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

ALGEBRA I

Tuesday, June 4, 2024 — 9:15 a.m. to 12:15 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 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 A ball was launched into the air, and its height above the ground was recorded each second, as shown in the table below.

Time (sec)	0	1	2	3	4
Height (ft)	11	59	75	59	11

Based on these data, which statement is a valid conclusion?

(1) The ball lands on the ground at 4 seconds.

(2) The ball reaches a maximum height of 11 feet.

(3) The ball was launched from a height of 0 feet.

(4) The ball reaches its maximum height at 2 seconds.

2 A tour bus can seat, at most, 48 passengers. An adult ticket costs \$18 and a child ticket costs \$12. The bus company must collect at least \$650 to make a profit. If a represents the number of adult tickets sold and c represents the number of child tickets sold, which system of inequalities models this situation if they make a profit?

(1) $a + c < 48$
$18a + 12c > 650$

(2) $a + c \leq 48$
$18a + 12c \geq 650$

(3) $a + c < 48$
$18a + 12c < 650$

(4) $a + c \leq 48$
$18a + 12c \leq 650$

3 Which equation is always true?

(1) $x^2 \bullet x^3 = x^5$

(2) $3^x \bullet 3^2 = 9^{2x}$

(3) $-z^2 = z^2$

(4) $7^a \bullet 7^b = 7^{ab}$

Use this space for computations.

4 The expression $-2(x^2 - 2x + 1) + (3x^2 + 3x - 5)$ is equivalent to

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

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

(3) $x^2 + 7x - 4$

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

5 Which sum is irrational?

(1) $-2\sqrt{12} + \sqrt{100}$

(2) $-\sqrt{4} + \frac{1}{3}\sqrt{900}$

(3) $\frac{1}{2}\sqrt{25} + \sqrt{64}$

(4) $\sqrt{49} + 3\sqrt{121}$

6 The solution to $\frac{4(x - 5)}{3} + 2 = 14$ is

(1) 15

(2) 14

(3) 6

(4) 4

7 On an island, a rare breed of rabbit doubled its population each month for two years. Which type of function best models the increase in population at the end of two years?

(1) linear growth

(2) linear decay

(3) exponential growth

(4) exponential decay

8 What is the degree of the polynomial $2x - x^2 + 4x^3$?

(1) 1

(2) 2

(3) 3

(4) 4

Use this space for computations.

9 The zeros of the function $f(x) = x(x - 5)(3x + 6)$ are

(1) 0, −5, and 2

(2) 0, 5, and −2

(3) −5 and 2, only

(4) 5 and −2, only

10 What is the y-intercept of the line that passes through the points $(-1,5)$ and $(2,-1)$?

(1) −1

(2) −2

(3) 3

(4) 5

11 Nancy has just been hired for her first job. Her company gives her four choices for how she can collect her annual salary over the first eight years of employment.

Each function below represents the four choices she has for her annual salary in thousands of dollars, where t represents the number of years after she is hired.

$$a(t) = 2^t + 25$$
$$b(t) = 10t + 75$$
$$c(t) = \sqrt{400t} + 80$$
$$d(t) = 2(t + 1)^2 - 10t + 50$$

Which pay plan should Nancy choose in order to have the highest salary in her eighth year?

(1) $a(t)$

(2) $b(t)$

(3) $c(t)$

(4) $d(t)$

12 The third term in a sequence is 25 and the fifth term is 625. Which number could be the common ratio of the sequence?

(1) $\frac{1}{5}$

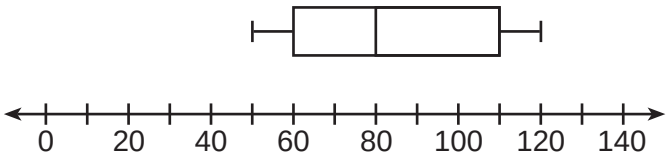
(2) 5

(3) $\frac{1}{25}$

(4) 25

Use this space for computations.

13 The box plot below summarizes the data for the amount of snowfall, in inches, during the winter of 2021 for 12 locations in western New York.



Winter of 2021 Snowfall (inches)

What is the interquartile range?

(1) 30
(2) 50
(3) 80
(4) 110

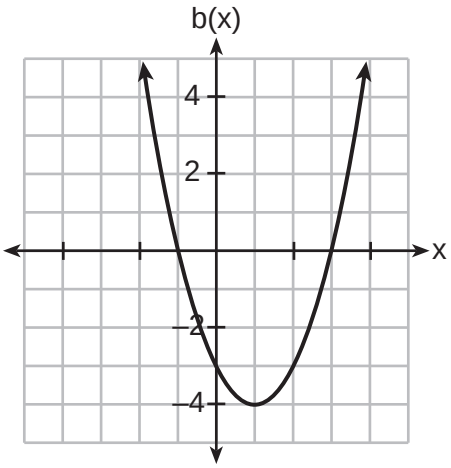
14 Four quadratic functions are represented below.

$a(x) = (x - 3)^2 - 7$

I

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

III



II

x	d(x)
–4	–1
–3	–4
–2	–5
–1	–4
0	–1

IV

Which function has the *smallest* minimum value?

(1) I
(2) II
(3) III
(4) IV

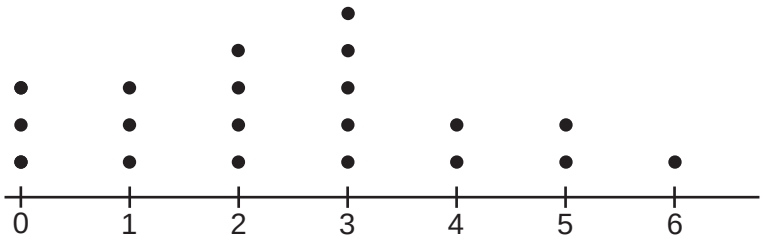
Use this space for computations.

15 The equation that represents the sequence $-2, -5, -8, -11, -14, \ldots$ is

(1) $a_n = -3 + (-2)(n - 1)$ (3) $a_n = 3 + (-2)(n - 1)$

(2) $a_n = -2 + (-3)(n - 1)$ (4) $a_n = -2 + (3)(n - 1)$

16 The dot plot below shows the number of goals Jessica scored in each lacrosse game last season.



Goals Scored per Game

Which statement about the dot plot is correct?

(1) mean > mode (3) mode = median

(2) mean = median (4) median > mean

17 The students in Mrs. Smith's algebra class were asked to describe the graph of $g(x) = 2(x - 3)^2$ compared to the graph of $f(x) = x^2$.

Which student response is correct?

(1) Ashley said that the graph of $g(x)$ is wider and shifted left 3 units.

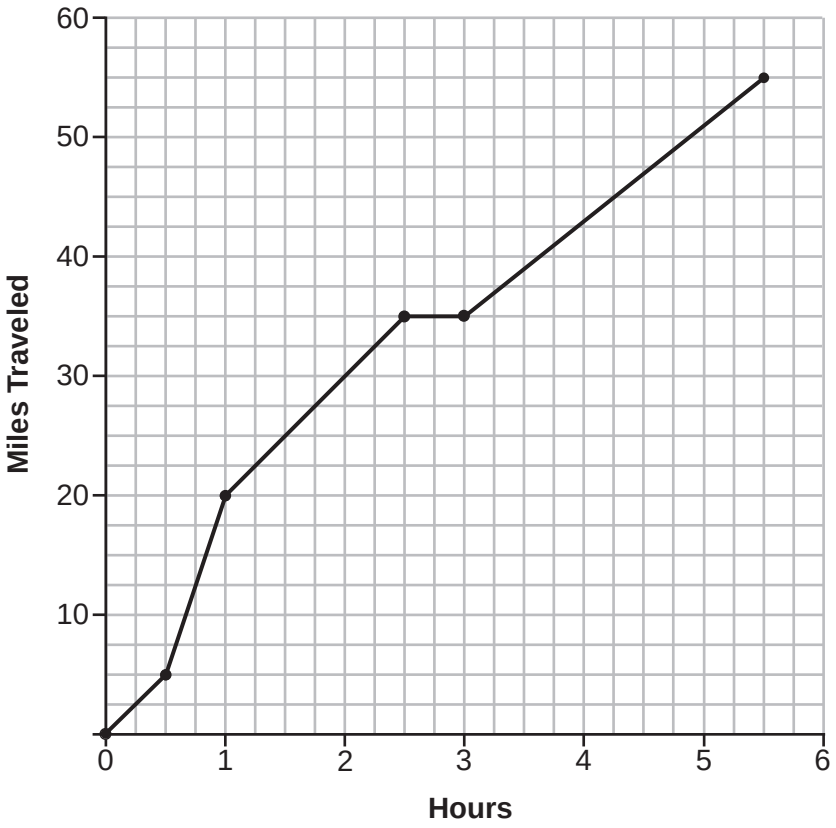
(2) Beth said that the graph of $g(x)$ is narrower and shifted left 3 units.

