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

ALGEBRA I

Wednesday, January 24, 2024 — 1:15 to 4:15 p.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 37 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.

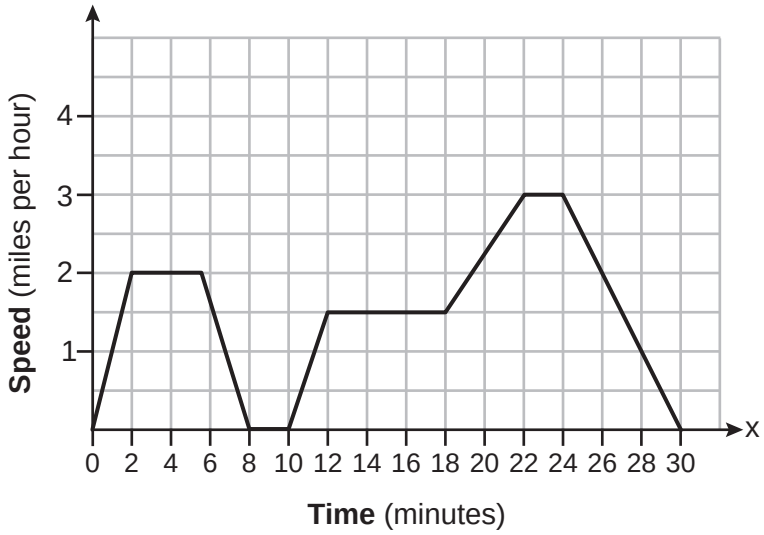
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

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 The graph below represents a dog walker's speed during his 30-minute walk around the neighborhood.



Which statement best describes what the dog walker was doing during the 12-18 minute interval of his walk?

(1) He was walking at a constant rate.

(2) He was increasing his speed.

(3) He was decreasing his speed.

(4) He was standing still.

2 Given the relation: $\{(0,4), (2,6), (4,8), (x,7)\}$

Which value of x will make this relation a function?

(1) 0

(2) 2

(3) 6

(4) 4

Use this space for computations.

3 The Speedy Jet Ski Rental Company charges an insurance fee and an hourly rental rate. The total cost is modeled by the function $R(x) = 30 + 40x$. Based on this model, which statements are true?

I. $R(x)$ represents the total cost.

II. x is the number of hours rented.

III. \$40 is the insurance fee.

IV. \$30 is the hourly rental rate.

(1) I, only

(2) I and II, only

(3) I, III, and IV, only

(4) I, II, III, and IV

4 The eleventh term of the sequence 3, −6, 12, −24, …, is

(1) −3072

(2) −6144

(3) 3072

(4) 6144

5 Which situation represents exponential growth?

(1) Aidan adds \$10 to a jar each week.

(2) A pine tree grows 1.5 feet per year.

(3) Ella earns \$20 per hour babysitting.

(4) The number of people majoring in computer science doubles every 5 years.

6 The expression $(-x^2 + 3x - 7) - (4x^2 + 5x - 2)$ is equivalent to

(1) $-5x^2 - 2x - 9$

(2) $-5x^2 - 2x - 5$

(3) $-5x^2 + 8x - 9$

(4) $-5x^2 + 8x - 5$

Use this space for computations.

7 If $f(x) = x^2$, which function is the result of shifting $f(x)$ 3 units left and 2 units down?

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

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

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

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

8 An equation used to find the velocity of an object is given as $v^2 = u^2 + 2as$, where u is the initial velocity, v is the final velocity, a is the acceleration of the object, and s is the distance traveled.

When this equation is solved for a, the result is

(1) $a = \dfrac{v^2u^2}{2s}$

(2) $a = \dfrac{v^2 - u^2}{2s}$

(3) $a = v^2 - u^2 - 2s$

(4) $a = 2s(v^2 - u^2)$

9 Mrs. Smith's math class surveyed students to determine their favorite flavors of soft ice cream. The results are shown in the table below.

	Chocolate	Vanilla	Twist
Juniors	42	27	45
Seniors	67	42	21

Of the students who preferred chocolate, approximately what percentage were seniors?

(1) 27.5

(2) 44.7

(3) 51.5

(4) 61.5

Use this space for computations.

10 If $f(x) = x^2 + 2x + 1$ and $g(x) = 3x + 5$, then what is the value of $f(1) - g(3)$?

(1) 10

(2) 8

(3) -10

(4) -8

11 Which function has the largest y-intercept?

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

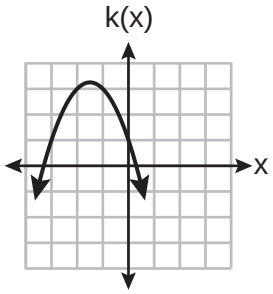
(1)

$g(x) = |x| + 3$

(3)

x	h(x)
–1	1.5
0	2
1	3
2	5

(2)



(4)

12 Two texting plans are advertised. Plan *A* has a monthly fee of \$15 with a charge of \$0.08 per text. Plan *B* has a monthly fee of \$3 with a charge of \$0.12 per text. If t represents the number of text messages in a month, which inequality should be used to show that the cost of Plan *A* is *less* than the cost of Plan *B*?

(1) $15 + 0.08t < 3 + 0.12t$

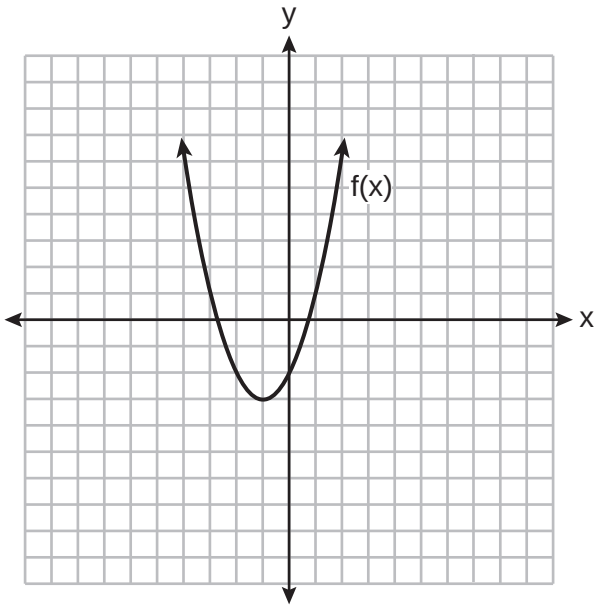
(2) $15 + 0.08t > 3 + 0.12t$

(3) $15t + 0.08 < 3t + 0.12$

(4) $15t + 0.08 > 3t + 0.12$

Use this space for computations.

13 The function $f(x)$ is graphed on the set of axes below.



What is the equation of the axis of symmetry for $f(x)$?

(1) $x = -1$

(2) $x = -3$

(3) $y = -1$

(4) $y = -3$

14 What is the degree of the polynomial $5x - 3x^2 - 1 + 7x^3$?

(1) 1

(2) 2

(3) 3

(4) 5

15 The product of $(x^2 + 3x + 9)$ and $(x - 3)$ is

(1) $x^3 - 27$

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

(3) $x^3 - 6x^2 - 18x - 27$

(4) $-6x^4 + x^3 - 18x^2 - 27$

16 The solution to $\frac{2}{3}(3 - 2x) = \frac{3}{4}$ is

(1) $-\frac{11}{8}$

(2) $\frac{5}{8}$

(3) $-\frac{33}{16}$

(4) $\frac{15}{16}$

Use this space for computations.

17 If $f(x) = 2x + 6$ and $g(x) = |x|$ are graphed on the same coordinate plane, for which value of x is $f(x) = g(x)$?

(1) 6
(2) 2
(3) -2
(4) -6

18 What is the solution to the inequality $2x - 7 > 2.5x + 3$?

(1) $x > -5$
(2) $x < -5$
(3) $x > -20$
(4) $x < -20$

19 Three expressions are written below.

A. $(2xy^2)^3$
B. $(2x)^3 y^6$
C. $(2x^2y^2)(4xy^3)$

Which expressions are equivalent to $8x^3y^6$?

(1) *A* and *B*, only
(2) *B* and *C*, only
(3) *A* and *C*, only
(4) *A*, *B*, and *C*

20 Joe deposits $4000 into a certificate of deposit (CD) at his local bank. The CD earns 3% interest, compounded annually. The value of the CD in x years can be found using the function

(1) $f(x) = 4000 + 0.3x$
(2) $f(x) = 4000 + 0.03x$
(3) $f(x) = 4000(1.3)^x$
(4) $f(x) = 4000(1.03)^x$

Use this space for computations.

21 When factored completely, $-x^3 + 10x^2 + 24x$ is

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

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

(3) $-x(x + 2)(x - 12)$

(4) $-x(x - 2)(x + 12)$

22 When the temperature is 59°F, the speed of sound at sea level is 1225 kilometers per hour. Which process could be used to convert this speed into feet per second?

(1) $\frac{1225 \text{ km}}{1 \text{ hr}} \bullet \frac{0.62 \text{ mi}}{1 \text{ km}} \bullet \frac{1 \text{ hr}}{60 \text{ min}} \bullet \frac{1 \text{ mi}}{5280 \text{ ft}} \bullet \frac{1 \text{ min}}{60 \text{ sec}}$

(2) $\frac{1225 \text{ km}}{1 \text{ hr}} \bullet \frac{0.62 \text{ mi}}{1 \text{ km}} \bullet \frac{5280 \text{ ft}}{1 \text{ mi}} \bullet \frac{1 \text{ hr}}{60 \text{ min}} \bullet \frac{1 \text{ min}}{60 \text{ sec}}$

(3) $\frac{1225 \text{ km}}{1 \text{ hr}} \bullet \frac{1 \text{ km}}{0.62 \text{ mi}} \bullet \frac{5280 \text{ ft}}{1 \text{ mi}} \bullet \frac{1 \text{ hr}}{60 \text{ min}} \bullet \frac{1 \text{ min}}{60 \text{ sec}}$

(4) $\frac{1225 \text{ km}}{1 \text{ hr}} \bullet \frac{0.62 \text{ mi}}{1 \text{ km}} \bullet \frac{5280 \text{ ft}}{1 \text{ mi}} \bullet \frac{60 \text{ min}}{1 \text{ hr}} \bullet \frac{1 \text{ min}}{60 \text{ sec}}$

23 The zeros of a polynomial function are -2, 4, and 0. What are all the factors of this function?

(1) $(x + 2)$ and $(x - 4)$

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

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

(4) x, $(x - 2)$, and $(x + 4)$

24 What is the range of the function $f(x) = (x - 4)^2 + 1$?

(1) $x > 4$

(2) $x \geq 4$

(3) $f(x) > 1$

(4) $f(x) \geq 1$

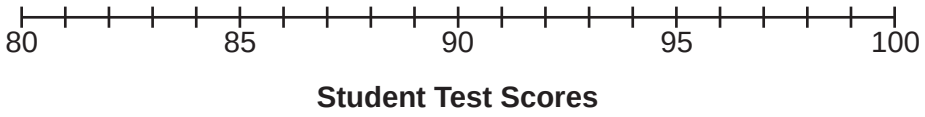
Part II

Answer all 8 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. [16]

25 Student scores on a recent test are shown in the table below.

85	96	92	82	90
90	88	95	85	88
90	87	96	82	85
92	96	85	92	87

On the number line below, create a dot plot to model the data.



State the median test score for the data set.

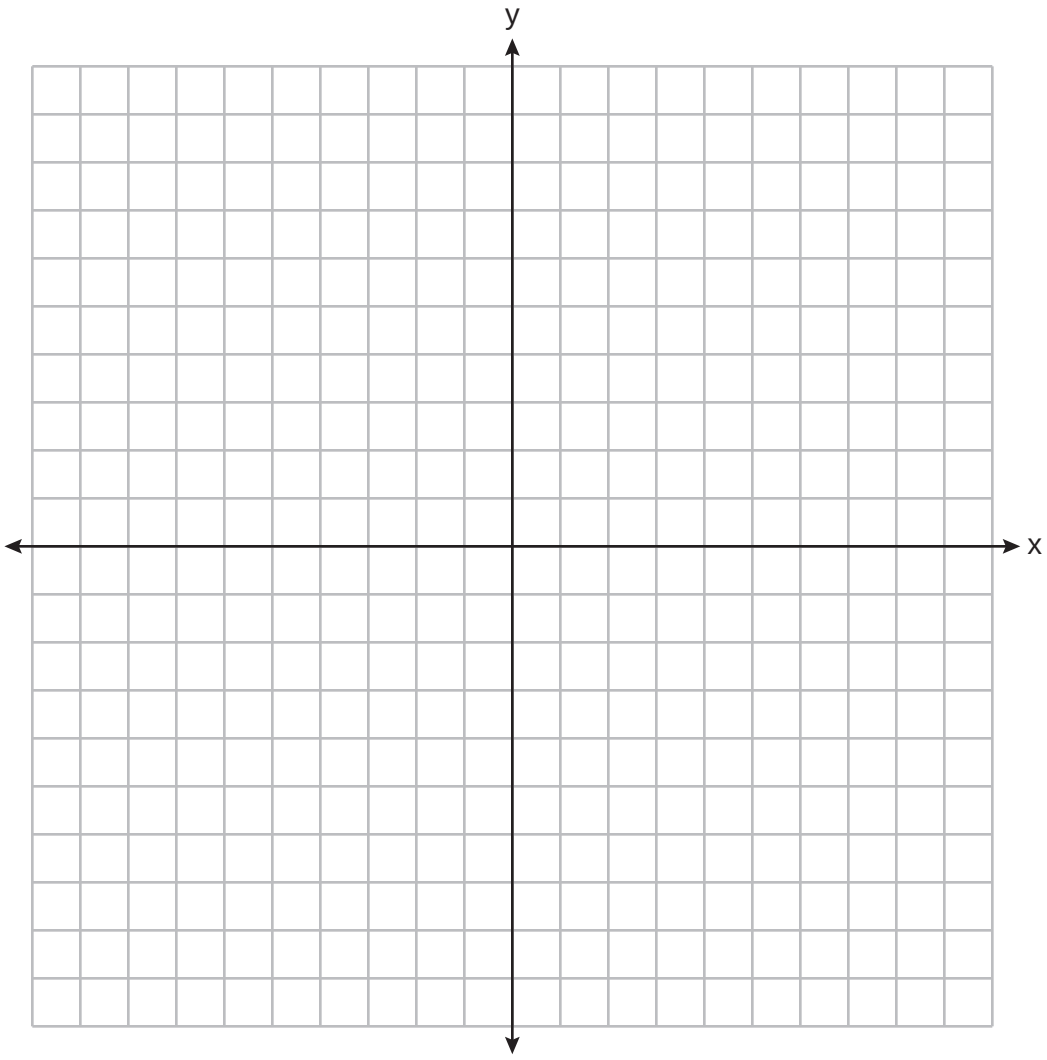
26 State whether $2\sqrt{3} + 6$ is rational or irrational. Explain your answer.

27 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	2	3	4	5
Miles from Home (y)	45	112	178	238	305

State the average rate of change for the distance traveled between hours 2 and 4. Include appropriate units.

28 On the set of axes below, graph the equation $3y + 2x = 15$.



Explain why $(-6,9)$ is a solution to the equation.

29 Using the quadratic formula, solve $3x^2 - 2x - 6 = 0$ for all values of x.
Round your answers to the *nearest hundredth*.

30 The piecewise function $f(x)$ is given below.

$$f(x) = \begin{cases} 2x - 3, & x > 3 \\ -x^2 + 15, & x \leq 3 \end{cases}$$

State the value of $f(3)$.

Justify your answer.

31 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.

