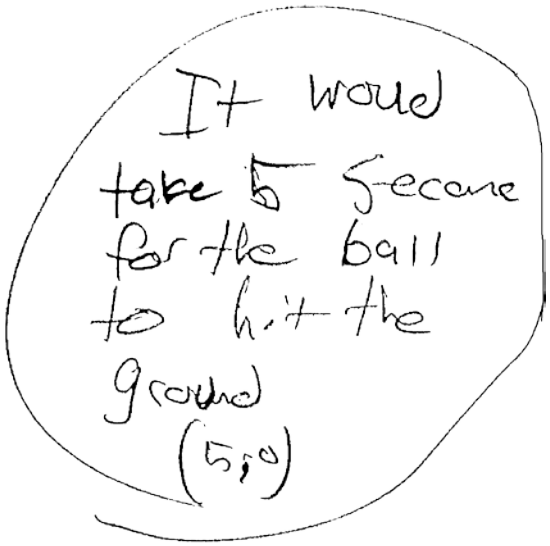
If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.





After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.





Score 4: The student gave a complete and correct response.

Question 33

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

$t = \frac{-b}{2a}$

$t = \frac{-64}{2(-16)}$

$t = 2$

$s(2) = -16(2)^2 + 64(2) + 80$

$s(2) = 144$

Vertex : (2, 144)

2 represents how many seconds it took to reach 144 ft which is the max height

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

$\frac{0}{-16} = \frac{-16t^2}{-16} + \frac{64t}{-16} + \frac{80}{-16}$

$0 = t^2 - 4t - 5$

$0 = (t-5)(t+1)$

$t-5=0$ | $t+1=0$

$t = 5$ | $t \neq -1$

5 seconds

Score 4: The student gave a complete and correct response.

Question 33

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

(2, 144) I think this means that the highest it reaches is 144 ft in two seconds

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

5 seconds

Score 3: The student did not give a justification for the number of seconds that it takes for the object to reach the ground.

Question 33

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

Vertex is 144, I used calculator

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

It takes five seconds because the calculator says x=5 and y=0 meaning it hit the grand 5 seconds after be launched

Score 2: The student stated 5 seconds and justified their answer.

Question 33

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

-t is the hight of the object t second after it's launched

64t is how many feet per second it travel

80 is how many feet high the platform

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

5 seconds

Score 1: The student stated 5 seconds, but no further correct work was shown.

Question 33

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

A −16

B +64

C +80

$\frac{-b}{2a} = \frac{-64}{-32} = 2$

The vertex is when it hits the ground

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

It takes it 144 seconds to hit the ground

Score 0: The student did not show enough correct work to receive any credit.

Question 34

34 Solve the system of equations algebraically for all values of x and y.

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

$$y = 2x + 7$$

$2x + 7 = x^2 + 4x - 1$

$-2x \quad -7 \quad = -2x \quad -8$

$0 = x^2 + 2x - 8$

1.8
2.4

$0 = (x + 4)(x - 2)$

$x + 4 = 0 \quad | \quad x - 2 = 0$

$-4 \quad -4 \quad | \quad +2 \quad +2$

$x = -4 \quad | \quad x = 2$

(-4, -1)
(2, 11)

answer

$Y = 2(2) + 7$

$Y = 11$

$Y = 2(-4) + 7$

$Y = -1$

Score 4: The student gave a complete and correct response.

Question 34

34 Solve the system of equations algebraically for all values of x and y.

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

$$y = 2x + 7$$

$2x+7 = x^2+4x-1$
$-2x-7 \quad -2x-7$
$0 = x^2+2x-8$
$0 = (x+4)(x-2)$
$\{-4, 2\} = x$

$y = 2(-4)+7 = -1$
$y = 2(2)+7 = 11$
$\{-1, 11\} = y$

$x = -4 \quad x = 2$
$y = -1 \quad y = 11$

Score 4: The student gave a complete and correct response.