(3) Carl said that the graph of $g(x)$ is wider and shifted right 3 units.

(4) Don said that the graph of $g(x)$ is narrower and shifted right 3 units.

Use this space for computations.

18 One Saturday, Dave took a long bike ride. The graph below models his trip.



What was Dave's average rate of change, in miles per hour, on this trip?

(1) 10

(2) 11

(3) 11.6

(4) 14.5

19 Which expression is equivalent to $(x - 5)(2x + 7) - (x + 5)$?

(1) $2x^2 - 2x - 30$

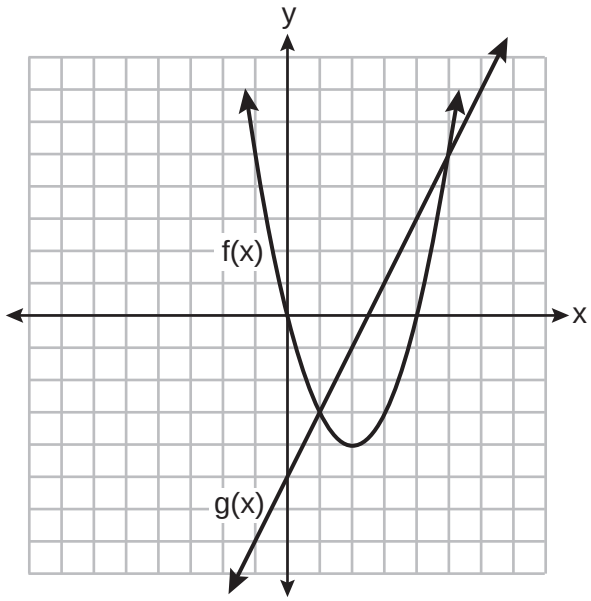
(2) $2x^2 - 2x - 40$

(3) $2x^2 - 4x - 30$

(4) $2x^2 - 4x - 40$

Use this space for computations.

20 The functions $f(x)$ and $g(x)$ are graphed on the set of axes below.



What is the solution to the equation $f(x) = g(x)$?

(1) 1 and 5

(2) -5 and 0

(3) -3 and 5

(4) 0 and 4

21 When babysitting, Nicole charges an hourly rate and an additional charge for gas. She uses the function $C(h) = 6h + 5$ to determine how much to charge for babysitting. The constant term of this function represents

(1) the additional charge for gas

(2) the hourly rate Nicole charges

(3) the number of hours Nicole babysits

(4) the total Nicole earns from babysitting

22 When solved for x in terms of a, the solution to the equation $3x - 7 = ax + 5$ is

(1) $\frac{12}{3a}$

(2) $\frac{12}{3 - a}$

(3) $\frac{3a}{12}$

(4) $\frac{3 - a}{12}$

Use this space for computations.

23 Wayde van Niekerk, a runner from South Africa, ran 400 meters in 43.03 seconds to set a world record. Which calculation would determine his average speed, in miles per hour?

(1) $\frac{400 \text{ m}}{43.03 \text{ sec}} \bullet \frac{1000 \text{ m}}{0.62 \text{ mi}} \bullet \frac{1 \text{ hr}}{3600 \text{ sec}}$

(2) $\frac{400 \text{ m}}{43.03 \text{ sec}} \bullet \frac{0.62 \text{ mi}}{1000 \text{ m}} \bullet \frac{1 \text{ hr}}{3600 \text{ sec}}$

(3) $\frac{400 \text{ m}}{43.03 \text{ sec}} \bullet \frac{0.62 \text{ mi}}{1000 \text{ m}} \bullet \frac{3600 \text{ sec}}{1 \text{ hr}}$

(4) $\frac{400 \text{ m}}{43.03 \text{ sec}} \bullet \frac{1000 \text{ m}}{0.62 \text{ mi}} \bullet \frac{3600 \text{ sec}}{1 \text{ hr}}$

24 Which function has a domain of all real numbers and a range greater than or equal to three?

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

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

(3) $h(x) = 3^x$

(4) $m(x) = |x + 3|$

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 Solve $5(x - 2) \leq 3x + 20$ algebraically.

26 Given $g(x) = x^3 + 2x^2 - x$, evaluate $g(-3)$.

27 Given the relation $R = \{(-1,1), (0,3), (-2,-4), (x,5)\}$.

State a value for x that will make this relation a function.

Explain why your answer makes this a function.

28 A survey of 150 students was taken. It was determined that $\frac{2}{3}$ of the students play video games.

Of the students that play video games, 85 also use social media.
Of the students that do not play video games, 20% do not use social media.

Complete the two-way frequency table.

	Play Video Games	Do Not Play Video Games	Total
Social Media			
No Social Media			
Total			

29 Use the method of completing the square to determine the exact values of x for the equation $x^2 + 10x - 30 = 0$.

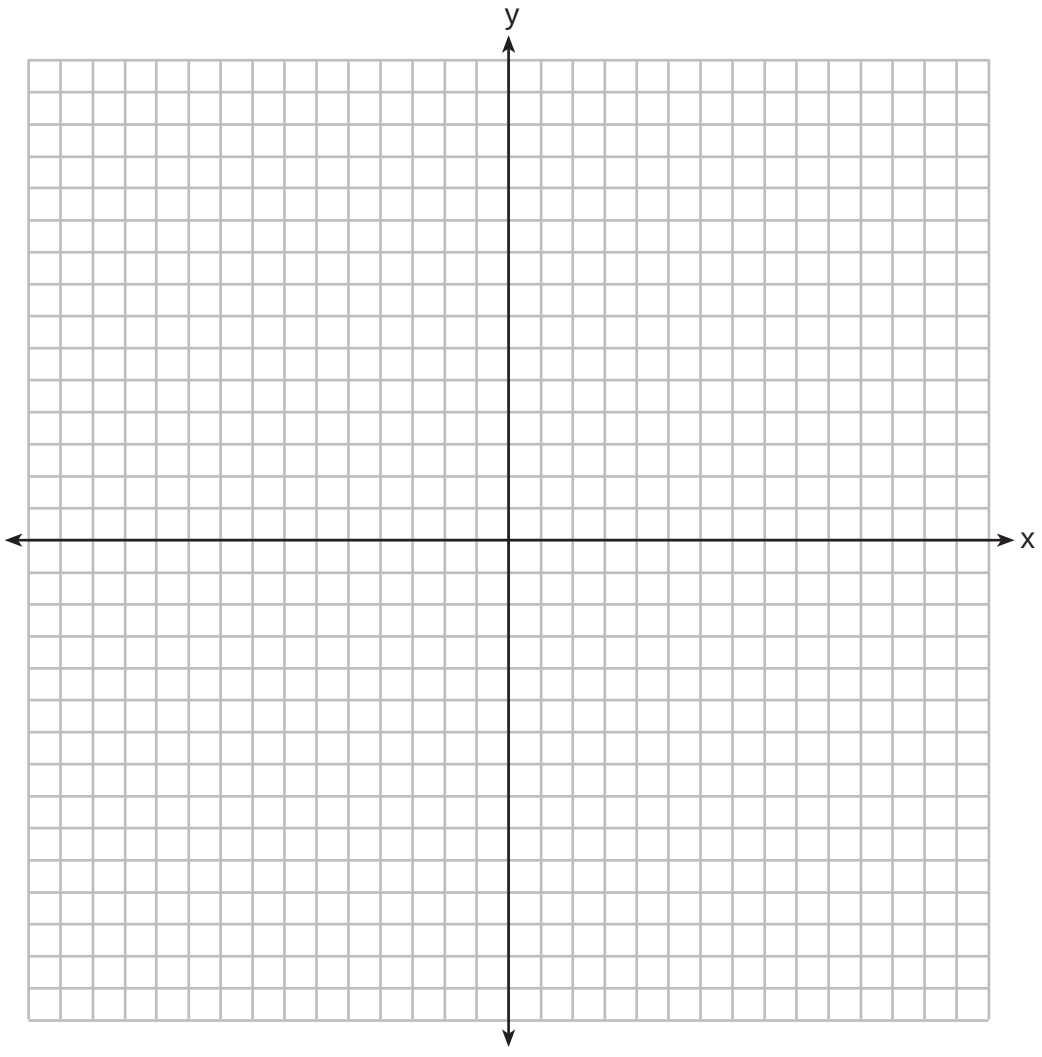
30 Factor $20x^3 - 45x$ completely.