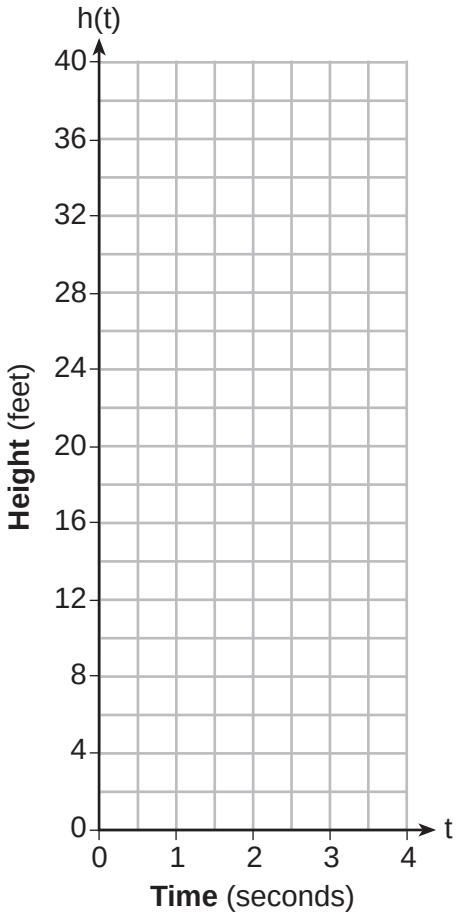
32 Factor $36 - 4x^2$ completely.

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]

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.



What is the maximum height, in feet, that the golf ball reaches on this hit?

How many seconds does it take the golf ball to hit the ground?

34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

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

State the correlation coefficient, rounded to the *nearest hundredth*.

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

35 Julia is 4 years older than twice Kelly's age, x. The product of their ages is 96.
Write an equation that models this situation.

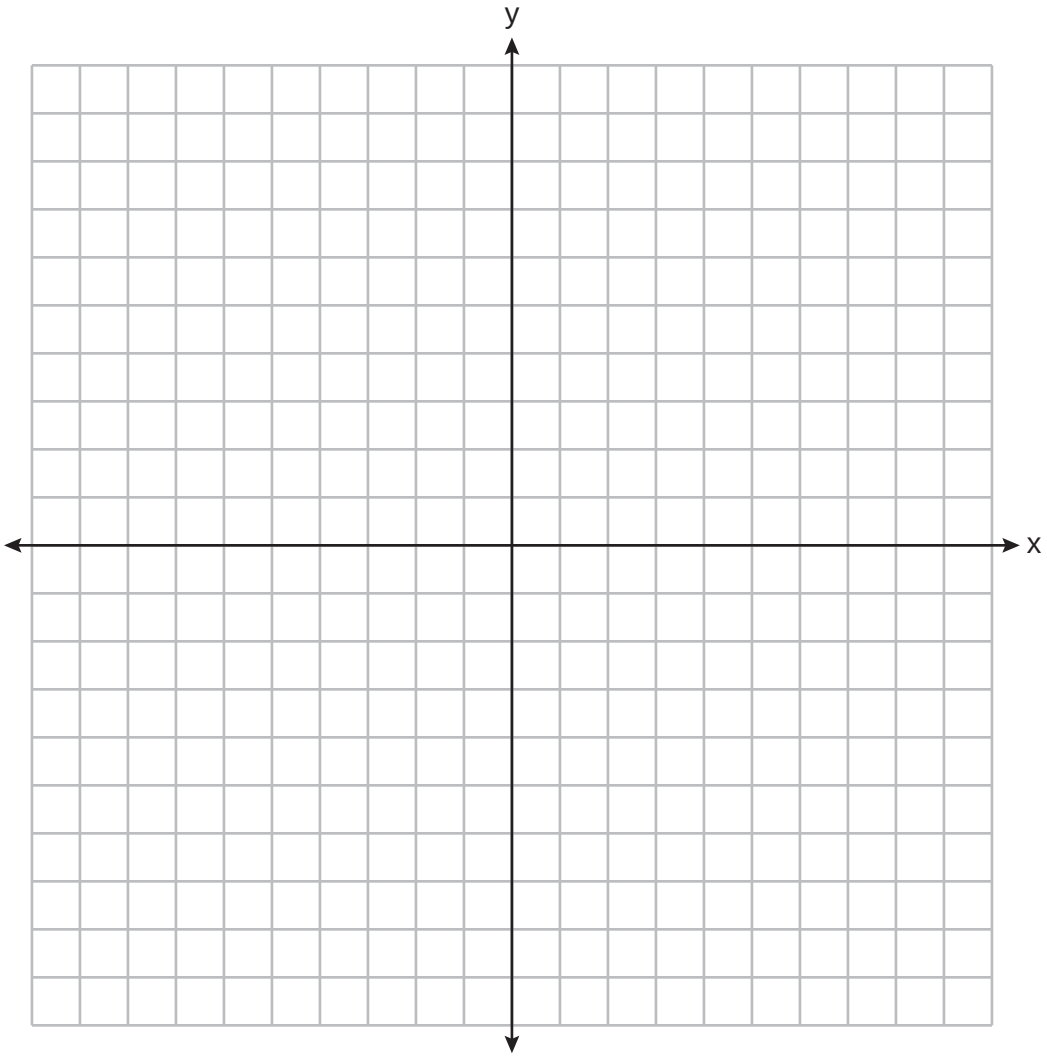
Determine Kelly's age algebraically.

State the difference between Julia's and Kelly's ages, in years.

36 On the set of axes below, graph the following system of inequalities:

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

Label the solution set *S*.



Is (4,2) a solution to this system? Justify your answer.

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]

37 Jim had a bag of coins. The number of nickels, n, and the number of quarters, q, totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

Use your system of equations to algebraically determine both the number of quarters, q, and the number of nickels, n, that Jim had in the bag.

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

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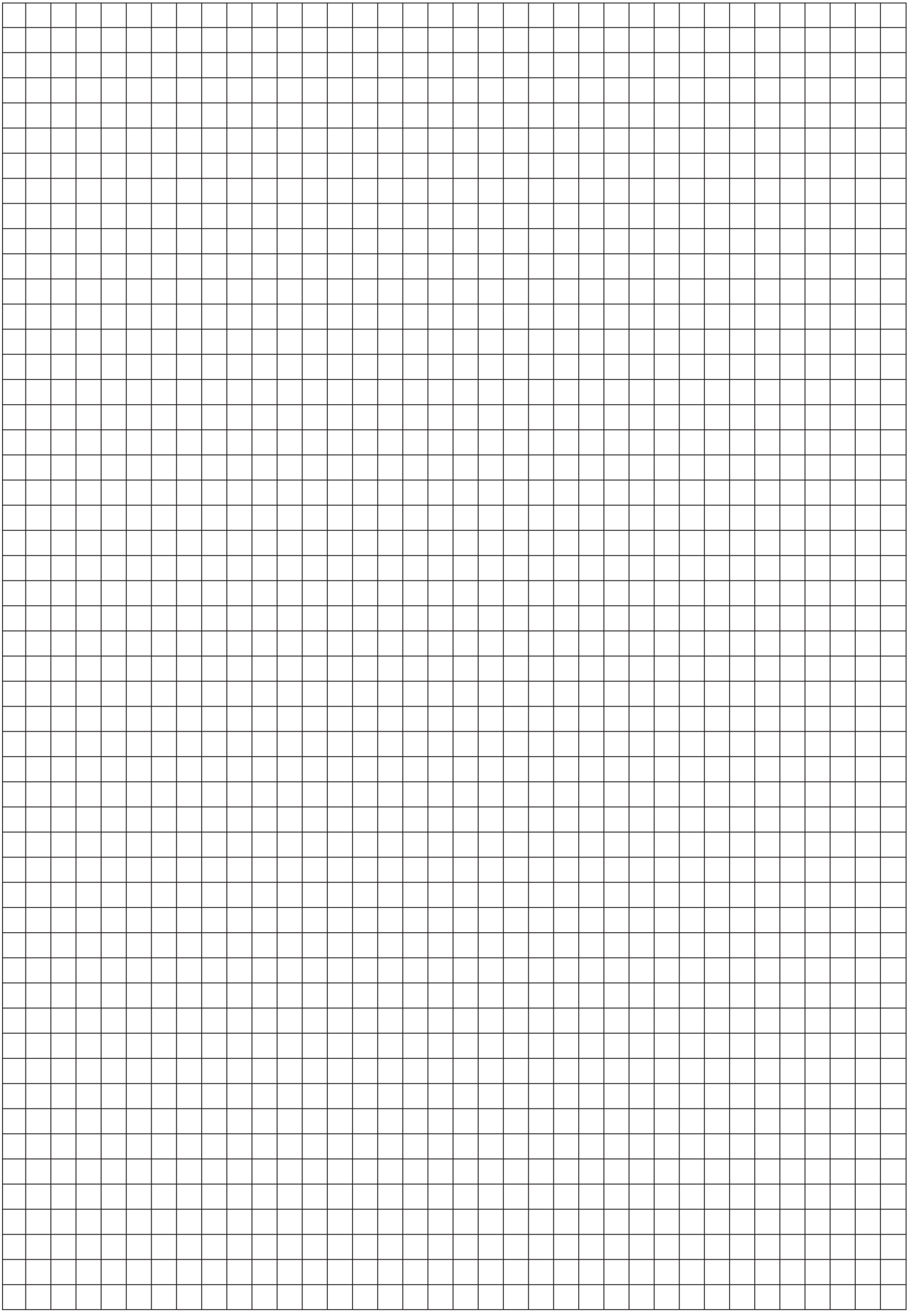

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High School Math Reference Sheet

1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 5280 feet
1 mile = 1760 yards
1 mile = 1.609 kilometers

1 kilometer = 0.62 mile
1 pound = 16 ounces
1 pound = 0.454 kilogram
1 kilogram = 2.2 pounds
1 ton = 2000 pounds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon = 3.785 liters
1 liter = 0.264 gallon
1 liter = 1000 cubic centimeters

Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Circle	$C = \pi d$ or $C = 2\pi r$
General Prisms	$V = Bh$
Cylinder	$V = \pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$
Cone	$V = \frac{1}{3}\pi r^2 h$
Pyramid	$V = \frac{1}{3}Bh$

Pythagorean Theorem	$a^2 + b^2 = c^2$
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Arithmetic Sequence	$a_n = a_1 + (n - 1)d$
Geometric Sequence	$a_n = a_1 r^{n-1}$
Geometric Series	$S_n = \frac{a_1 - a_1 r^n}{1 - \mathrm{r}}$ where $r \neq 1$
Radians	1 radian $= \frac{180}{\pi}$ degrees
Degrees	1 degree $= \frac{\pi}{180}$ radians
Exponential Growth/Decay	$A = A_0 e^{k(t - t_0)} + B_0$

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ALGEBRA I

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ALGEBRA I

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

Regents Examination in Algebra I – January 2024

Scoring Key: Part I (Multiple-Choice Questions)

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

Regents Examination in Algebra I – January 2024

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

Examination	Date	Question Number	Scoring Key	Question Type	Credit
Algebra I	January '24	**25**	-	CR	2
Algebra I	January '24	**26**	-	CR	2
Algebra I	January '24	**27**	-	CR	2
Algebra I	January '24	**28**	-	CR	2
Algebra I	January '24	**29**	-	CR	2
Algebra I	January '24	**30**	-	CR	2
Algebra I	January '24	**31**	-	CR	2
Algebra I	January '24	**32**	-	CR	2
Algebra I	January '24	**33**	-	CR	4
Algebra I	January '24	**34**	-	CR	4
Algebra I	January '24	**35**	-	CR	4
Algebra I	January '24	**36**	-	CR	4
Algebra I	January '24	**37**	-	CR	6

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

The chart for determining students' final examination scores for the **January 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

Wednesday, January 24, 2024 — 1:15 to 4:15 p.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 Wednesday, January 24, 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 dot plot is drawn, and 89 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] 89 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.

(26) **[2]** Irrational, and a correct explanation is written.

[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] Irrational, but the explanation is incomplete.

[0] Irrational, but no explanation is written.

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.

(27) **[2]** 63 mph is stated.

[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] 63, but the units are missing or incorrect.

or

[1] Miles per hour 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.

(28) **[2]** A correct graph is drawn, and a correct explanation is written.

[1] Appropriate work is shown, but one computational or 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] A correct explanation is written, 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.

(29) **[2]** 1.79 and −1.12, and correct work is shown.

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

or

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

or

[1] Appropriate work is shown, but only 1.79 or −1.12 is stated.

or

[1] Appropriate work is shown to find $\frac{2 \pm \sqrt{76}}{6}$, but no further correct work is shown.

or

[1] 1.79 and −1.12, but a method other than the quadratic formula is used.

or

[1] 1.79 and −1.12, 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]** 6, and a correct justification is given.

[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] 6 is stated, but the justification is missing 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.

(31) **[2]** $(x - 4)^2 = -25$ is written, 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] $(x - 4)^2 = -25$, 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.

(32) **[2]** $4(3 + x)(3 - x)$, 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] $(6 + 2x)(6 - 2x)$ is stated, but no further correct work is shown.

or

[1] $4(3 + x)(3 - x)$, but no work is shown.

[0] $4(9 - x^2)$ is stated, but no further correct 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.

(33) **[4]** A correct graph is drawn, and 36 and 3 are stated.

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

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

or

[2] 36 and 3, but no further correct work is shown.

or

[2] An incorrect graph is drawn, but appropriate answers are stated for maximum height and the number of seconds.

[1] 36 or 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.

(34) **[4]** $y = 40.48x + 363.81$, 0.84, and strong is indicated.

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

or

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

or

[3] Appropriate work is shown, but the expression $40.48x + 363.81$ is written.

[2] $y = 40.48x + 363.81$ is written, but no further correct work is shown.

[1] 0.84 is stated, 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.

(35) **[4]** $x(2x + 4) = 96$, 6, and correct algebraic work is shown, and 10 is stated.

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

or

[3] Appropriate work is shown, but 10 is not stated.

[2] $2x^2 + 4x - 96 = 0$ is written, but no further correct work is shown.

or

[2] 6, but a method other than algebraic is used, and 10 is stated.

[1] $x(2x + 4) = 96$ is written, but no further correct work is shown.

or

[1] An appropriate system of equations is written, but no further correct work is shown.

or

[1] 6 and 10, 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.

(36) **[4]** The system of inequalities is graphed correctly and at least one is labeled, the solution set is labeled *S*, and a correct justification indicating a positive 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 set 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] Appropriate work is shown, but two or more computational, graphing, or labeling errors are made.

or

[2] The system of inequalities is graphed correctly and at least one is labeled, but no further correct work is shown.

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

or

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

or

[1] $2x - y = 4$ and $x + 3y = 6$ 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.

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.

(37) **[6]** $0.05n + 0.25q = 4$, $n + q = 28$ or an equivalent system is written, $q = 13$, $n = 15$, and correct algebraic work is shown, 10, and a correct justification is given.

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

or

[5] Appropriate work is shown, but a method other than algebraic is used.

or

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

[4] Appropriate work is shown to find $q = 13$ and $n = 15$, but no further correct work is shown.

[3] Appropriate work is shown to find either $q = 13$ or $n = 15$, but no further correct work is shown.

or

[3] One equation is incorrect, but the system is solved appropriately for n and q, and no further correct work is shown.

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

or

[2] 10, and 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] $q = 13$, $n = 15$, and 10 are stated, 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.