Question 34

34 Solve the system of equations algebraically for all values of x and y.

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

$$y = 2x + 7$$

$x^2 + 4x - 1 = 2x + 7$

$-2x - 7 \quad -2x - 7$

$x^2 - 2x - 8 = 0$

$(x - 4)(x + 2) = 0$

$x - 4 = 0$ $\quad$ $x + 2 = 0$

$+4 \quad +4$ $\quad$ $-2 \quad -2$

$x = 4$ $\quad$ $x = -2$

$y = 2(4) + 7$

$y = 8 + 7$

$y = 15$

$y = 2(-2) + 7$

$y = -4 + 7$

$y = 3$

$x = 4$

$y = 15$

$x = -2$

$y = 3$

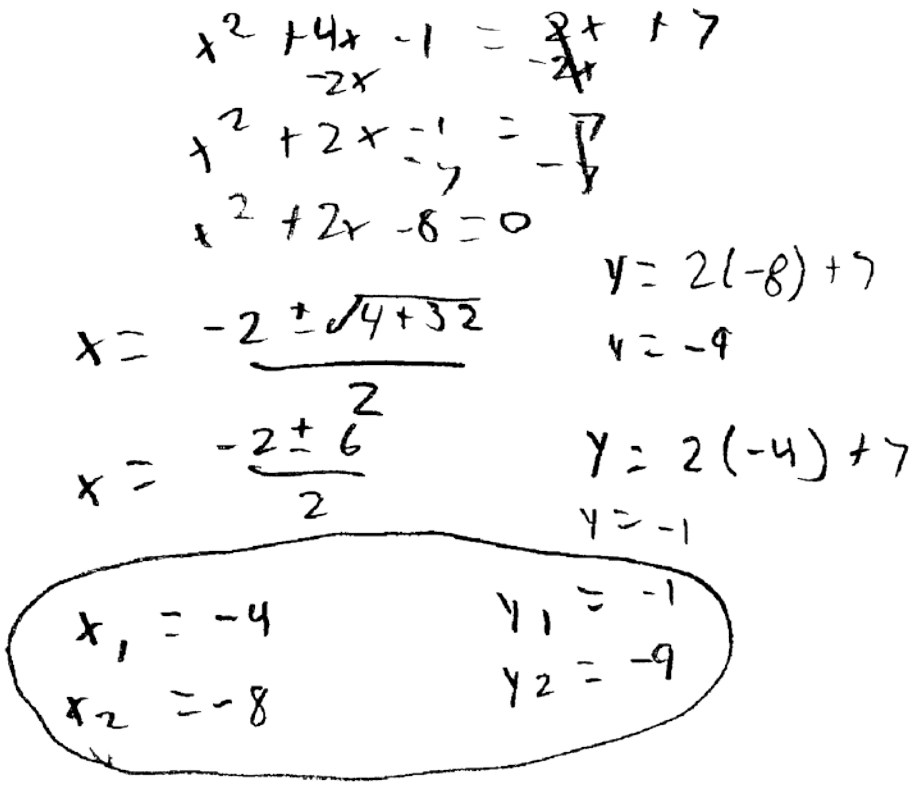
Score 3: The student made one computational error.

Question 34

34 Solve the system of equations algebraically for all values of x and y.

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

$$y = 2x + 7$$



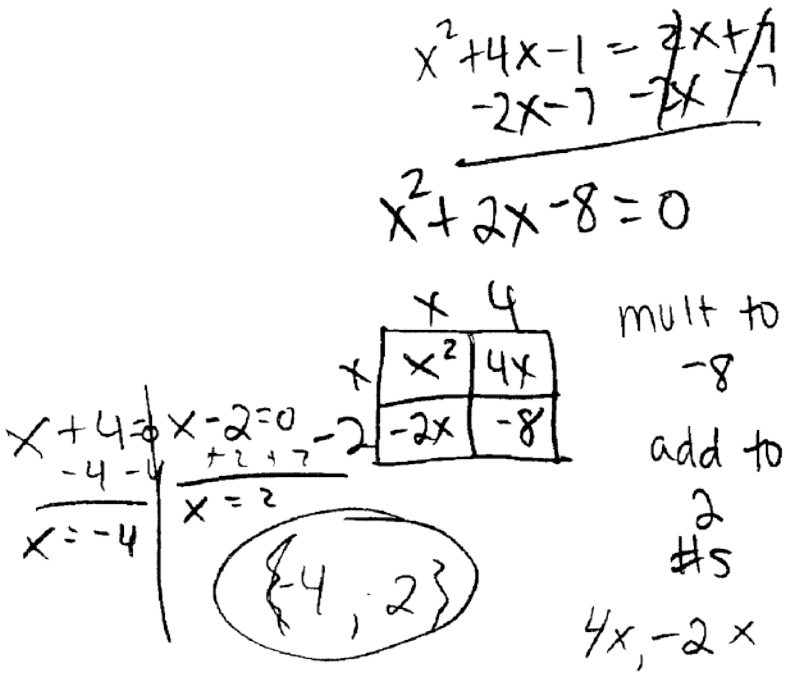
Score 3: The student found $x = -4$, $y = -1$.