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 Graph the following system of equations on the set of axes below.

$$y = x^2 - 3x - 6$$
$$y = x - 1$$



State the coordinates of all solutions.

32 The table below shows the amount of money a popular movie earned, in millions of dollars, during its first six weeks in theaters.

Week (x)	1	2	3	4	5	6
Dollars Earned, in Millions (y)	185	150	90	50	25	5

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

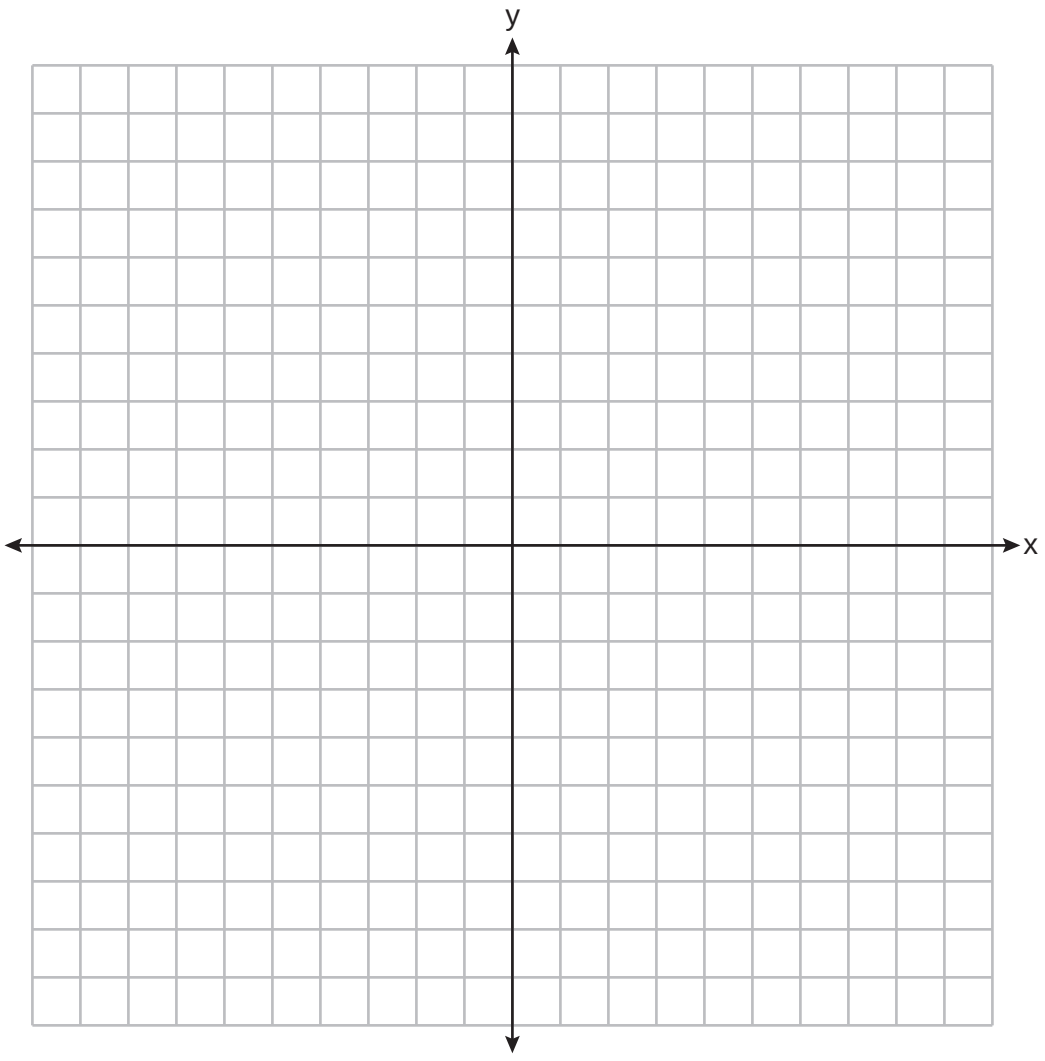
State the correlation coefficient to the *nearest hundredth*.

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

33 Use the quadratic formula to solve the equation $3x^2 - 10x + 5 = 0$. Express the answer in simplest radical form.

34 Graph the system of inequalities on the set of axes below.

$$3y + 2x \leq 15$$
$$y - x > 1$$



State the coordinates of a point in the 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]

35 Courtney went to a coffee shop to purchase lattes and donuts for her friends. One day she spent a total of \$15.50 on four lattes and two donuts. The next day she spent a total of \$18.10 on three lattes and five donuts. All prices included tax.

If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

Courtney thinks that one latte costs \$2.75 and one donut costs \$2.25.
Is Courtney correct? Justify your answer.

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

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Scrap Graph Paper — this sheet will *not* be scored.

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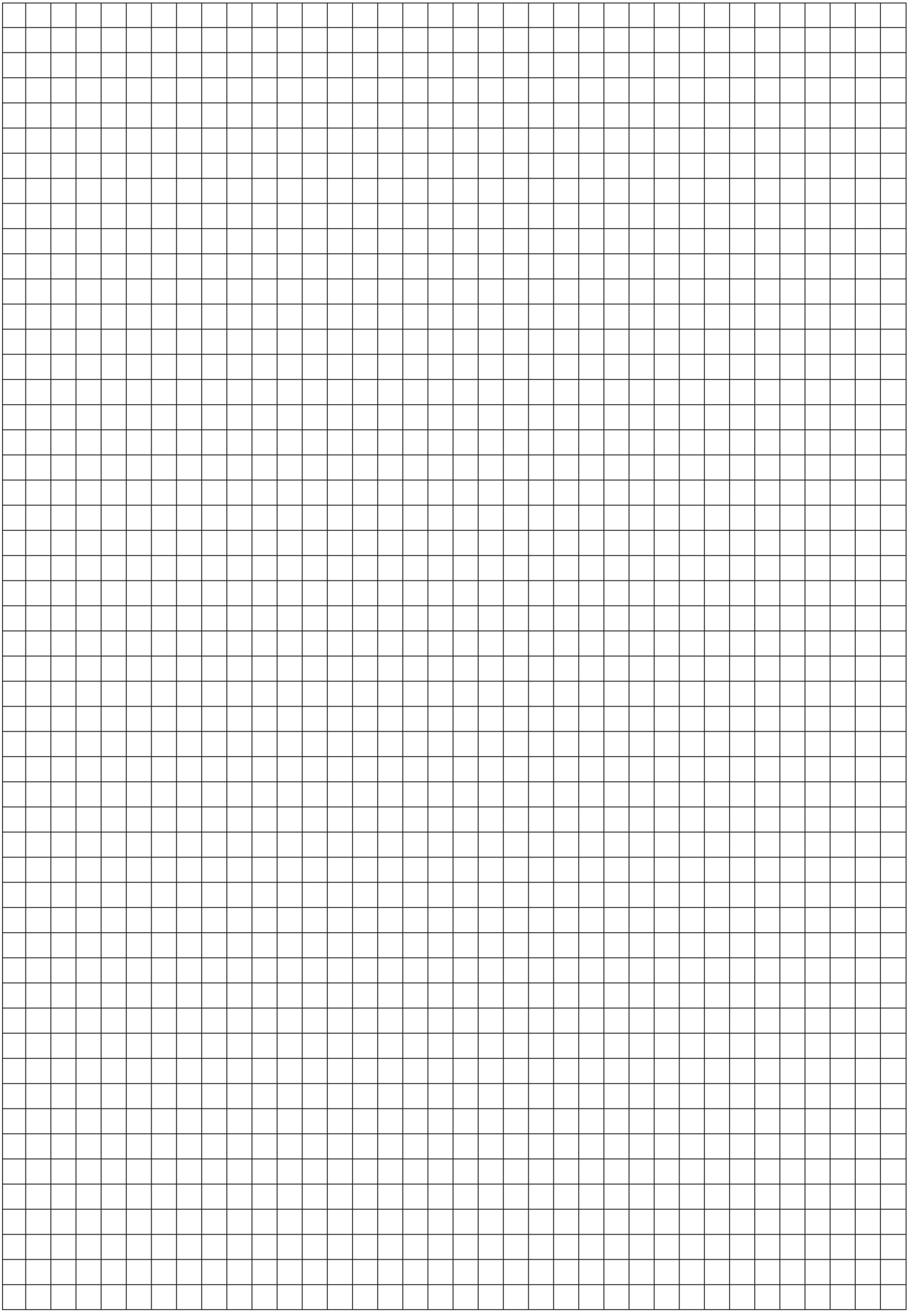