Map to the Learning Standards
Algebra I
January 2024

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

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

Regents Examination in Algebra I

January 2024

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

The *Chart for Determining the Final Examination Score for the January 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 Wednesday, January 24, 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

Wednesday, January 24, 2024 — 1:15 to 4:15 p.m., only

MODEL RESPONSE SET

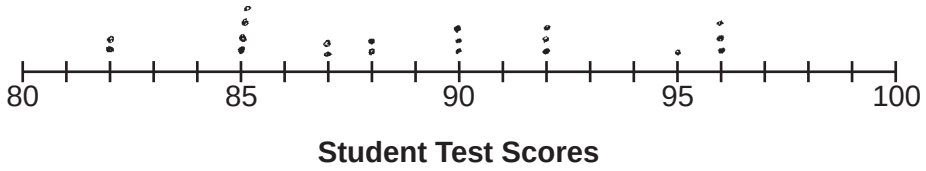
Table of Contents

Question 25

25 Student scores on a recent test are shown in the table below.

85	96	92	82	90
90	88	95	85	88
90	87	96	82	85
92	96	85	92	87

On the number line below, create a dot plot to model the data.



Student Test Scores

State the median test score for the data set.

89

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

Question 25

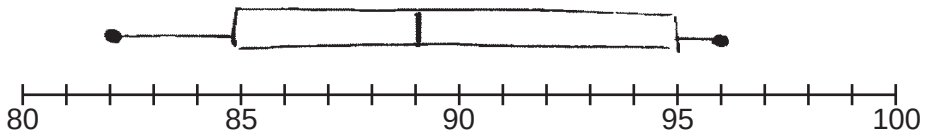
25 Student scores on a recent test are shown in the table below.

85	96	92	82	90
90	88	95	85	88
90	87	96	82	85
92	96	85	92	87

Smallest 82 Largest 96 Median 89 Range 16

82, 82, 85, 85, 85, 85, 87, 87, 88, 88, 89, 90, 90, 90, 92, 92, 92, 95, 96, 96, 96

On the number line below, create a dot plot to model the data.



Student Test Scores

Interquartile range

State the median test score for the data set.

The Median test score for the data set is 89

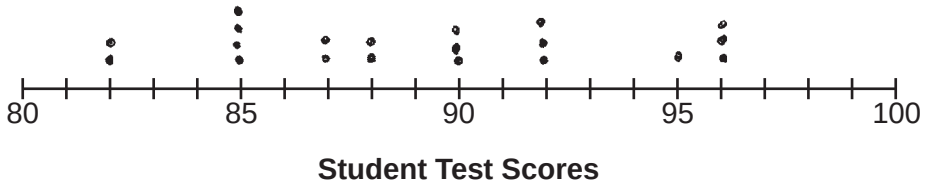
Score 1: The student stated the median correctly.

Question 25

25 Student scores on a recent test are shown in the table below.

85	96	92	82	90
90	88	95	85	88
90	87	96	82	85
92	96	85	92	87

On the number line below, create a dot plot to model the data.



State the median test score for the data set.

82, 82, 85, 85, 85, 85, 87, 87, 88, 88, 90, 90, 90, 92, 92, 92
95, 96 96, 96

88.5

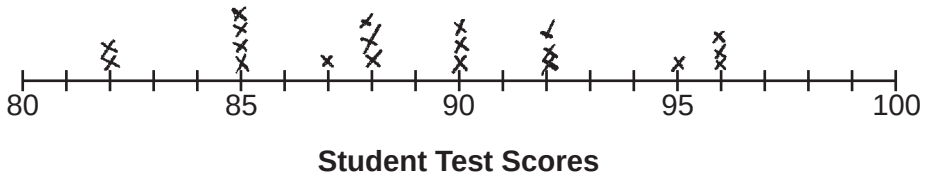
Score 1: The student created a correct dot plot.

Question 25

25 Student scores on a recent test are shown in the table below.

85	96	92	82	90
90	88	95	85	88
90	87	96	82	85
92	96	85	92	87

On the number line below, create a dot plot to model the data.



State the median test score for the data set.

The median Test Scores is 85.

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

Question 26

26 State whether $2\sqrt{3} + 6$ is rational or irrational. Explain your answer.

It is irrational because it equals to a non-repeating, non-terminating decimal that cannot be converted to a fraction. This is because $\sqrt{3}$ is an imperfect square and it is multiplied by a rational number and added to a rational number, which results in an irrational number.

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

Question 26

26 State whether $2\sqrt{3} + 6$ is rational or irrational. Explain your answer.

$2\sqrt{3} + 6 = 9.464101615$

$2\sqrt{3} + 6$ is irrational because its sum is not a number that terminates or repeats. The digits behind the decimal point do not repeat in a specific order with the same numbers therefore, it is irrational.

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

Question 26

26 State whether $2\sqrt{3} + 6$ is rational or irrational. Explain your answer.

$2\sqrt{3+6} = 6$ which is rational because it's a whole number.

Score 1: The student made a computational error, but wrote an appropriate explanation.

Question 26

26 State whether $2\sqrt{3} + 6$ is rational or irrational. Explain your answer.

9.4641... is the answer, this is irrational because 3 is not a perfect square. So when solving, your answer will be a decimal.

Score 1: The student wrote an incomplete explanation.

Question 26

26 State whether $2\sqrt{3} + 6$ is rational or irrational. Explain your answer.

$2\sqrt{3}+6$

$2\sqrt{3}+6$ is irrational it turns into a radical.

Score 0: The student wrote an incorrect explanation.

Question 27

27 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	x_1 2	3	x_2 4	5
Miles from Home (y)	45	y_1 112	178	y_2 238	305

State the average rate of change for the distance traveled between hours 2 and 4. Include appropriate units.

$m = \frac{y_2 - y_1}{x_2 - x_1}$ $\quad m = \frac{238 - 112}{4 - 2} = 63$

63 miles/hr

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

Question 27

27 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	2	3	4	5
Miles from Home (y)	45	112	178	238	305

State the average rate of change for the distance traveled between hours 2 and 4. Include appropriate units.

$\frac{126}{2} = 63$ mph

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

Question 27

27 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	2	3	4	5
Miles from Home (y)	45	112	178	238	305

State the slope average rate of change for the distance traveled between hours 2 and 4. Include appropriate units.

(2, 112) (4, 238)
x_1 y_1 x_2 y_2

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{238 - 112}{4 - 2} \rightarrow \frac{126}{2} \rightarrow 63$$

$m = 63$

Score 1: The student did not include the units.

Question 27

27 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	2	3	4	5
Miles from Home (y)	45	112	178	238	305

State the average rate of change for the distance traveled between hours 2 and 4. Include appropriate units.

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{238 - 112}{4 - 2} = \frac{126}{2} = 63$$

The average rate of change for distance traveled between hours 2 and 4 is 63 miles.

Score 1: The student gave incorrect units.

Question 27

27 The table below shows data from a recent car trip for the Burke family.

x	**Hours After Leaving** (x)	1	2	3	4	5
y	**Miles from Home** (y)	45	112	178	238	305

State the average rate of change for the distance traveled between hours 2 and 4. Include appropriate units.

$$\text{rate of change} = \frac{x_2 - x_1}{y_2 - y_1} = \frac{4 - 2}{238 - 112} = \frac{2}{126} = \frac{1}{63}$$

Score 0: The student incorrectly determined the average rate of change and did not include units.

Question 27

27 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	2	3	4	5
Miles from Home (y)	45	112	178	238	305

slope

State the average rate of change for the distance traveled between hours 2 and 4. Include appropriate units.

$\frac{\Delta y}{\Delta x} = \frac{2+3+4}{112+178+238} = \frac{8hr}{528 miles}$

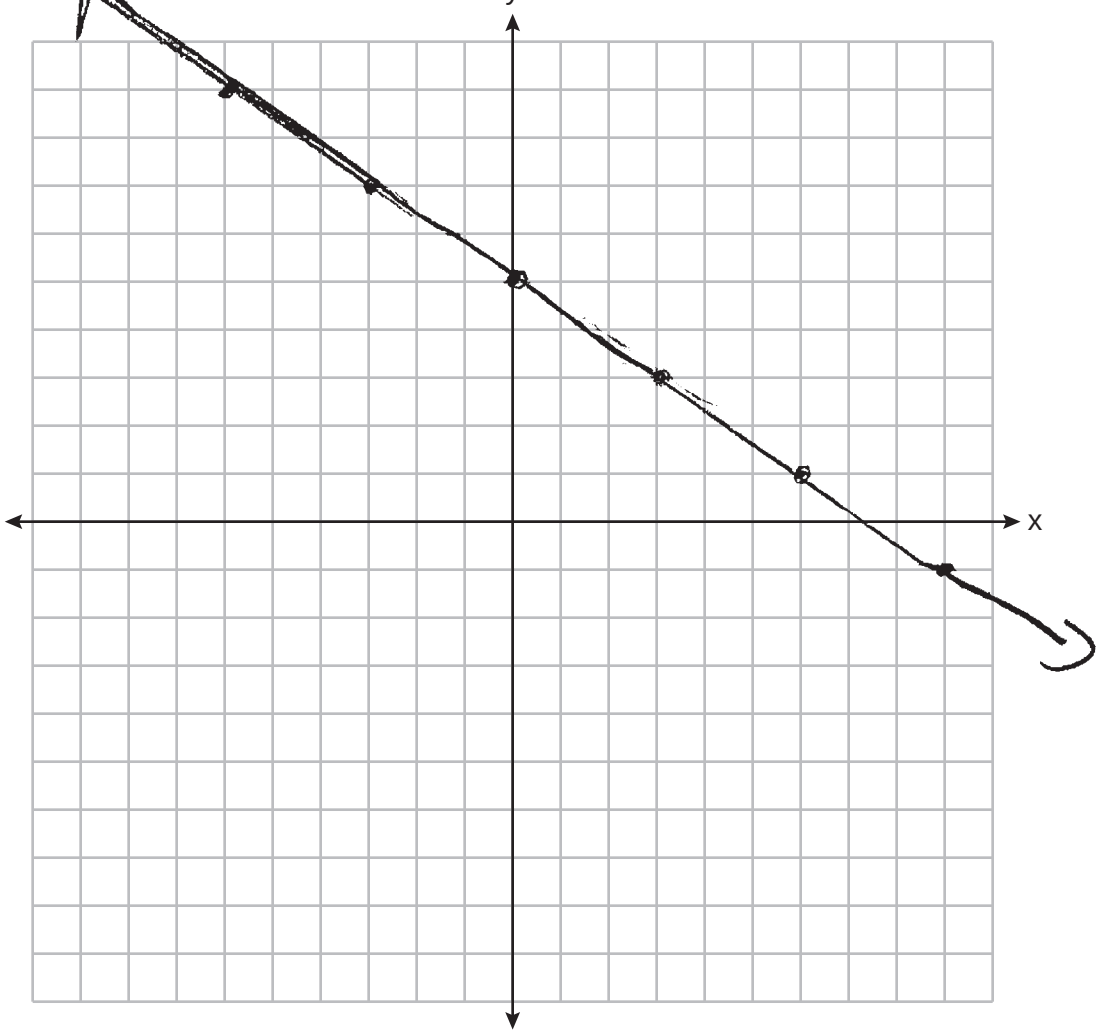
Score 0: The student did not show enough correct work to receive any credit.

Question 28

28 On the set of axes below, graph the equation $3y + 2x = 15$.

$\frac{3y}{3} = \frac{-2}{3}x + \frac{15}{3}$

$y = -\frac{2}{3}x + 5$



Explain why $(-6,9)$ is a solution to the equation.

(-6,9) is a solution because it falls on the line

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

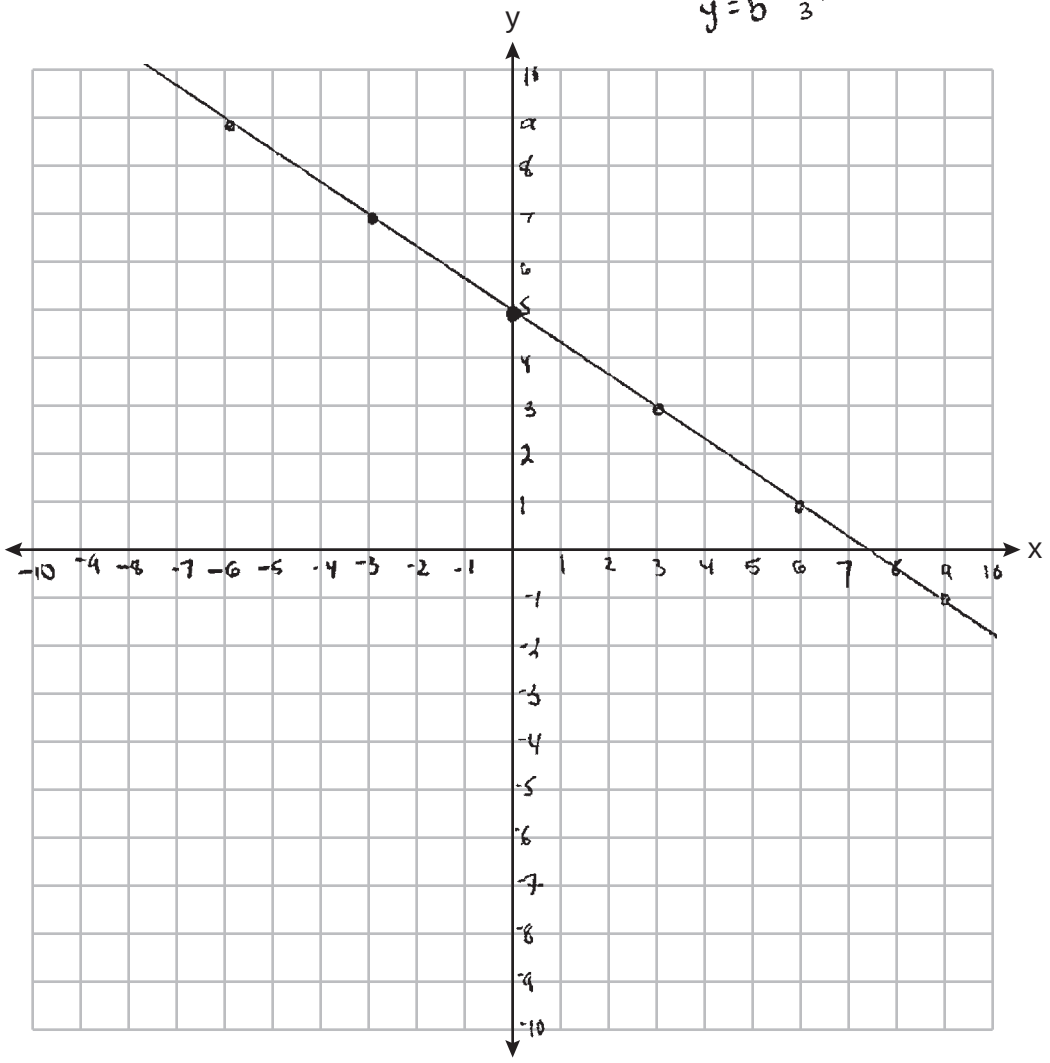
Question 28

28 On the set of axes below, graph the equation $3y + 2x = 15$.

$-2x \quad -2x$

$\frac{3y}{3} = \frac{15 - 2x}{3}$

$y = 5 - \frac{2}{3}x$



Explain why $(-6,9)$ is a solution to the equation.

(-6,9) is a solution to the equation because at (0,5) you have to go up 2, left 3 and if you do that 2 times you're at the point (-6,9) on the line.