Question 34

34 Solve the system of equations algebraically for all values of x and y.

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

$$y = 2x + 7$$



Score 3: The student showed appropriate work to find both $x = 2$ and $x = -4$, but no further correct work was shown.

Question 34

34 Solve the system of equations algebraically for all values of x and y.

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

$$y = 2x + 7$$

$2x+7 = x^2 + 4x - 1$

$-2x \quad -7$

$x^2 + 2x - 8 = 0$

$(x+4)(x-2) = 0$

Score 2: The student showed appropriate work to find $(x + 4)(x - 2) = 0$, but no further correct work was shown.

Question 34

34 Solve the system of equations algebraically for all values of x and y.

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

$$y = 2x + 7$$

(-4, -1)

(2, 11)

Score 1: The student gave two correct solutions, but no work was shown.

Question 34

34 Solve the system of equations algebraically for all values of x and y.

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

$$y = 2x + 7$$

$2x + 7 = x^2 + 4x - 1$

$-4x \downarrow \quad -4x$

$-2x + 7 = x^2 - 1$

$\downarrow -7 \quad \downarrow -7$

$8 + (-2x) = x^2 - 8$

$+8$

$\sqrt{8 + (-2x)} = x^2$

$y = (2.8)^2 + 4(2.8) - 1$

$\sqrt{8 + (-2x)} = x$

$2.8 = x$

Score 0: The student made multiple errors.

Question 34

34 Solve the system of equations algebraically for all values of x and y.

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

$$y = 2x + 7$$

$x^2 + 4x - 1 = 2x + 7$
$-7 \quad -7$

$x^2 + 4x - 8 = 2x$
$-4x \quad -4x$

$x^2 - 8 = -2x$
$+8 \quad +8$

$\sqrt{x^2} = \sqrt{-2x + 8}$

$x = \sqrt{-2x + 8}$

$\sqrt{-2x} + \sqrt{8}$

$y = 2x + 7$

$-2x = -y + 7$

$x = \frac{1}{2}y - 3.5$

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

$y = (\frac{1}{2}y - 3.5)^2 + 4(\frac{1}{2}y - 3.5) - 1$

$y = \frac{1}{4}y + 12.25 + 2y - 14 - 1$

$y = \frac{9}{4}y - 2.75$

Score 0: The student made multiple errors.

Question 35

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$2m + 3r = 38.50$

$6m + r = 47.50$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

She is incorrect because in June when she spent $47.50 the ticket could not have been that price or else the prices would've been lower

$2(5.75) + 3(9) = 38.50$

$11.5 + 27 = 38.50$

$38.50 = 38.50$

$6(5.75) + 9 = 47.50$

$34.5 + 9 = 43.50$

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

$2m + 3r = 38.50$

$-3(6m + r = 47.50)$

$-18m - 3r = -142.50$

$2m + 3r = 38.50$

$\frac{-16m}{-16} = \frac{-104}{-16}$

$m = 6.5$

$2(6.5) + 3r = 38.50$

$13 + 3r = 38.50$

$\frac{3r}{3} = \frac{25.5}{3}$

$r = 8.5$

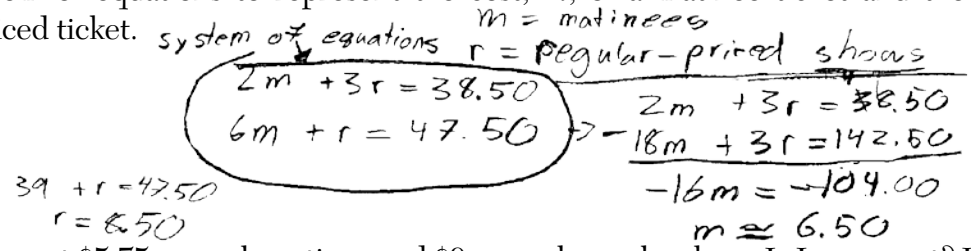
the cost of a matinee ticket is $6.50 and the cost of a regular ticket is $8.50

Score 6: The student gave a complete and correct response.

Question 35

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.



Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

Jen is incorrect because when you correctly solved the equation a matinee costs $6.50 and a regular-priced ticket costs $8.50

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

$2m + 3r = 38.50$
$3(6m + r = 47.50)$ → $-18m + 3r = 142.50$
$-16m = -104$
$m = 6.50$

m = matinees
r = regular-priced shows

$6(6.5) + r = 47.50$
$39 + r = 47.50$
$r = 8.50$

Score 6: The student gave a complete and correct response.

Question 35

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$2m + 3r = 38.50$

$6m + 1r = 47.50$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

$2(5.75) + 3(9) = 38.50$

$38.50 = 38.50$

No

$6(5.75) + 1(9) = 47.50$

$43.50 \neq 47.50$

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

$2m + 3r = 38.50$

$-18m - 3r = -142.50$

$\frac{-16m}{-16} = \frac{-104}{-16}$

$m = 6.50$

Score 5: The student did not find r.

Question 35

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$2m + 3r = 38.50$
$6m + 1r = 47.50$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

$2(5.75) + 3(9) = 38.50$
$11.50 + 27 = 38.5$
$6(5.75) + 1(9) \neq 47.50$
No, She is not Correct

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

Score 4: The student wrote a correct system of equations and a correct justification.

Question 35

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$38.50 = 2m + 3r$
$47.50 = 6m + 1r$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

$2m + 3r = 2(5.75) + 3(9)$
$11.5 + 27 = 38.50$

Jen is correct because when you multiply the cost of each ticket by the amount of tickets and add both amounts you get $38.50

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

Score 3: This student wrote a correct system of equations and justified only in the first equation.

Question 35

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$m = 38.50(n)$
$r =$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

NO, if Jen went to 6 matinees the price would have been 47.50 but (and one regular) $5.75 \cdot 6 + 9$ equals 43.50

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

Score 2: The student gave a correct justification, but no further correct work was shown.

Question 35

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

$2 \times 5.75 = 11.50$

$9 \times 3 = 27$

$27 + 11.50 = 38.50$

Yes.

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

Score 1: The student justified only in the first equation.

Question 35

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$r = 38.50r - 38.50m$

$47.50m - 47.50m$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

yes because when you solve the equation

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

Score 0: The student did not show enough grade-level work to receive any credit.

The State Education Department / The University of the State of New York

Regents Examination in Algebra I – AUGUST 2024

Chart for Converting Total Test Raw Scores to Final Exam Scores (Scale Scores)

(Use for the August 2024 exam only.)

Raw Score	Scale Score	Performance Level
82	**100**	5
81	**99**	5
80	**97**	5
79	**95**	5
78	**94**	5
77	**93**	5
76	**91**	5
75	**90**	5
74	**89**	5
73	**88**	5
72	**87**	5
71	**86**	5
70	**86**	5
69	**85**	5
68	**84**	4
67	**83**	4
66	**83**	4
65	**82**	4
64	**82**	4
63	**81**	4
62	**80**	4
61	**80**	4
60	**79**	4
59	**79**	4
58	**79**	4
57	**78**	4
56	**78**	4
55	**77**	4
54	**77**	4
53	**76**	4
52	**76**	4
51	**75**	4
50	**75**	4
49	**75**	4
48	**74**	3
47	**74**	3
46	**73**	3
45	**73**	3
44	**72**	3
43	**72**	3
42	**72**	3
41	**71**	3
40	**71**	3
39	**70**	3
38	**70**	3
37	**69**	3
36	**69**	3
35	**69**	3
34	**68**	3
33	**68**	3
32	**67**	3
31	**67**	3
30	**66**	3
29	**66**	3
28	**65**	3
27	**64**	2
26	**64**	2
25	**63**	2
24	**62**	2
23	**61**	2
22	**60**	2
21	**59**	2
20	**58**	2
19	**57**	2
18	**56**	2
17	**55**	2
16	**53**	1
15	**51**	1
14	**50**	1
13	**48**	1
12	**46**	1
11	**43**	1
10	**41**	1
9	**38**	1
8	**35**	1
7	**32**	1
6	**29**	1
5	**25**	1
4	**21**	1
3	**16**	1
2	**12**	1
1	**6**	1
0	**0**	1

To determine the student's final examination score (scale score), find the student's total test raw score in the column labeled "Raw Score" and then locate the scale score that corresponds to that raw score. The scale score is the student's final examination score. Enter this score in the space labeled "Scale Score" on the student's answer sheet.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart change from one administration to another, it is crucial that for each administration the conversion chart provided for that administration be used to determine the student's final score. The chart above is usable only for this administration of the Regents Examination in Algebra I.