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Reference Sheet for Algebra I

Conversions

1 mile = 5280 feet
1 mile = 1760 yards
1 pound = 16 ounces
1 ton = 2000 pounds

Conversions Across Measurement Systems

1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 1.609 kilometers
1 kilometer = 0.6214 mile
1 pound = 0.454 kilogram
1 kilogram = 2.2 pounds

Quadratic Equation	$y = ax^2 + bx + c$
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Equation of the Axis of Symmetry	$x = -\frac{b}{2a}$
Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$
Linear Equation Slope Intercept	$y = mx + b$
Linear Equation Point Slope	$y - y_1 = m(x - x_1)$

Exponential Equation	$y = ab^x$
Annual Compound Interest	$A = P(1 + r)^n$
Arithmetic Sequence	$a_n = a_1 + d(n - 1)$
Geometric Sequence	$a_n = a_1 r^{n-1}$
Interquartile Range (IQR)	$IQR = Q_3 - Q_1$
Outlier	Lower Outlier Boundary = $Q_1 - 1.5(IQR)$
	Upper Outlier Boundary = $Q_3 + 1.5(IQR)$

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ALGEBRA I

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

Regents Examination in Algebra I – June 2024

Scoring Key: Part I (Multiple-Choice Questions)

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

Regents Examination in Algebra I – June 2024

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

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

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

The chart for determining students' final examination scores for the **June 2024 Regents Examination in Algebra I** will be posted on the Department's web site at: https://www.nysedregents.org/algebraone/ no later than June 26, 2024. 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

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REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I

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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 no later than June 26, 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]** $x \leq 15$, 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] $x \leq 15$, but a method other than algebraic is used.

or

[1] $x \leq 15$, 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.

(26) **[2]** -6, 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] -6, 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 value is stated, and a correct explanation is written.

[1] One conceptual error is made.

or

[1] A correct value is stated, but the explanation is missing, incomplete, or incorrect.

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.

(28) **[2]** The frequency table is completed correctly.

	Play Video Games	Do Not Play Video Games	Total
Social Media	85	40	125
No Social Media	15	10	25
Total	100	50	150

[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] Either 100 or 10 is written correctly in the table, and no further correct work is shown.

[0] Only the given information of 150 and 85 is written in the table.

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.

(29) **[2]** $-5 \pm \sqrt{55}$, 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 solution is stated.

or

[1] $-5 \pm \sqrt{55}$, but a method other than completing the square is used.

or

[1] $-5 \pm \sqrt{55}$, 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]** $5x(2x - 3)(2x + 3)$, 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] $5x(4x^2 - 9)$ is written, but no further correct work is shown.

or

[1] $5x(2x - 3)(2x + 3)$, 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.

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]** Correct graphs are drawn, and $(-1,-2)$ and $(5,4)$ are stated.

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

or

[3] Appropriate work is shown, but only the coordinates of one point are stated correctly.

or

[3] Appropriate work is shown, and solutions are indicated on the graph, but the coordinates are not stated.

[2] Both equations are graphed correctly, but no further correct work is shown.

or

[2] $(-1,-2)$ and $(5,4)$ are stated, but a method other than graphing is used.

[1] One equation is graphed correctly, but no further correct work is used.

or

[1] $(-1,-2)$ and $(5,4)$ 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.

(32) **[4]** $y = -37.57x + 215.67$, -0.98, and strong is stated.

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

or

[3] Appropriate work is shown, but the expression $-37.57x + 215.67$ is written.

or

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

[2] $y = -37.57x + 215.67$ is written, but no further correct work is shown.

[1] -0.98, 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.

(33) **[4]** $\frac{10 \pm 2\sqrt{10}}{6}$ or $\frac{5 \pm \sqrt{10}}{3}$ is written, and correct work is shown.

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

or

[3] Appropriate work is shown, but only one solution is stated.

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

or

[2] Appropriate work is shown to find $\frac{10 \pm \sqrt{40}}{6}$, but no further correct work is shown.

or

[2] $\frac{10 \pm 2\sqrt{10}}{6}$, but a method other than the quadratic formula is used.

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

or

[1] $\frac{10 \pm 2\sqrt{10}}{6}$, 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]** The system of inequalities is graphed correctly and at least one is labeled, a correct point is stated, and a correct justification is given.

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

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

or

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

or

[1] $3y + 2x = 15$ and $y - x = 1$ 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.

(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 2.95, the cost of one latte, and 1.85, the cost of one donut.

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

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 2.95, the cost of a latte and 1.85, the cost of a donut.

[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.

[3] A correct system of equations is written, but a justification indicating a positive response is given based upon substitution in only the first equation, and no further correct work is shown.

or

[3] A correct system of equations is written, but an incomplete justification is given, 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 indicating a negative response is given, but no further correct work is shown.

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

or

[1] 2.95, the cost of a latte and 1.85, the cost of a donut are stated, but no work is shown.

[0] 2.95 and 1.85, 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.

Map to the Learning Standards
Algebra I
June 2024

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

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

Regents Examination in Algebra I

June 2024

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

The *Chart for Determining the Final Examination Score for the June 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 no later than June 26, 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

Tuesday, June 4, 2024 — 9:15 a.m. to 12:15 p.m., only

MODEL RESPONSE SET

Table of Contents

Question 25

25 Solve $5(x - 2) \leq 3x + 20$ algebraically.

$5x - 10 \leq 3x + 20$
$-3x \quad -3x$

$2x - 10 \leq 20$
$+10 \quad +10$

$\frac{2x}{2} \leq \frac{30}{2}$

$x \leq 15$

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

Question 25

25 Solve $5(x - 2) \leq 3x + 20$ algebraically.

$5x - 10 \leq 3x + 20$

$2x - 10 \geq +20$

$2x \geq 30$

$x \geq 15$

Score 1: The student made an error writing their inequality sign.

Question 25

25 Solve $5(x - 2) \leq 3x + 20$ algebraically.

$5x - 10 \leq 3x + 20$

$-3x \quad +10 \quad -3x \quad +10$

$\frac{2x}{2} \leq \frac{30}{2}$

$x = 15$

Score 1: The student wrote the solution as an equation and not an inequality.