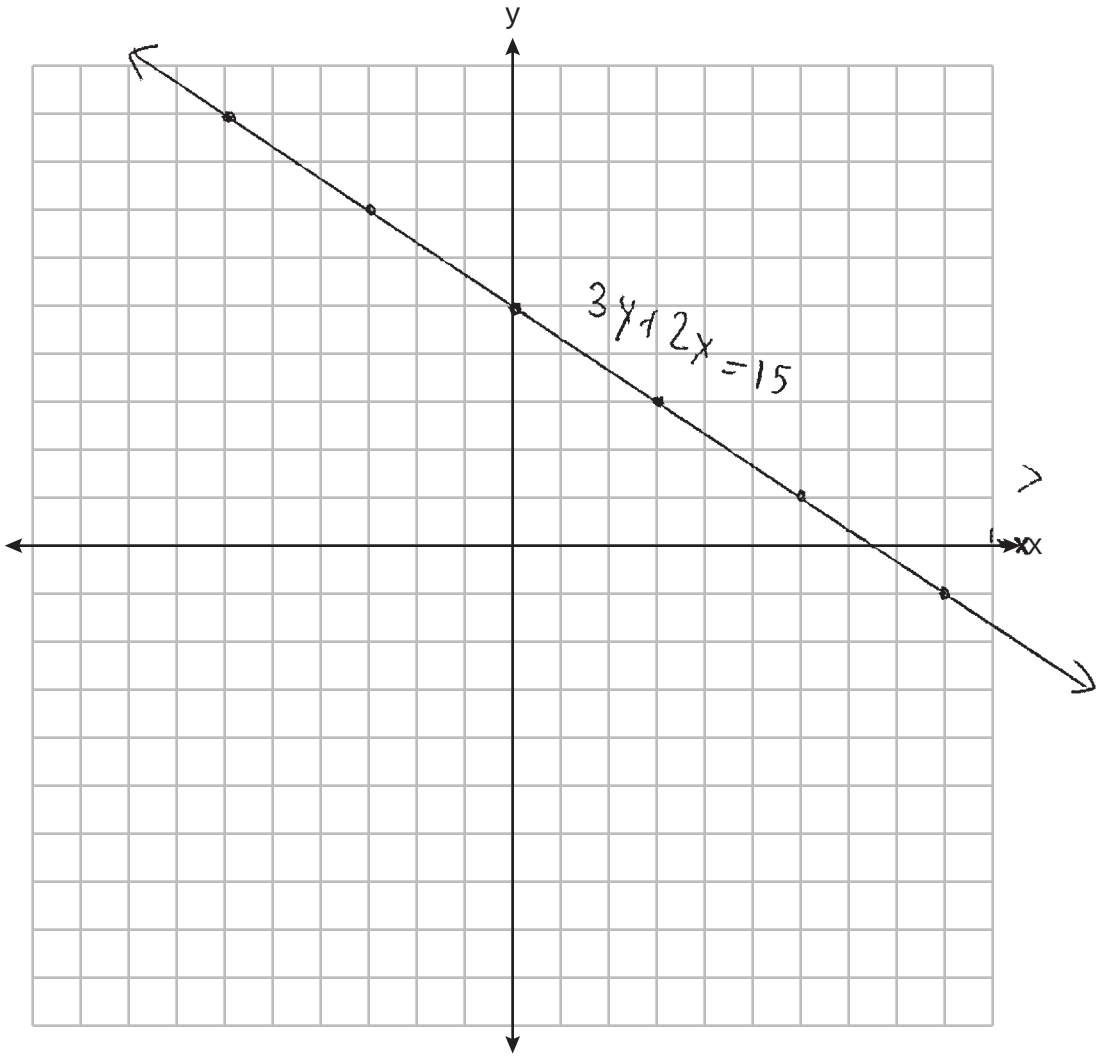
Score 2: The student gave a complete and correct response.

Question 28

28 On the set of axes below, graph the equation $3y + 2x = 15$.

$y + \frac{2}{3}x = 5$

$y = -\frac{2}{3}x + 5$



Explain why $(-6,9)$ is a solution to the equation.

$3(9) + 2(-6) = 15$

$27 - 12 = 15$

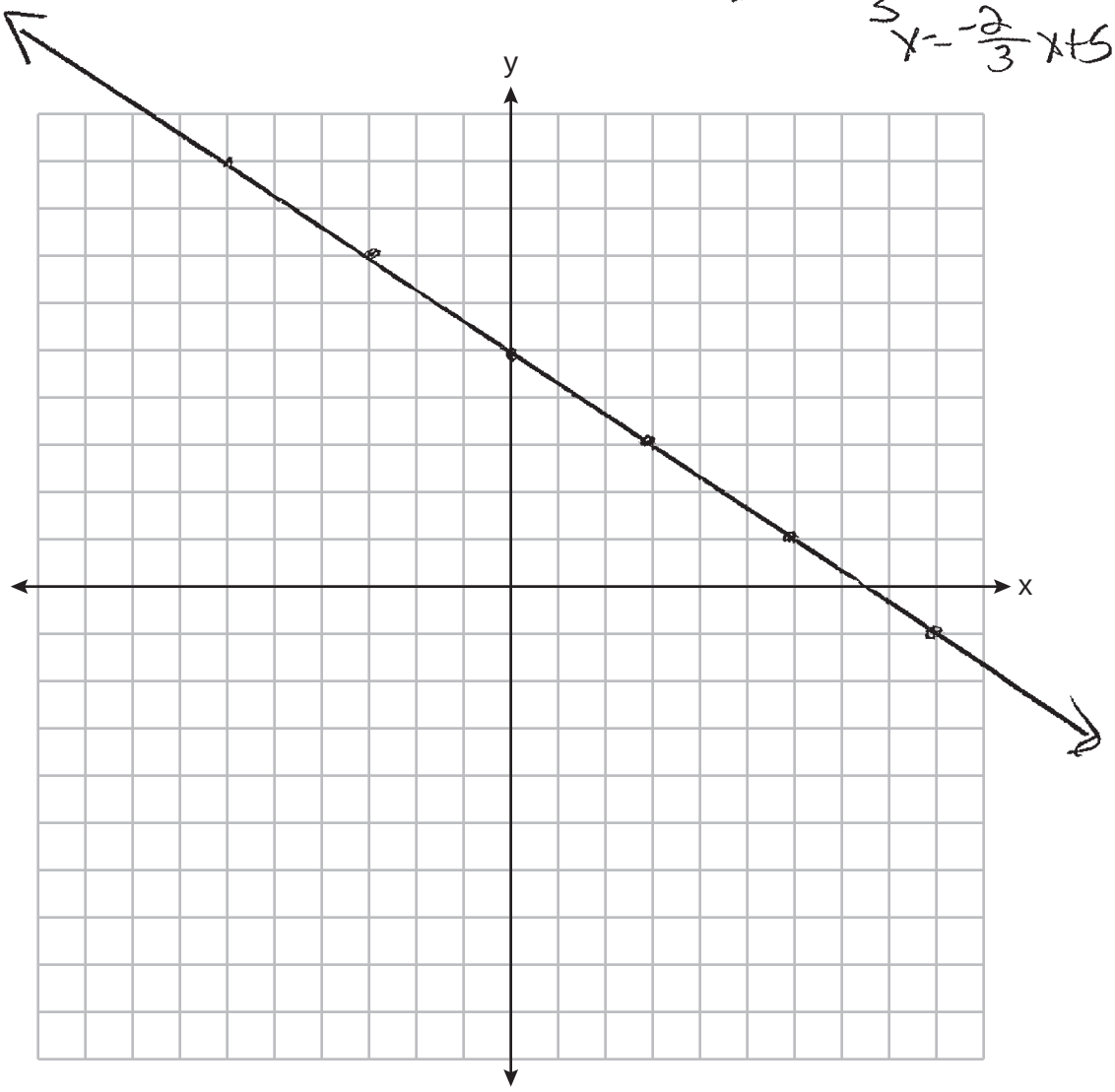
$15 = 15$ ✓

Score 1: The student wrote a justification, not an explanation.

Question 28

28 On the set of axes below, graph the equation $3y + 2x = 15$.

$3y+2x=15$
$-2x \quad -2x$
$3y=-2x+15$
$\frac{3}{3}$
$y=-\frac{2}{3}x+5$



Explain why $(-6,9)$ is a solution to the equation.

It is the top point

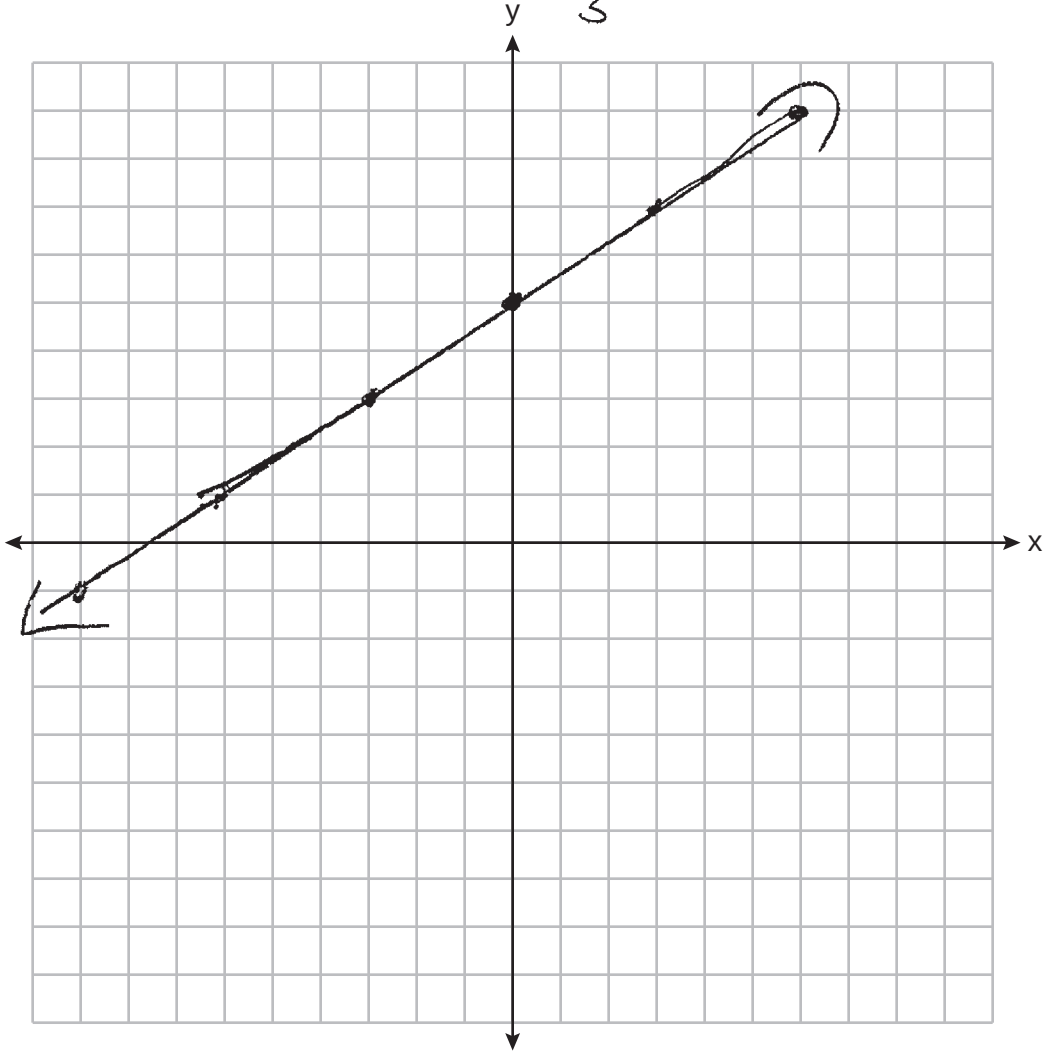
Score 1: The student graphed the equation correctly.

Question 28

28 On the set of axes below, graph the equation $3y + 2x = 15$.

$\frac{3y}{3} + \frac{2x}{3} = \frac{15}{3}$

$y = \frac{2}{3}x + 5$



Explain why $(-6,9)$ is a solution to the equation.

Because it is near the line of the graph

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

Question 29

29 Using the quadratic formula, solve $3x^2 - 2x - 6 = 0$ for all values of x.
Round your answers to the *nearest hundredth*.

$a=3\ b=-2\ c=-6$

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

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

$\frac{2 \pm \sqrt{4+72}}{6}$

$\frac{2 \pm \sqrt{76}}{6}$

$\frac{2 \pm \sqrt{4}\sqrt{19}}{6}$

$\frac{2 \pm 2\sqrt{19}}{6}$

$\frac{1 \pm \sqrt{19}}{3}$

$\frac{1+\sqrt{19}}{3}$ $x = 1.79$

$\frac{1-\sqrt{19}}{3}$ $x = -1.12$

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

Question 29

29 Using the quadratic formula, solve $3x^2 - 2x - 6 = 0$ for all values of x. Round your answers to the *nearest hundredth*.

$$\frac{-b \pm \sqrt{(b)^2 - 4(a)(c)}}{2(a)}$$

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

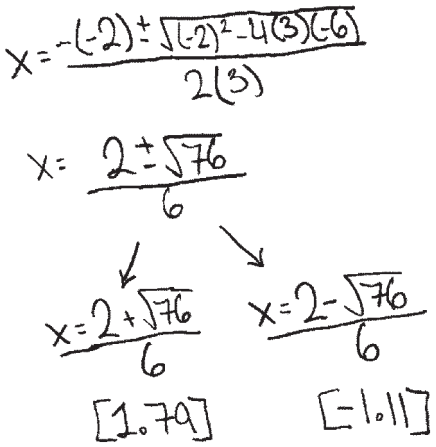
$$\frac{-2 + \sqrt{76}}{6} = \boxed{1.12}$$

$$\frac{-2 - \sqrt{76}}{6} = \boxed{-1.79}$$

Score 1: The student made a substitution error.

Question 29

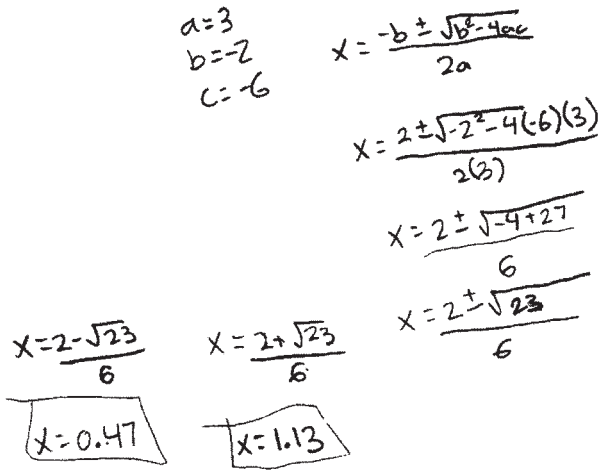
29 Using the quadratic formula, solve $3x^2 - 2x - 6 = 0$ for all values of x.
Round your answers to the *nearest hundredth*.



Score 1: The student made one rounding error.

Question 29

29 Using the quadratic formula, solve $3x^2 - 2x - 6 = 0$ for all values of x. Round your answers to the *nearest hundredth*.



Score 0: The student made more than one computational error.

Question 30

30 The piecewise function $f(x)$ is given below.

$$f(x) = \begin{cases} 2x - 3, & x > 3 \\ -x^2 + 15, & x \leq 3 \end{cases}$$

State the value of $f(3)$.

Justify your answer.

$-(3)^2 + 15 = 6$

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

Question 30

30 The piecewise function $f(x)$ is given below.

$$f(x) = \begin{cases} 2x - 3, & x > 3 \\ -x^2 + 15, & x \leq 3 \end{cases}$$

State the value of $f(3)$.

Justify your answer.

$2(3)-3$

$6-3=3$

Score 1: The student evaluated $2x - 3$ for $f(3)$ instead of evaluating $-x^2 + 15$.

Question 30

30 The piecewise function $f(x)$ is given below.

$$f(x) = \begin{cases} 2x - 3, & x > 3 \\ -x^2 + 15, & x \leq 3 \end{cases}$$

State the value of $f(3)$.

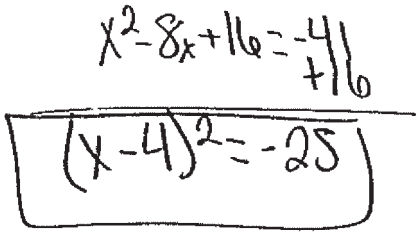
Justify your answer.

$f(3)$ { $2(3) - 3$ $\quad 3 > 3$
$-3^2 + 15$ $\quad 3 \leq 3$

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

Question 31

31 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.



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

Question 31

31 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.

$x^2 - 8x + 41 = 0$

$(x^2 - 8x + 16) + 41 - 16 = 0$

$(x-4)^2 + 25 = 0$

$-25 \quad -25$

$(x-4)^2 = -25$

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

Question 31

31 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.

$x^2 - 8x + 41 = 0$
-41

$\left(-\frac{8}{2}\right)^2$ $\quad x^2 - 8x = -41$

$(-4)^2 = 16$ $\quad x^2 - 8x + 16 = -41$

$(x - 4)^2 = -41$

Score 1: The student only added 16 to one side of the equation.

Question 31

31 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.

$x^2 - 8x = -41$

$x^2 - 8x + 16 = -41 + 16$

$(x - 4)^2 = -25$

$+4 \qquad +4$

$\sqrt{x^2} = \sqrt{-21}$

$x = \sqrt{-21}$

Score 1: The student showed correct work to find $(x - 4)^2 = -25$, but continued with incorrect work.

Question 31

31 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.

$(x-8)^2 = -41$

$(x^2 - 16x + 64) = -41$

$x^2 - 16x + 64 = -41$

$+41 \quad +41$

$x^2 - 16x + 105$

	x	$-8x$
x	x^2	$-8x$
-8	$-8x$	64

$x^2 - 16x + 64$

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

Question 32

32 Factor $36 - 4x^2$ completely.

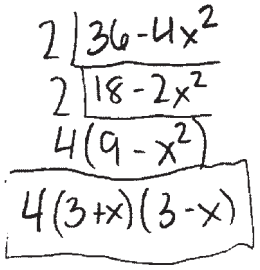
$4(9 - x^2)$

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

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

Question 32

32 Factor $36 - 4x^2$ completely.



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

Question 32

32 Factor $36 - 4x^2$ completely.

$36-4x^2=0$

$4(9-x^2)=0$

$4(3+x)(3-x)=0$

$x=-3$

$x=3$

Score 1: The student made an error by solving for x.

Question 32

32 Factor $36 - 4x^2$ completely.

$-4x^2 + 36$

$\frac{-4x^2}{-4} \quad \frac{36}{-4}$

$-4(x^2 - 9)$

$(x - 3)(x + 3)$

Score 1: The student made a factoring error by leaving out the GCF.

Question 32

32 Factor $36 - 4x^2$ completely.

$36 - 4x^2 = 0$
$-36 \quad -36$

$\frac{-4x^2}{-4} = \frac{-36}{-4}$

$\sqrt{x^2} = \sqrt{144}$

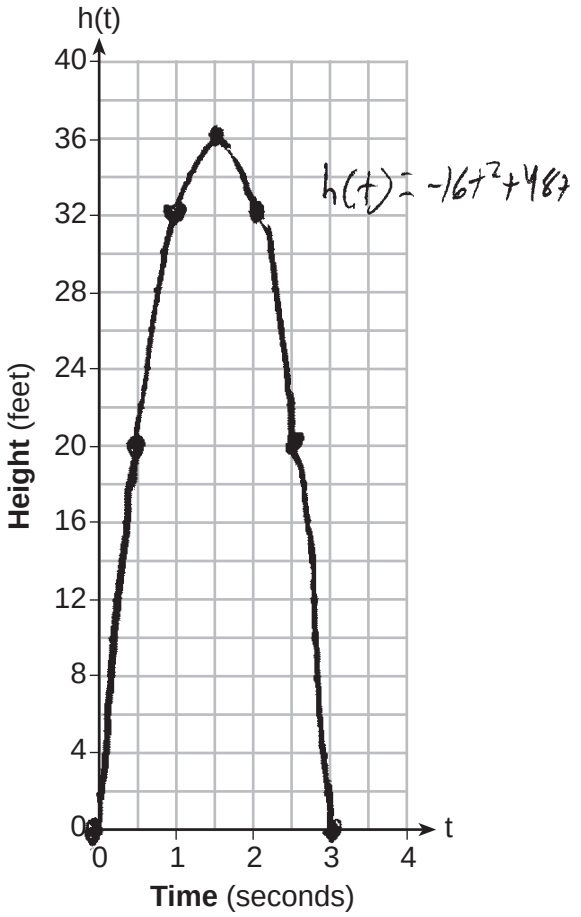
$x = 12$

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

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.



What is the maximum height, in feet, that the golf ball reaches on this hit?

36ft

How many seconds does it take the golf ball to hit the ground?

3 Seconds

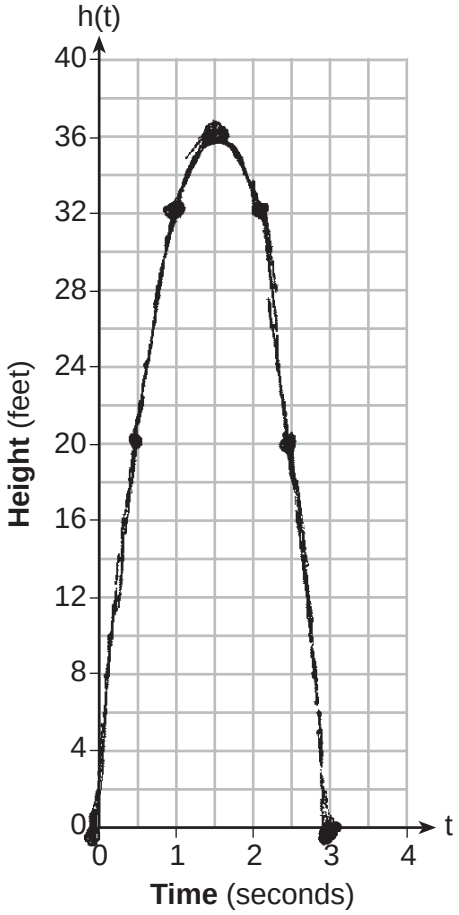
Score 4: The student gave a complete and correct response.

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.

T



$-\frac{48}{-32}$

(1.5, 36)

What is the maximum height, in feet, that the golf ball reaches on this hit?

The mabimum height is 36 feet

How many seconds does it take the golf ball to hit the ground?

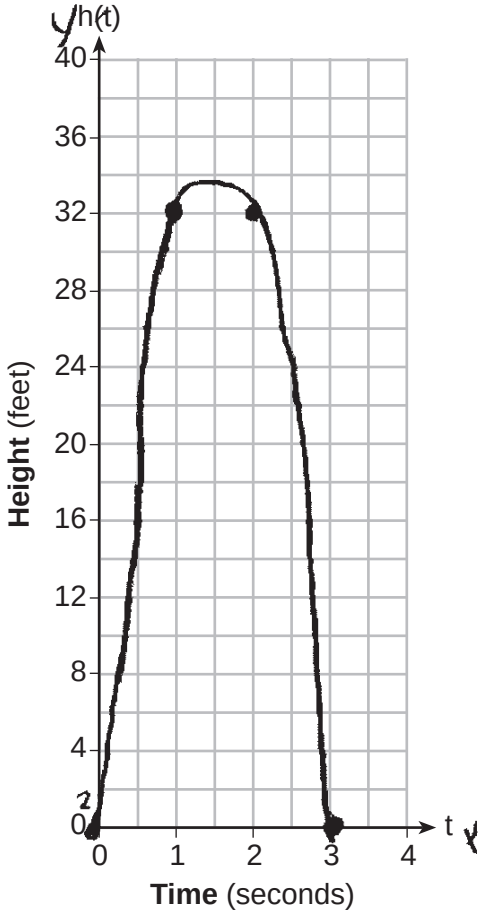
It takes the ball 1.5 seconds to hit the ground.

Score 3: The student drew a correct graph and gave a correct maximum height.

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.



What is the maximum height, in feet, that the golf ball reaches on this hit?

32ft

How many seconds does it take the golf ball to hit the ground?

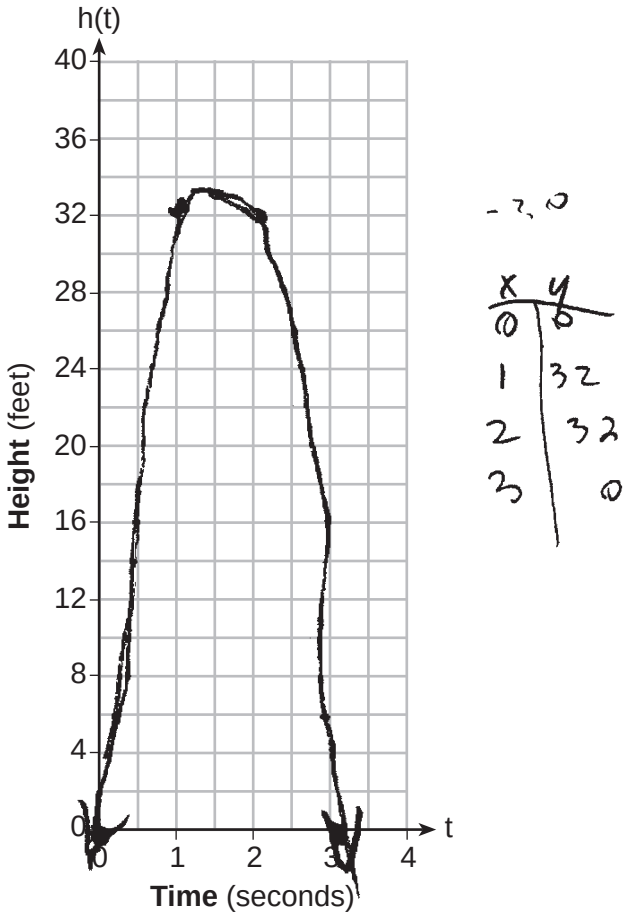
3 Seconds

Score 2: The student made one graphing error by not including the point (1.5,36) and gave an incorrect maximum height.

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.



What is the maximum height, in feet, that the golf ball reaches on this hit?

32 Feet

How many seconds does it take the golf ball to hit the ground?

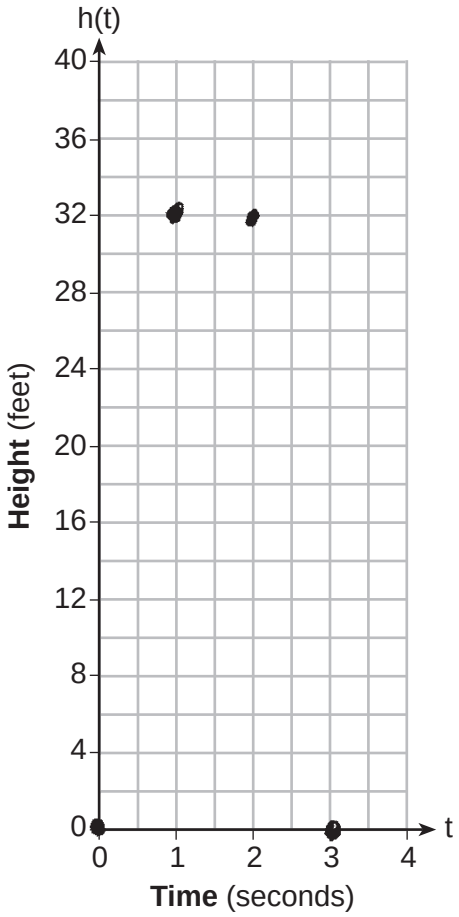
3 seconds

Score 1: The student made two graphing errors by not including the point (1.5,36) and included arrows beyond the x-axis and gave an incorrect maximum height.

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.



What is the maximum height, in feet, that the golf ball reaches on this hit?

32 feet

How many seconds does it take the golf ball to hit the ground?

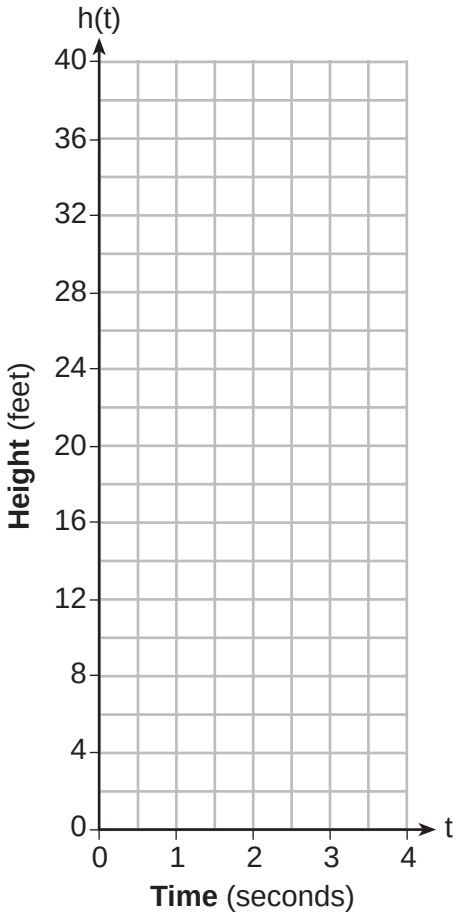
3 seconds

Score 1: The student stated 3, the number of seconds the golf ball took to hit the ground.

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.



What is the maximum height, in feet, that the golf ball reaches on this hit?

40 ft

How many seconds does it take the golf ball to hit the ground?

2 sec

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

Question 34

34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

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

$y = 40.48x + 363.81$

State the correlation coefficient, rounded to the *nearest hundredth*.

0.84

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

The # of prep classes attended and the math SAT score have a strong positive correlation. The more prep classes attended the higher the SAT score.

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

Question 34

34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

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

$y = 40.48x + 363.81$

State the correlation coefficient, rounded to the *nearest hundredth*.

.84

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

it is strong

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

Question 34

34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

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

$y = Ax + b$

$y = 40.48x + 363.80$

State the correlation coefficient, rounded to the *nearest hundredth*.

$r = 0.84$

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

There is a strong positive correlation

Score 3: The student made one rounding error.

Question 34

34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

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

$y = ax + b$

$y = 40.5x + 363.8$

$r = .84$

State the correlation coefficient, rounded to the *nearest hundredth*.

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

Score 2: The student made one rounding error by rounding to the nearest tenth, but stated the correlation coefficient correctly.

Question 34

34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

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

$y = 40.48x + 363.80$

State the correlation coefficient, rounded to the *nearest hundredth*.

363.80

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

It shows the minimum score you get without prep classes.

Score 1: The student made one rounding error, and no further correct work is shown.

Question 34

34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

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

40.48x + 363.81

State the correlation coefficient, rounded to the *nearest hundredth*.

.97

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

It shows the amount of score the first attendee had.

Score 1: The student wrote an expression instead of an equation, and no further correct work was shown.

Question 34

34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

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

$y = ab^x$

$y = a(1-r)^x$

State the correlation coefficient, rounded to the *nearest hundredth*.

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

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

Question 35

35 Julia is 4 years older than twice Kelly's age, x. The product of their ages is 96.
Write an equation that models this situation.

$(2x+4)(x) = 96$

Determine Kelly's age algebraically.