Question 25

25 Solve $5(x - 2) \leq 3x + 20$ algebraically.

$5x - 10 \leq 3x + 20$

$+10 \quad +10$

$5x \leq 3x + 30$

$-3x \quad -3x$

$\frac{2x}{2} \leq \frac{30}{2}$

$x \leq 18$

Score 0: The student made a transcription error and wrote the solution as an equation.

Question 26

26 Given $g(x) = x^3 + 2x^2 - x$, evaluate $g(-3)$.

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

$g(-3) = -27 + 18 + 3$

$g(-3) = -6$

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

Question 26

26 Given $g(x) = x^3 + 2x^2 - x$, evaluate $g(-3)$.

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

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

Question 26

26 Given $g(x) = x^3 + 2x^2 - x$, evaluate $g(-3)$.

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

$g(3) = 42$

Score 1: The student evaluated $g(3)$ instead of $g(-3)$.

Question 26

26 Given $g(x) = x^3 + 2x^2 - x$, evaluate $g(-3)$.

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

$g(-3) = -27 + 18 + 3$

$g(-3) = -6$

$\frac{-3}{-3} = \frac{-6}{-3}$

$g = 2$

Score 1: The student found the correct answer, but continued with incorrect work.

Question 26

26 Given $g(x) = x^3 + 2x^2 - x$, evaluate $g(-3)$.

$-27 - 9 - 3 = (16)$

Score 0: The student made multiple errors.

Question 27

27 Given the relation $R = \{(-1,1), (0,3), (-2,-4), (x,5)\}$.

State a value for x that will make this relation a function.

$x = 1$

Explain why your answer makes this a function.

Each input has exactly 1 output, so -1 has the output 1, 0 has the output 3, -2 has the output -4, and 1 has the output 5.

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

Question 27

27 Given the relation $R = \{(-1,1), (0,3), (-2,-4), (x,5)\}$.

State a value for x that will make this relation a function.

x = 3

Explain why your answer makes this a function.

It would make the relation a function because none of the x values repeat

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

Question 27

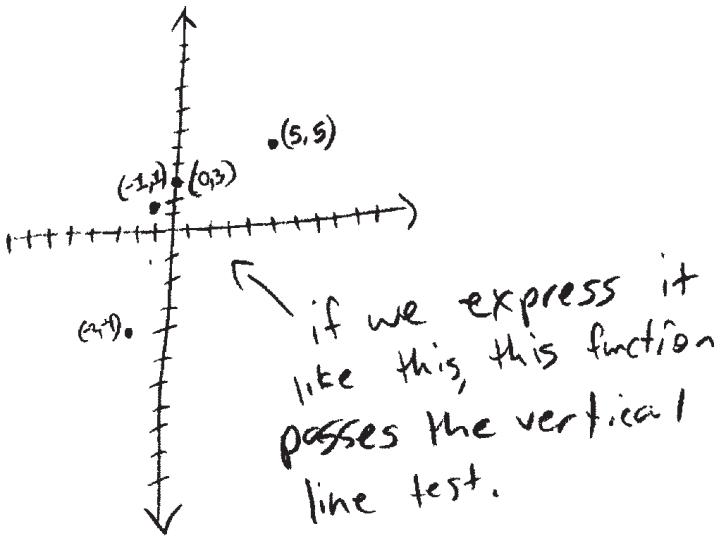
27 Given the relation $R = \{(-1,1), (0,3), (-2,-4), (x,5)\}$.

State a value for x that will make this relation a function.

$x = 5$

Explain why your answer makes this a function.

$R = \{(-1,1)(0,3),(-2,-4),(5,5)\}$



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

Question 27

27 Given the relation $R = \{(-1,1), (0,3), (-2,-4), (x,5)\}$.

State a value for x that will make this relation a function.

6

Explain why your answer makes this a function.

it makes a line

Score 1: The student gave a correct value for x, but wrote an incorrect explanation.

Question 27

27 Given the relation $R = \{(-1,1), (0,3), (-2,-4), (x,5)\}$.

State a value for x that will make this relation a function.

−3

Explain why your answer makes this a function.

there isn't a −3 on any of the pairs, so it stays a function

Score 1: The student gave a correct value for x, but wrote an incomplete explanation.

Question 27

x+2
x+1 y-7 11 x+9
x-2 x+1

27 Given the relation $R = \{(-1,1), (0,3), (-2,-4), (x,5)\}$.

State a value for x that will make this relation a function.

Explain why your answer makes this a function.

It is a point on the line.

Score 0: The student did not show any correct work.

Question 28

28 A survey of 150 students was taken. It was determined that $\frac{2}{3}$ of the students play video games.

Of the students that play video games, 85 also use social media.
Of the students that do not play video games, 20% do not use social media.

Complete the two-way frequency table.

	Play Video Games	Do Not Play Video Games	Total
Social Media	85	40	125
No Social Media	15	10	25
Total	100	50	150

50 do not play video games

$\frac{2}{3} \cdot 150 = 100$ play video games

$100 - 85 = 15$ no social media but play video games

$20\% \times 50 = 10$ do not play video games no social media

$50 - 10 = 40$ do not play video games but use social media

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

Question 28

28 A survey of 150 students was taken. It was determined that $\frac{2}{3}$ of the students play video games.

Of the students that play video games, 85 also use social media.
Of the students that do not play video games, 20% do not use social media.

Complete the two-way frequency table.

	Play Video Games	Do Not Play Video Games	Total
Social Media	85	40	125
No Social Media	15	10	25
Total	100	50	150

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

Question 28

28 A survey of 150 students was taken. It was determined that $\frac{2}{3}$ of the students play video games.

Of the students that play video games, 85 also use social media.
Of the students that do not play video games, 20% do not use social media.

Complete the two-way frequency table.

	Play Video Games	Do Not Play Video Games	Total
Social Media	85	20	105
No Social Media	15	30	45
Total	100	50	150

Score 1: The student found 100.

Question 28

28 A survey of 150 students was taken. It was determined that $\frac{2}{3}$ of the students play video games.

Of the students that play video games, 85 also use social media.
Of the students that do not play video games, 20% do not use social media.

Complete the two-way frequency table.

	Play Video Games	Do Not Play Video Games	Total
Social Media	85	10	95
No Social Media	15	40	55
Total	100	50	150

.29

Score 1: The student reversed the number of students in the "do not play video games" column.

Question 28

28 A survey of 150 students was taken. It was determined that $\frac{2}{3}$ of the students play video games.

Of the students that play video games, 85 also use social media.
Of the students that do not play video games, 20% do not use social media.

Complete the two-way frequency table.

	Play Video Games	Do Not Play Video Games	Total
Social Media	85	1	
No Social Media	20%		
Total			

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

Question 29

29 Use the method of completing the square to determine the exact values of x for the equation $x^2 + 10x - 30 = 0$.

$x^2+10x-30=0$

$\left(x^2+10x+\frac{25}{2}\right)-30-\frac{25}{2}=0$

$(x+5)^2-55=0$

$+55 \quad +55$

$\sqrt{(x+5)^2}=\pm\sqrt{55}$

$x+5=\pm\sqrt{55}$

$-5 \quad -5$

$x=-5\pm\sqrt{55}$

$x=-5+\sqrt{55}$ $\quad$ $x=-5-\sqrt{55}$

1
4
9
16
25
36
49

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

Question 29

29 Use the method of completing the square to determine the exact values of x for the equation $x^2 + 10x - 30 = 0$.

$x^2+10x-30=0$

$+30 \quad +30$

$x^2+10x=30$

$\left(\frac{b}{2}\right)^2 \rightarrow b=10 \rightarrow \left(\frac{10}{2}\right)^2 \rightarrow 5^2 \rightarrow 25$