$(2x+4)(x)$

$2x^2 + 4x = 96$

$-96 \quad -96$

$2x^2 + 4x - 96 = 0$

$\frac{-4 \pm \sqrt{4^2 - 4(2)(-96)}}{2(2)}$

$\frac{-4 \pm \sqrt{784}}{4}$

$x = 6$

~~$x = -8$~~

6 years old

State the difference between Julia's and Kelly's ages, in years.

$2(6) + 4 = 16$

$16 - 6 = 10$

10 years

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

Question 35

35 Julia is 4 years older than twice Kelly's age, ~~x~~ K. The product of their ages is 96.
Write an equation that models this situation.

$J = 2K + 4$
$JK = 96$
$(2K+4)(K) = 96$

Determine Kelly's age algebraically.

$2K^2 + 4K - 96 = 0$
$K^2 + 2K - 48 = 0$
$(K+8)(K-6) = 0$
$K = 6$
Kelly cannot have a negative age

State the difference between Julia's and Kelly's ages, in years.

$J = 2(6) + 4 = 16$
$16 - 6 = 10$
Julia is 10 yrs older than Kelly

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

Question 35

35 Julia is 4 years older than twice Kelly's age, x. The product of their ages is 96.
Write an equation that models this situation.

let kelly's age = x
let Julia = 2x + 4

$(2x+4)(x) = 96$

Determine Kelly's age algebraically.

$(2(6)+4)(6) = 96$

$(16)(6) = 96$

16 6

State the difference between Julia's and Kelly's ages, in years.

10 years

$16 - 6 = 10$

Score 3: The student wrote a correct equation, but found 6 by a method other than algebraic.

Question 35

35 Julia is 4 years older than twice Kelly's age, x. The product of their ages is 96.
Write an equation that models this situation.

$2x + 4 = 96$

x
$x+4$

Determine Kelly's age algebraically.

$2x + 4 = 96$
$-4 \quad -4$
$\frac{2x}{2} = \frac{92}{2}$
$x = 46$

State the difference between Julia's and Kelly's ages, in years.

Kelly = 46
Julia = 50

4 years

Score 2: The student wrote a linear equation instead of a quadratic, but solved and used it appropriately to find the difference in ages.

Question 35

35 Julia is 4 years older than twice Kelly's age, x. The product of their ages is 96.
Write an equation that models this situation.

total

$2x+4=96$

Determine Kelly's age algebraically.

$2x+4=96$
-4

$\frac{2x}{2}=\frac{92}{2}$

$x=46$ years old

State the difference between Julia's and Kelly's ages, in years.

$4(2)=8$
$46+8=54$
$54-46=8$

8 years

Score 1: The student wrote a linear equation instead of a quadratic, but solved it appropriately.

Question 35

35 Julia is 4 years older than twice Kelly's age, x. The product of their ages is 96.
Write an equation that models this situation.

Julia: $2x+4$

Kelly: x

$x(2x+4)=96$

Determine Kelly's age algebraically.

$x(2x+4)=96$

$2x^2$

State the difference between Julia's and Kelly's ages, in years.

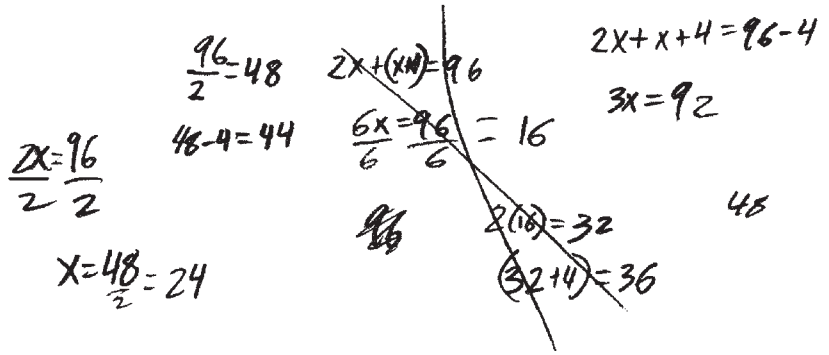
Score 1: The student wrote a correct equation.

Question 35

35 Julia is 4 years older than twice Kelly's age, x. The product of their ages is 96. Write an equation that models this situation.

$2x + (x+4) = 96$

Determine Kelly's age algebraically.



State the difference between Julia's and Kelly's ages, in years.

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

Question 36

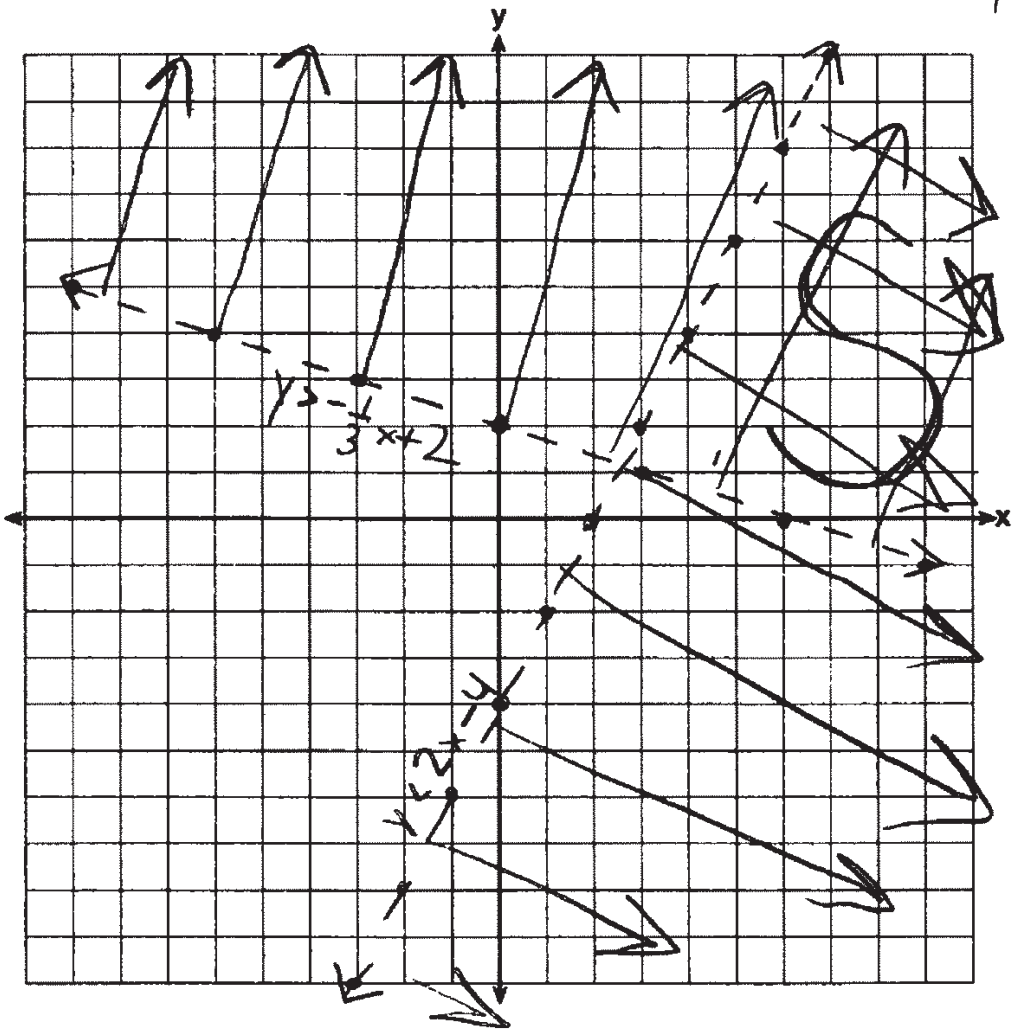
36 On the set of axes below, graph the following system of inequalities:

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

$2x-y>4$ $-y>-2x+4$ $y<2x-4$

$x+3y>6$ $\frac{3y}{3} > \frac{-x+6}{3}$ $y > -\frac{1}{3}x+2$

Label the solution set S.



Is (4,2) a solution to this system? Justify your answer.

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

$(2) < 2(4)-4$ $2 < 4$ ✓

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

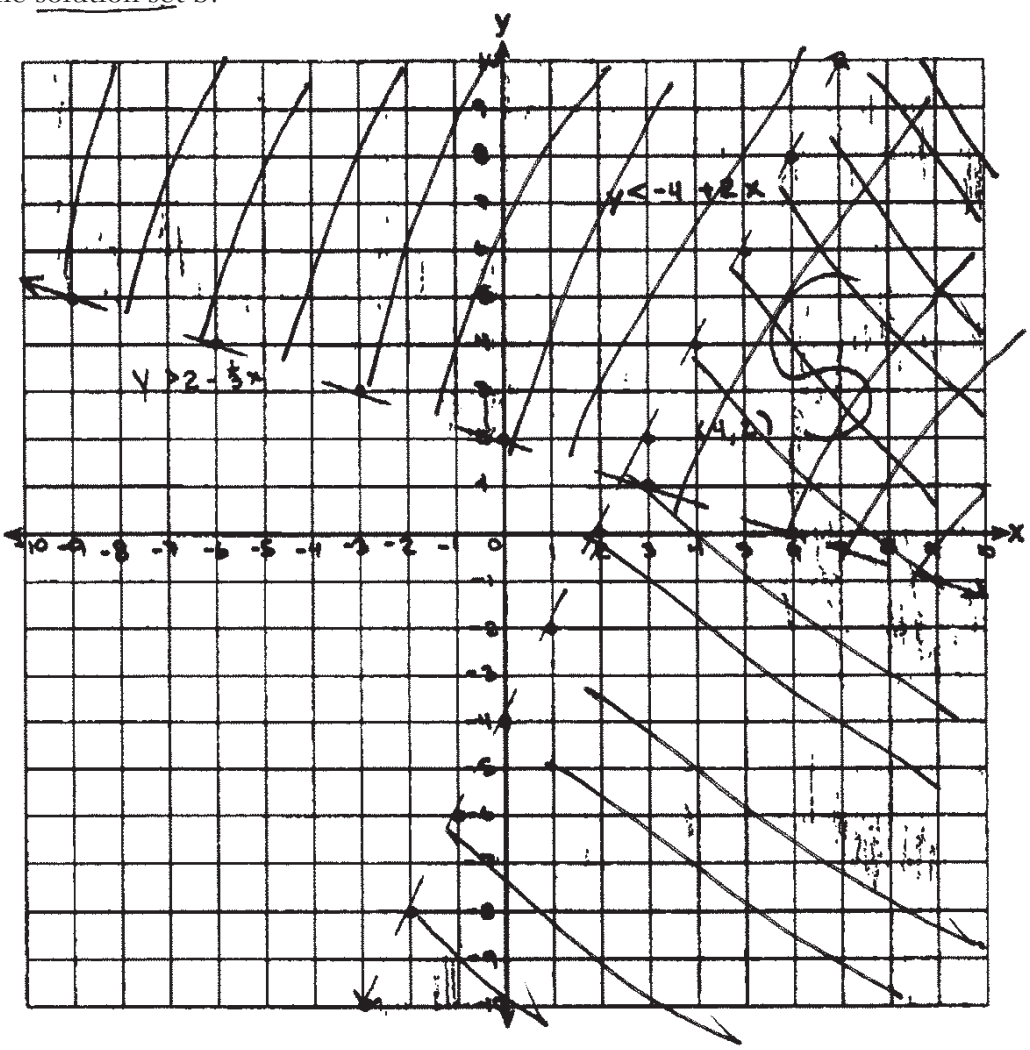
Question 36

36 On the set of axes below, graph the following system of inequalities:

$2x - y > 4$

$x + 3y > 6$

Label the solution set S.



Is (4,2) a solution to this system? Justify your answer.

It would be a solution because its in the shaded area of both inequalities.

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

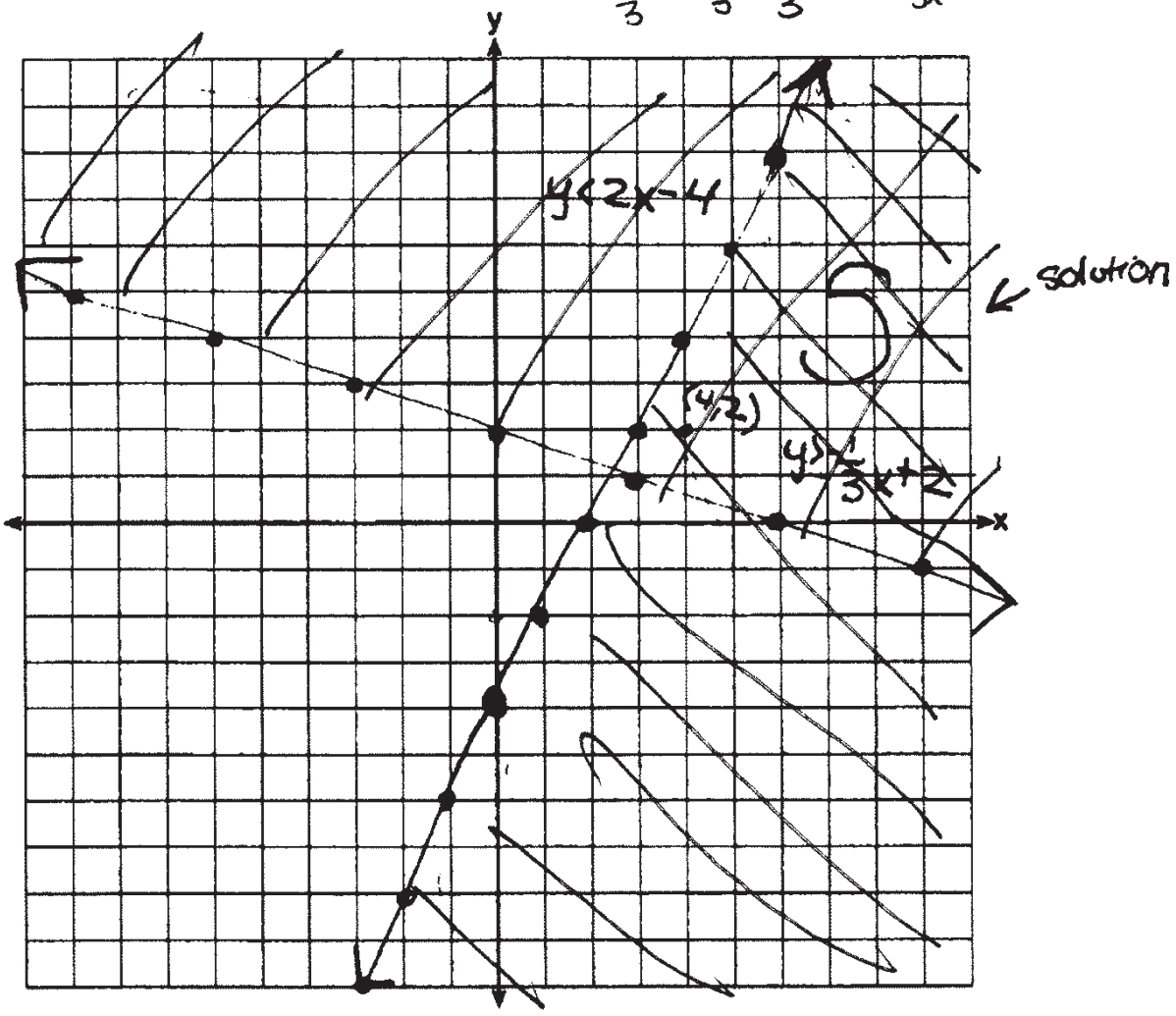
Question 36

36 On the set of axes below, graph the following system of inequalities:

$2x - y > 4$

$x + 3y > 6$

Label the solution set S.



Is (4,2) a solution to this system? Justify your answer.

yes, (4,2) is a solution to this set because it is placed in the solution area.