$x^2+10x+25=30+25$

$x^2+10x+25=55$

$\sqrt{(x+5)^2}=\sqrt{55}$

$x+5=\pm\sqrt{55}$

$-5 \quad -5$

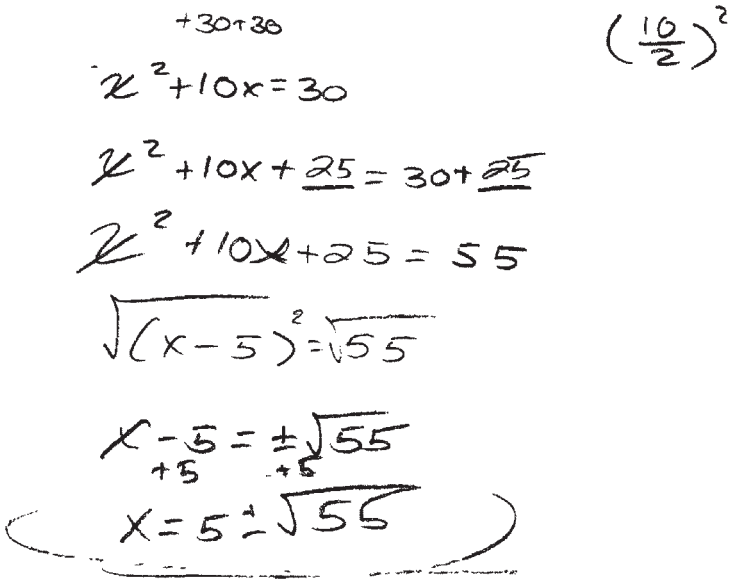
$x=\sqrt{55}-5$

$x=-\sqrt{55}-5$

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

Question 29

29 Use the method of completing the square to determine the exact values of x for the equation $x^2 + 10x - 30 = 0$.



Score 1: The student incorrectly factored $x^2 + 10x + 25$ by writing $(x - 5)^2$.

Question 29

29 Use the method of completing the square to determine the exact values of x for the equation $x^2 + 10x - 30 = 0$.

$x^2 + 10x - 30 = 0$

$x^2 + 10x = 30$

$(x+5)^2 = 25 + 30$

$(x+5)^2 = 55$

$x + 5 = \pm\sqrt{55}$

$x = -5 \pm \sqrt{55}$

$x = -5 \pm 7.416$

$\{2.416, -12.416\}$

$\frac{-10 \pm \sqrt{100 - 4(1)(-30)}}{2}$

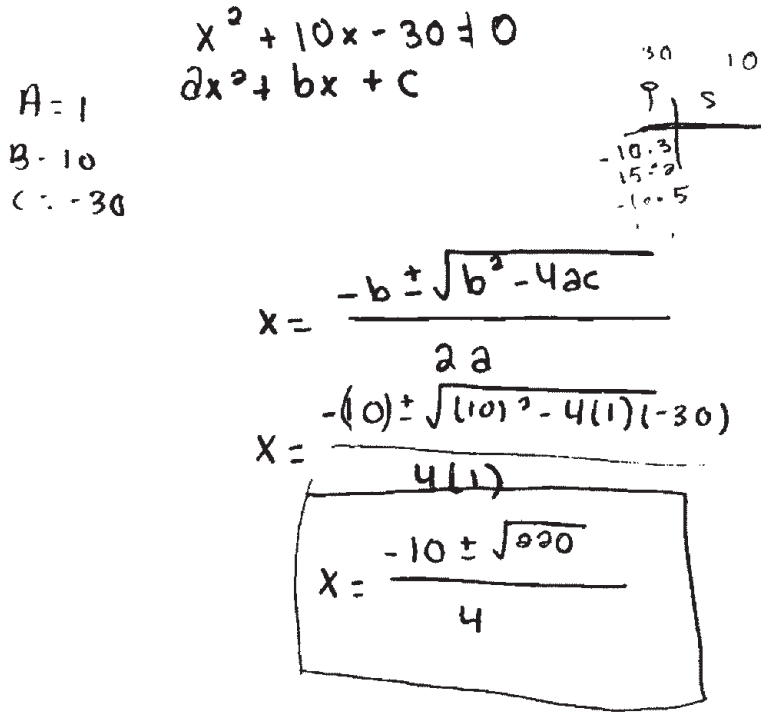
$\frac{-10 \pm 14.832}{2}$

$\frac{-10 \pm \sqrt{220}}{2}$

Score 1: The student found $x = -5 \pm \sqrt{55}$, but expressed their answers as decimals.

Question 29

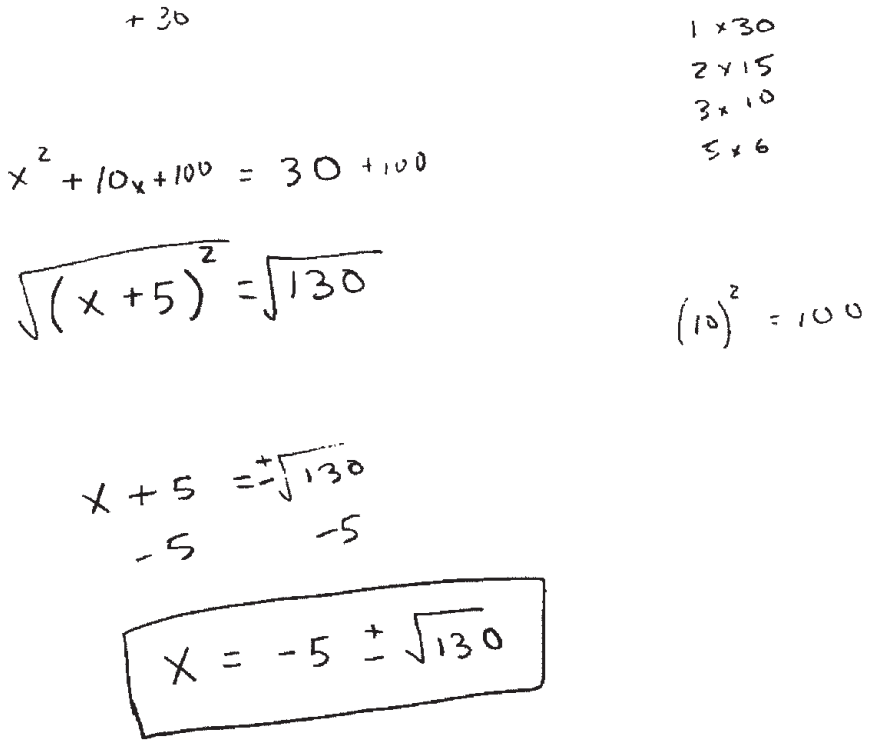
29 Use the method of completing the square to determine the exact values of x for the equation $x^2 + 10x - 30 = 0$.



Score 0: The student used a method other than completing the square and made a computational error.

Question 29

29 Use the method of completing the square to determine the exact values of x for the equation $x^2 + 10x - 30 = 0$.



Score 0: The student made two errors by squaring 10 and factoring their trinomial incorrectly.

Question 30

30 Factor $20x^3 - 45x$ completely.

$20x^3 - 45x$

$5x(4x^2 - 9)$

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

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

Question 30

30 Factor $20x^3 - 45x$ completely.

$20x^3 - 45x$

$5x(4x^2 - 9)$

$5x(2x - 3 = 0)(2x + 3)$

$X = 0 \quad 2x = 3 \quad 2x = -3$

$x = \frac{3}{2} \quad x = \frac{-3}{2}$

Score 1: The student factored correctly, but then solved for x.

Question 30

30 Factor $20x^3 - 45x$ completely.

$20x^3 - 0 - 45x$

$a = 20$
$b = 0$
$c = -45$

$$\frac{-0 \pm \sqrt{(0)^2 - 4(20)(-45)}}{2(20)}$$

$$\frac{-0 \pm \sqrt{3600}}{40}$$

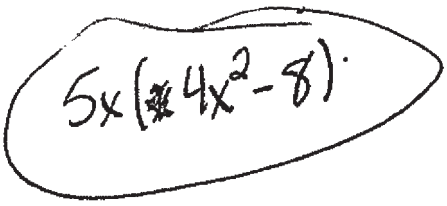
$$\frac{-0 + \sqrt{3600}}{40}, \quad \frac{-0 - \sqrt{3600}}{40}$$

$x = 1.5, -1.5$

Score 0: The student incorrectly applied the quadratic formula.

Question 30

30 Factor $20x^3 - 45x$ completely.



Score 0: The student made a computational error and no further work was shown.

Question 31

31 Graph the following system of equations on the set of axes below.

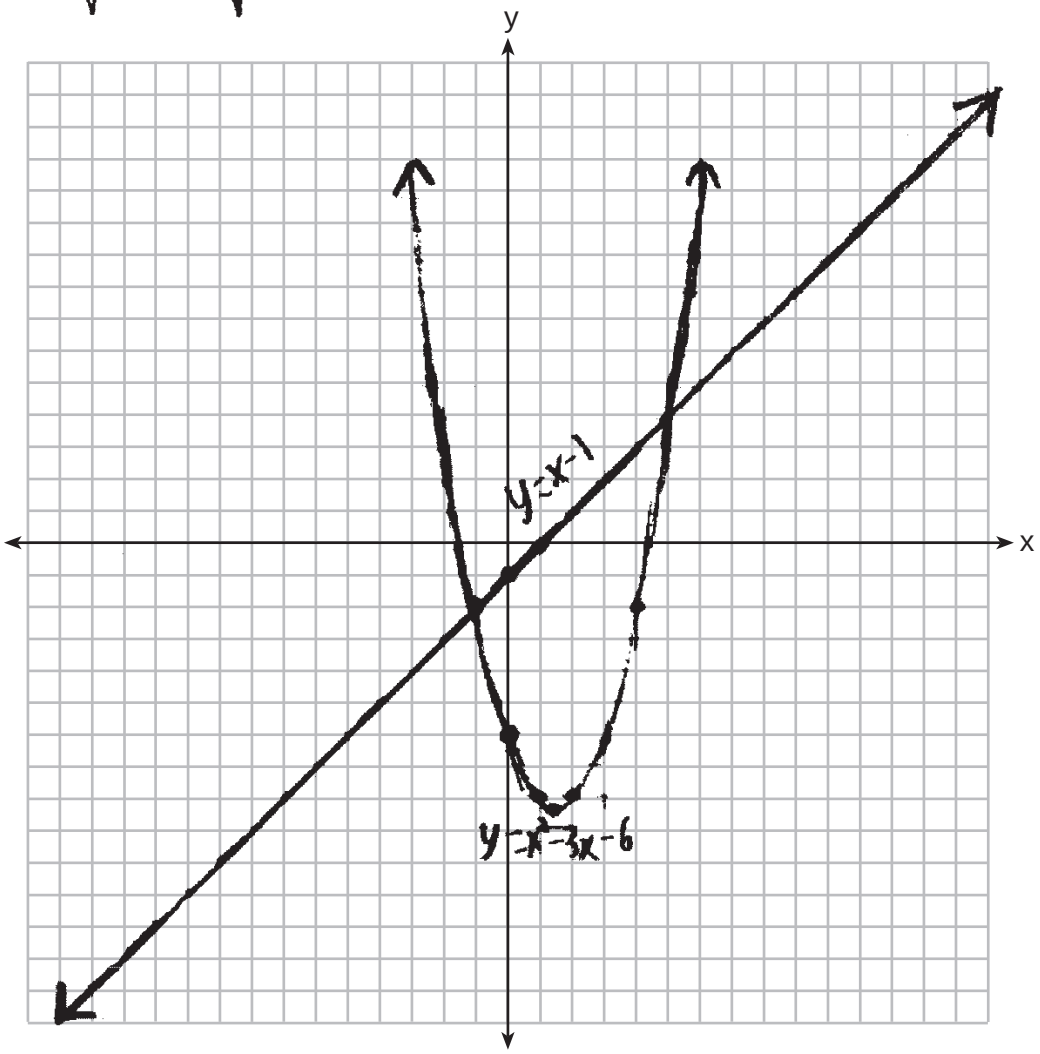
$4 = 5^2 - 2(5) - 6$
$4 = 25 - 10 - 6$
$4 = 4$ ✓

$4 = 5 - 1$
$4 = 4$ ✓

$y = x^2 - 3x - 6$
$y = x - 1$

$-2 = -1 - 1$
$-2 = -2$ ✓

$-2 = (-1)^2 - 3(-1) - 6$
$-2 = 1 + 3 - 6$
$-2 = -2$ ✓



State the coordinates of all solutions.

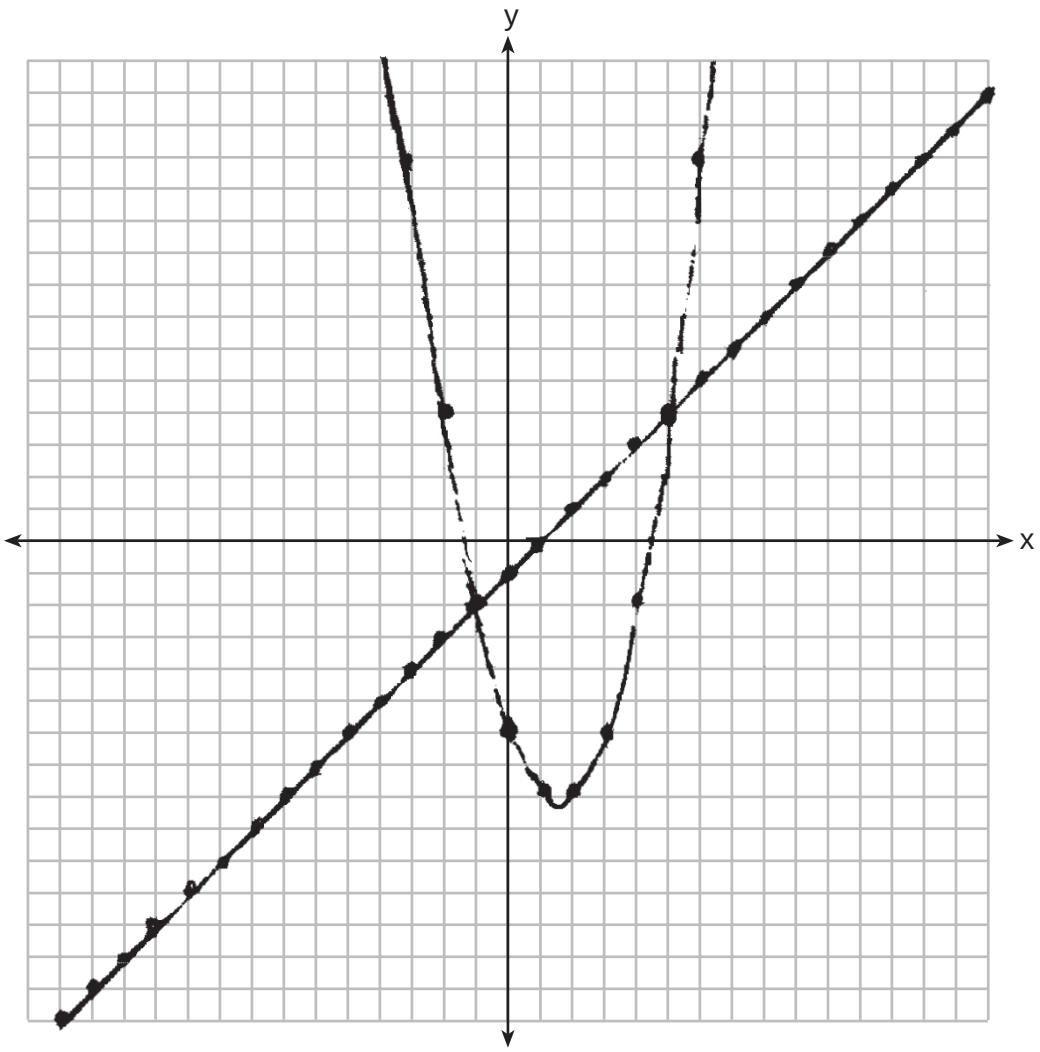
(-1, -2) and (5, 4)

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

Question 31

31 Graph the following system of equations on the set of axes below.

$$y = x^2 - 3x - 6$$
$$y = x - 1$$



State the coordinates of all solutions.