Score 3: The student made one graphing error by not using dashed lines.

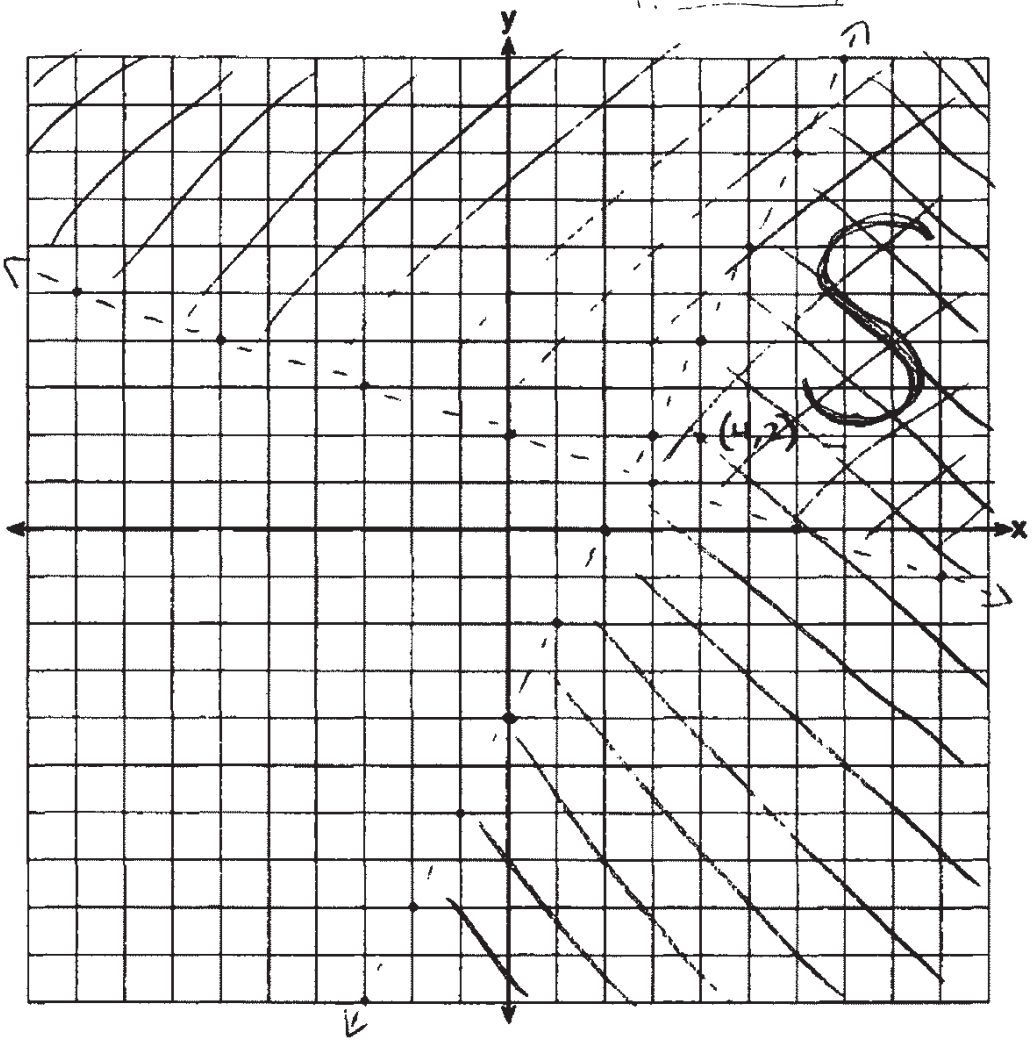
Question 36

36 On the set of axes below, graph the following system of inequalities:

$2x - y > 4$

$x + 3y > 6$

Label the solution set S.



Is (4,2) a solution to this system? Justify your answer.

Yes because (4,2) is a solution to both inequalities. It is in the solution set S on the green

Score 3: The student made one graphing error by not labeling at least one of the lines.

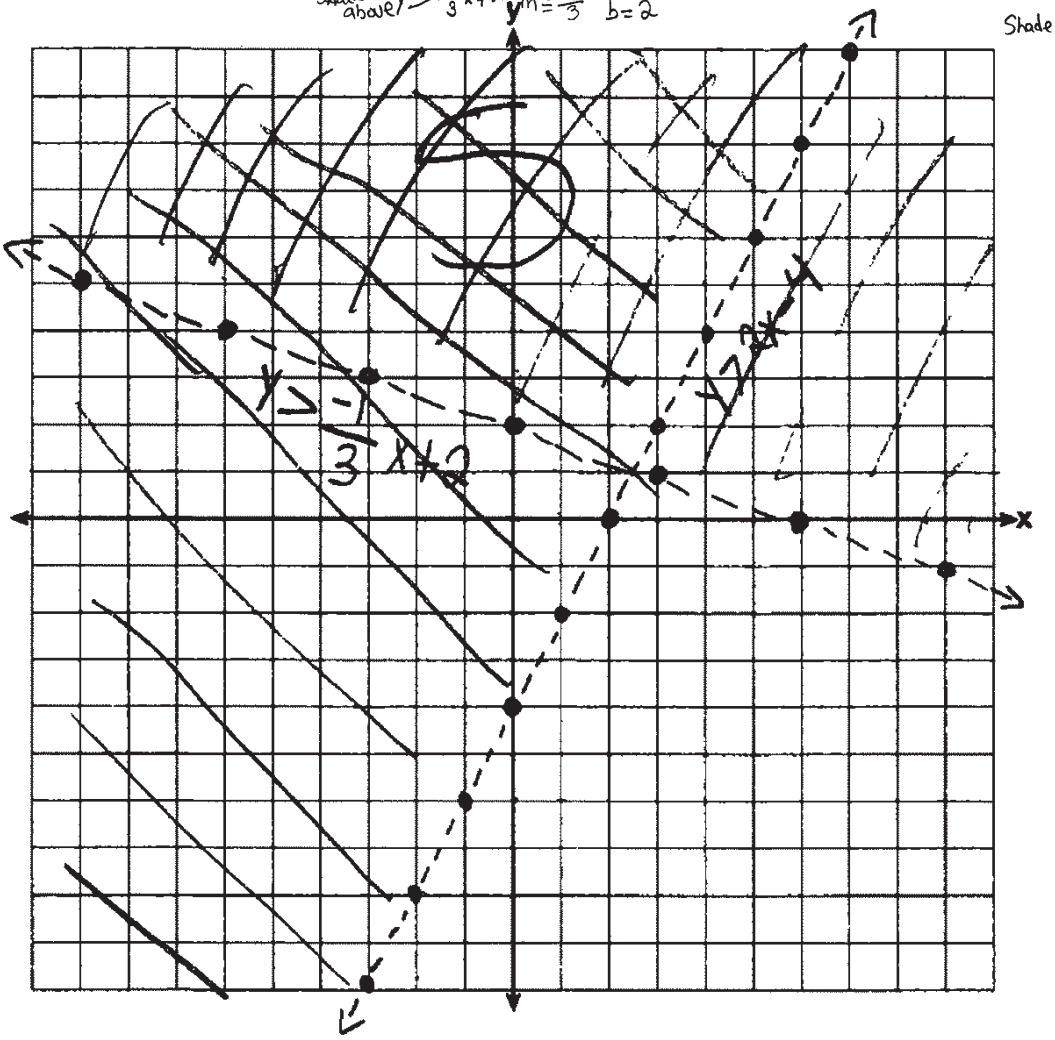
Question 36

36 On the set of axes below, graph the following system of inequalities:

$$2x - y > 4$$

$$x + 3y > 6$$

Label the solution set S.



Is (4,2) a solution to this system? Justify your answer.

No, because its only in one of the inequalities.

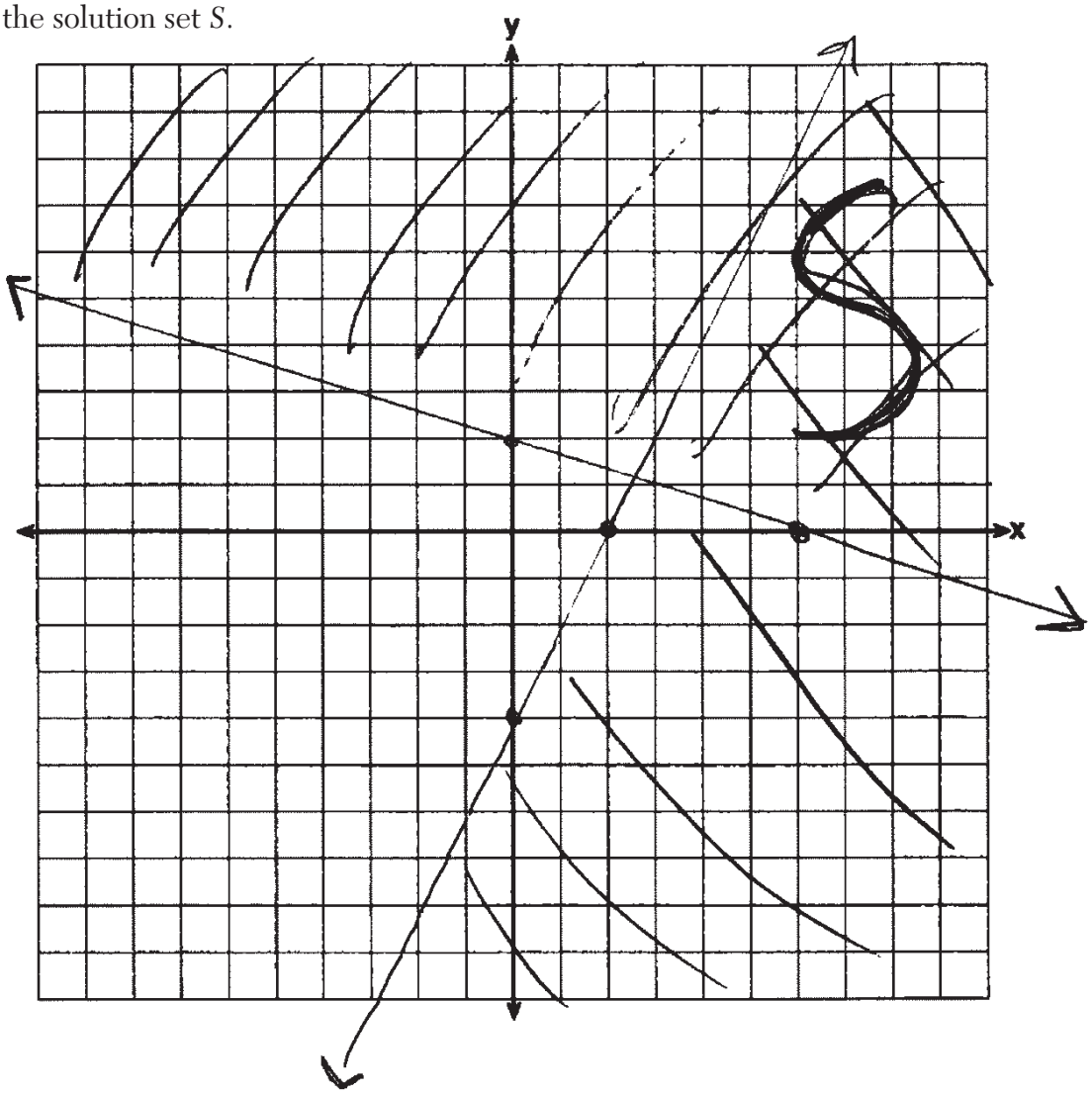
Score 3: The student made one computational error by writing $y > 2x - 4$ instead of $y < 2x - 4$, but used their inequality appropriately.

Question 36

36 On the set of axes below, graph the following system of inequalities:

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

Label the solution set *S*.



Is (4,2) a solution to this system? Justify your answer.

Yes. It is in the solution set

Score 2: The student made two graphing errors by not labeling at least one of the lines and by not using dashed lines.

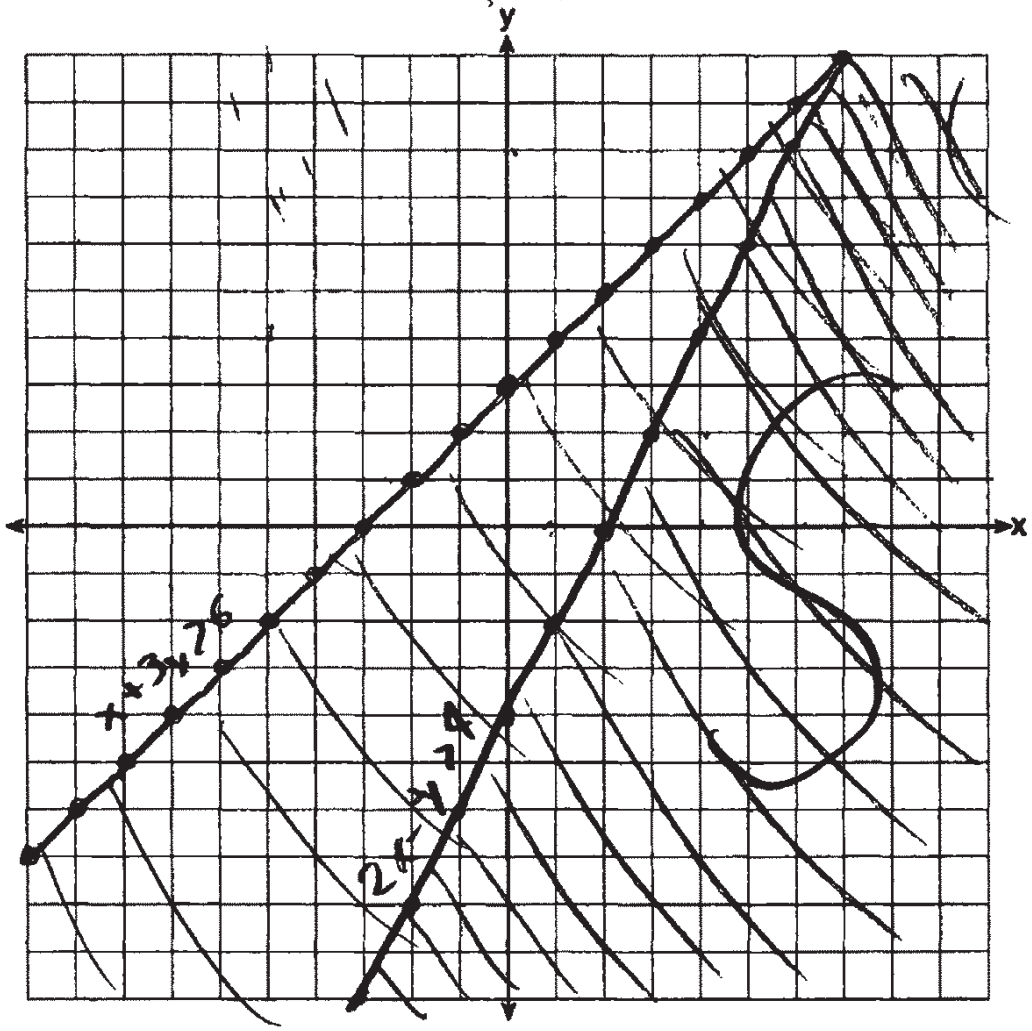
Question 36

36 On the set of axes below, graph the following system of inequalities:

$2x - y > 4$

$x + 3y > 6$

Label the solution set *S*.



Is (4,2) a solution to this system? Justify your answer.

Yes it is a solution

Score 1: The student made two or more graphing errors and wrote an incomplete justification, but labeled the solution set appropriately.

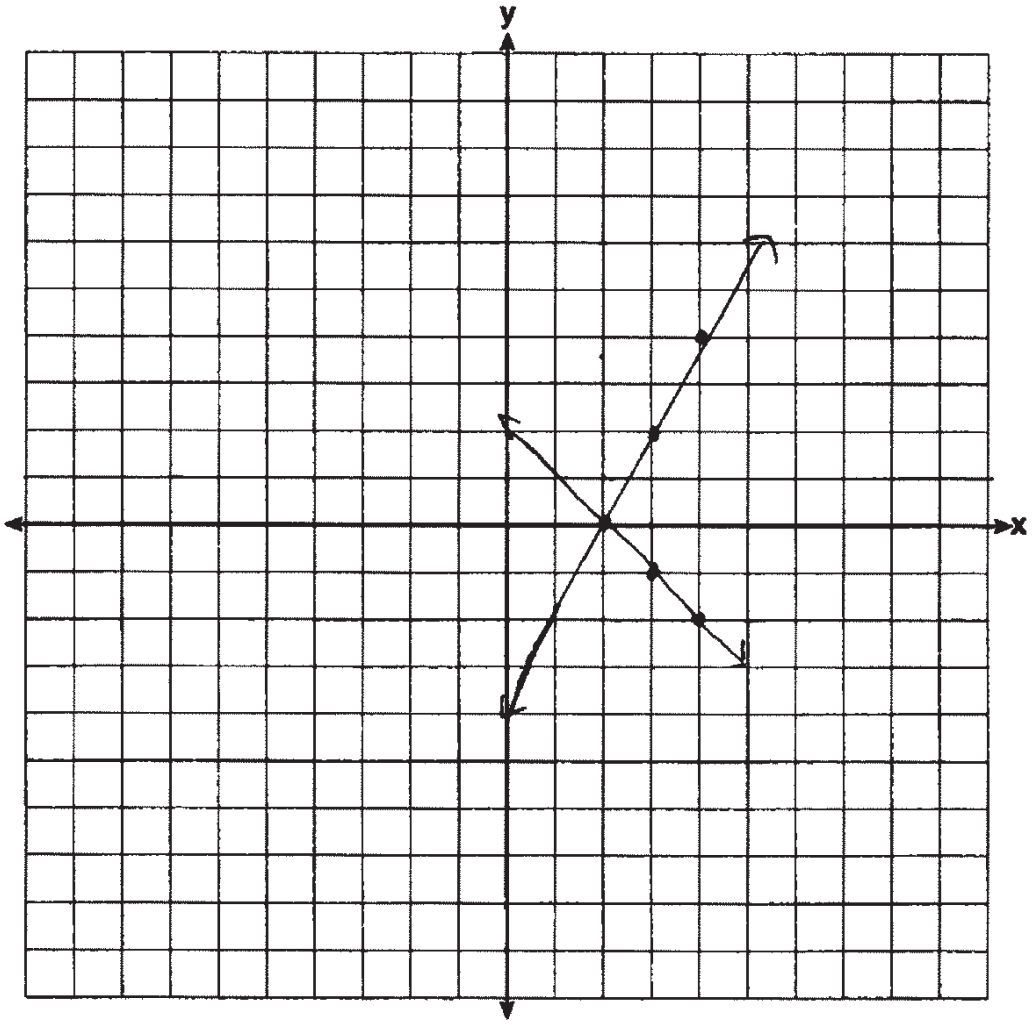
Question 36

36 On the set of axes below, graph the following system of inequalities:

$2x - y > 4$ y< 2x-4

$x + 3y > 6$ y>-x+2

Label the solution set *S*.



Is (4,2) a solution to this system? Justify your answer.

Yes, it is a solution because when plugged in, we get 6>4 and 10>6, making it true.

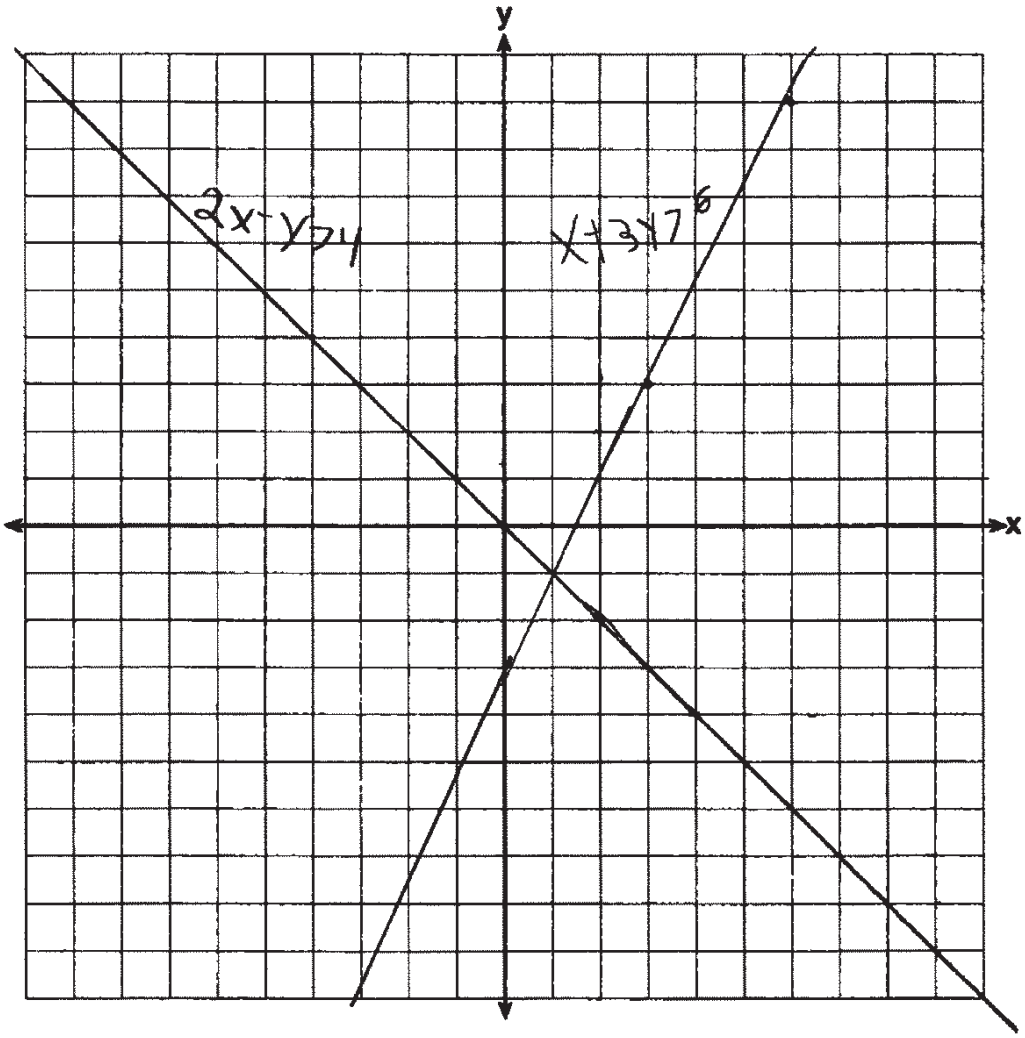
Score 1: The student wrote a correct justification.

Question 36

36 On the set of axes below, graph the following system of inequalities:

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

Label the solution set *S*.



Is (4,2) a solution to this system? Justify your answer.

No, I Sat (1,1) as my solution

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

Question 37

37 Jim had a bag of coins. The number of nickels, n, and the number of quarters, q, totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$0.05n + 0.25q = 4$

$n + q = 28$

Use your system of equations to algebraically determine both the number of quarters, q, and the number of nickels, n, that Jim had in the bag.

$q = 28 - n$

$0.05n + 0.25(28-n) = 4$

$0.05n + 7 - 0.25n = 4$

$0.05n - 0.25n = -3$

$-0.2n = -3$

$n = 15$

$n = 28 - q$

$0.05(28-q) + 0.25q = 4$

$1.4 - 0.05q + 0.25q = 4$

$-0.05q + 0.25q = 2.6$

$0.2q = 2.6$

$q = 13$

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

$q = n$

$0.25q + 0.05n = 3$

$0.25n + 0.05n = 3$

$0.3n = 3$

$3n = 30$

$n = 10$

10 nickels 10 quarters

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

Question 37

37 Jim had a bag of coins. The number of nickels, n, and the number of quarters, q, totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

let Q = Quarters
let n = nickels

$Q + n = 28$

$.05n + .25Q = 4$

Use your system of equations to algebraically determine both the number of quarters, q, and the number of nickels, n, that Jim had in the bag.

$Q + n = 28$

$(.25Q + .05n = 4) - 4$

$-.2Q - .2n = -16$

$\frac{0.8n}{0.8} = \frac{12}{0.8}$

28 - 15 = 13

$Q = 13$
$n = 15$

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

10 of each.

$.25(10) + .05(10) = 3$

I did this on the calculator through trail and error

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

Question 37

37 Jim had a bag of coins. The number of nickels, n, and the number of quarters, q, totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$n + q = 28$

$5n + 25q = 400$

Use your system of equations to algebraically determine both the number of quarters, q, and the number of nickels, n, that Jim had in the bag.

$5n + 25q = 400$

15 nickels
13 quarters

$15 + 13 = 28$
$n + q = 28$

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

10 coins each. $25 \times 10 = 250$ and $5 \times 10 = 50$. Once added and divided by 100, we get 3.00.

Score 5: The student used a method other than algebraic to find $n = 15$ and $q = 13$.

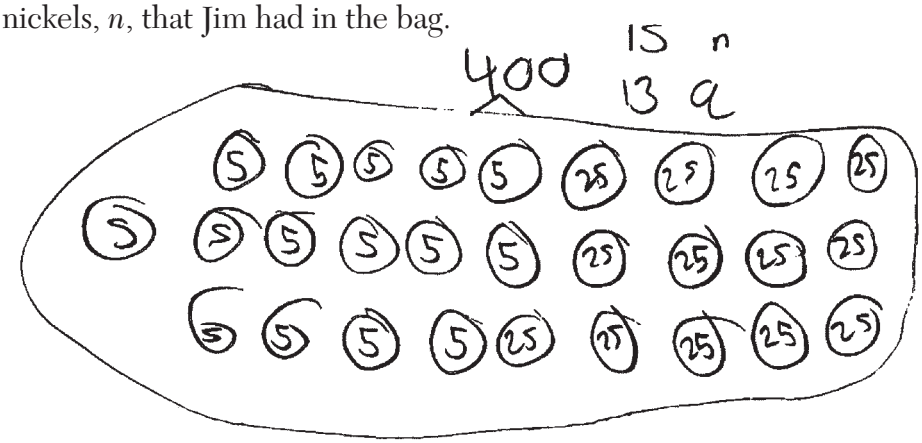
Question 37

37 Jim had a bag of coins. The number of nickels, n, and the number of quarters, q, totaled 28 coins. The combined value of the coins was \$4.

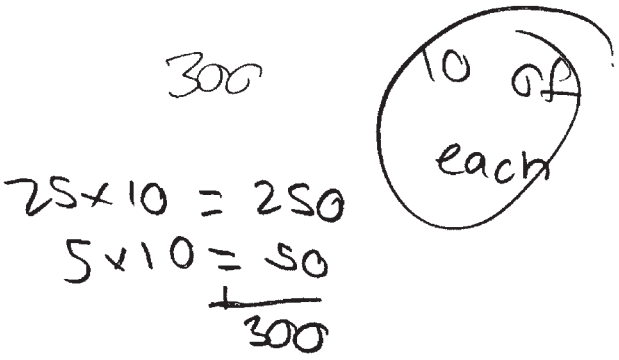
Write a system of equations that models this situation.

$N + q = 28$

Use your system of equations to algebraically determine both the number of quarters, q, and the number of nickels, n, that Jim had in the bag.



Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.



Score 4: The student wrote one correct equation, found $n = 15$ and $q = 13$ by a method other than algebraic, and wrote a correct justification.

Question 37

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37 Jim had a bag of coins. The number of nickels, n, and the number of quarters, q, totaled 28 coins. The combined value of the coins was $4.

Write a system of equations that models this situation.

$n + q = 28$

$5n + 25q = 4.00$

?? Use your system of equations to algebraically determine both the number of quarters, q, and the number of nickels, n, that Jim had in the bag.

$n + q = 28$

$5n + 25q = 4.00$

$5 + 26q = 32$

$-5 \quad -5$

$\frac{26q}{26} = \frac{27}{26}$ $\quad q = 1$

$n + 1 = 28$

$-1 \quad -1$

$n = 27$

1 quarter
27 nickles

Jim was given an additional $3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

10 quarters
10 nickles

$10 \times 25 = 2.50$

$10 \times .5 = .50$

↓

$3.00

Score 3: The student wrote only one equation correctly and gave a correct justification.

Question 37

37 Jim had a bag of coins. The number of nickels, n, and the number of quarters, q, totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$n+q=28$ $\quad .05n+.25q=4$

Use your system of equations to algebraically determine both the number of quarters, q, and the number of nickels, n, that Jim had in the bag.

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

Score 2: The student wrote the correct system of equations.

Question 37

37 Jim had a bag of coins. The number of nickels, n, and the number of quarters, q, totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$10n + 25q = 4$

$n + q = 28$

Use your system of equations to algebraically determine both the number of quarters, q, and the number of nickels, n, that Jim had in the bag.

$10n + 25q = 4$

$-25(n + q = 28)$

$-25n - 25q = -700$

$-10n = -696$

$n = 6$

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

Score 1: The student only wrote one correct equation.

Question 37

37 Jim had a bag of coins. The number of nickels, n, and the number of quarters, q, totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$n(7) + q(7)$ 4

Use your system of equations to algebraically determine both the number of quarters, q, and the number of nickels, n, that Jim had in the bag.

$n + q(28) - 4$

$28 - 4 = 7 \cdot 7 = 28 - 4$

$n = 7$
$q = 7$

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

They were given 6 coins

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

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

Regents Examination in Algebra I – January 2024

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

(Use for the January 2024 exam only.)

Raw Score	Scale Score	Performance Level
86	**100**	5
85	**99**	5
84	**97**	5
83	**96**	5
82	**95**	5
81	**94**	5
80	**93**	5
79	**92**	5
78	**91**	5
77	**90**	5
76	**89**	5
75	**89**	5
74	**88**	5
73	**87**	5
72	**87**	5
71	**86**	5
70	**86**	5
69	**86**	5
68	**85**	5
67	**84**	4
66	**84**	4
65	**84**	4
64	**83**	4
63	**83**	4
62	**83**	4
61	**82**	4
60	**82**	4
59	**82**	4
58	**81**	4
57	**81**	4
56	**81**	4
55	**81**	4
54	**80**	4
53	**80**	4
52	**80**	4
51	**80**	4
50	**79**	3
49	**79**	3
48	**79**	3
47	**78**	3
46	**78**	3
45	**78**	3
44	**77**	3
43	**77**	3
42	**76**	3
41	**76**	3
40	**75**	3
39	**75**	3
38	**74**	3
37	**74**	3
36	**73**	3
35	**72**	3
34	**72**	3
33	**71**	3
32	**70**	3
31	**69**	3
30	**68**	3
29	**67**	3
28	**66**	3
27	**65**	3
26	**64**	2
25	**62**	2
24	**61**	2
23	**60**	2
22	**58**	2
21	**57**	2
20	**55**	2
19	**53**	1
18	**51**	1
17	**50**	1
16	**48**	1
15	**46**	1
14	**43**	1
13	**41**	1
12	**39**	1
11	**36**	1
10	**34**	1
9	**31**	1
8	**28**	1
7	**25**	1
6	**22**	1
5	**19**	1
4	**15**	1
3	**12**	1
2	**8**	1
1	**4**	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.