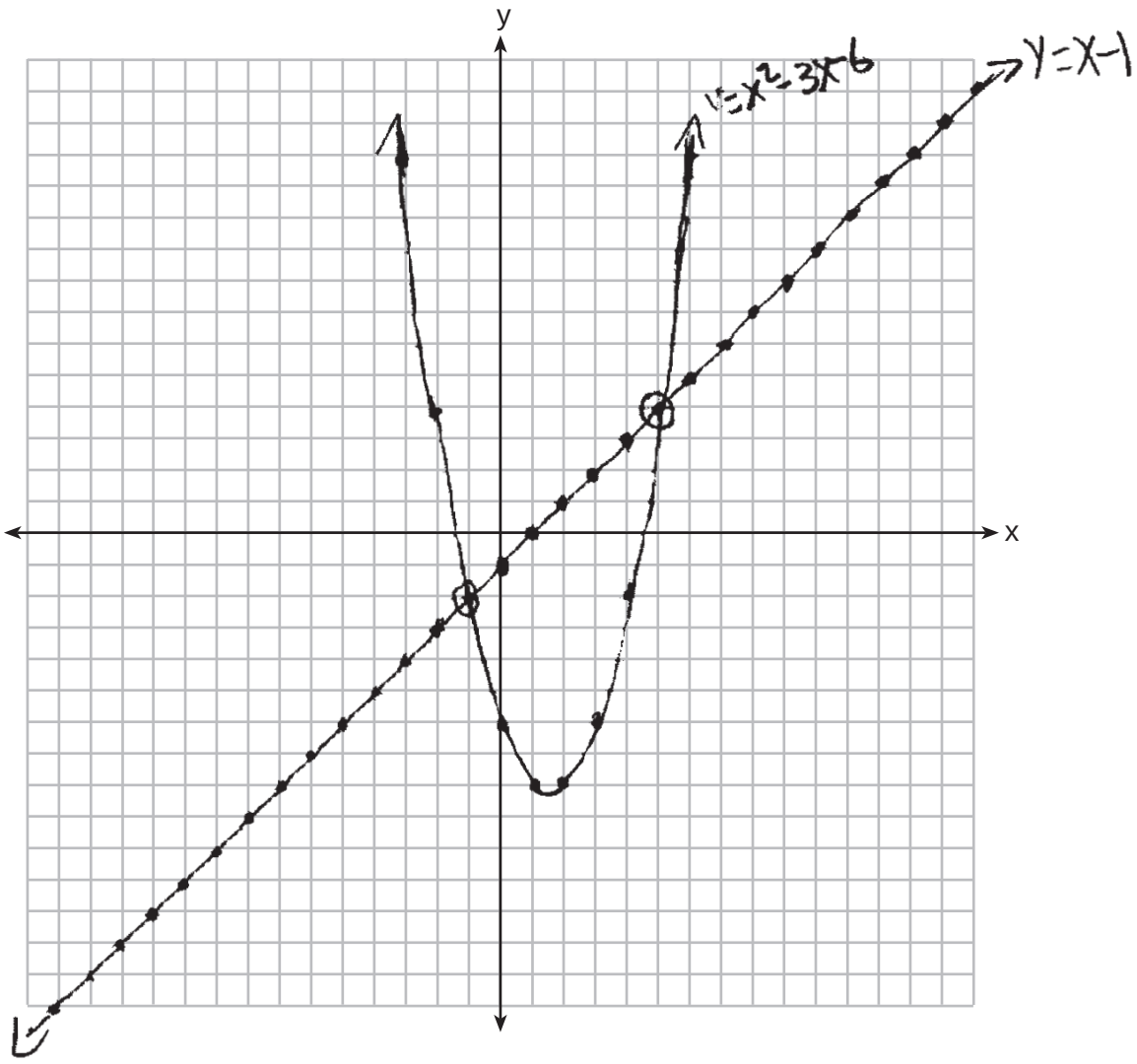
(5,4) (-1,-2)

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

Question 31

31 Graph the following system of equations on the set of axes below.

$$y = x^2 - 3x - 6$$
$$y = x - 1$$



State the coordinates of all solutions.

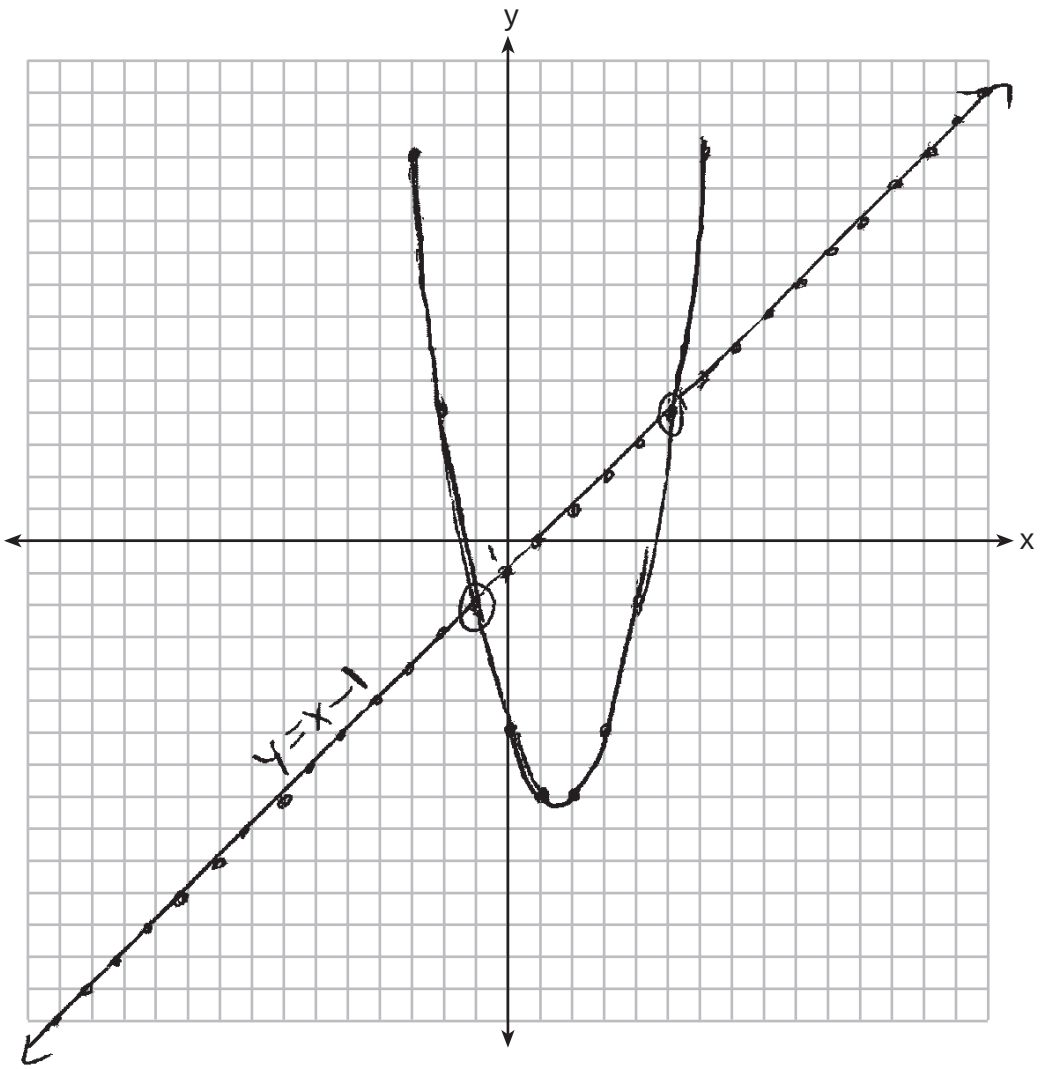
(5,4) (-2,1)

Score 3: The student stated only one solution correctly.

Question 31

31 Graph the following system of equations on the set of axes below.

$$y = x^2 - 3x - 6$$
$$y = x - 1$$



State the coordinates of all solutions.

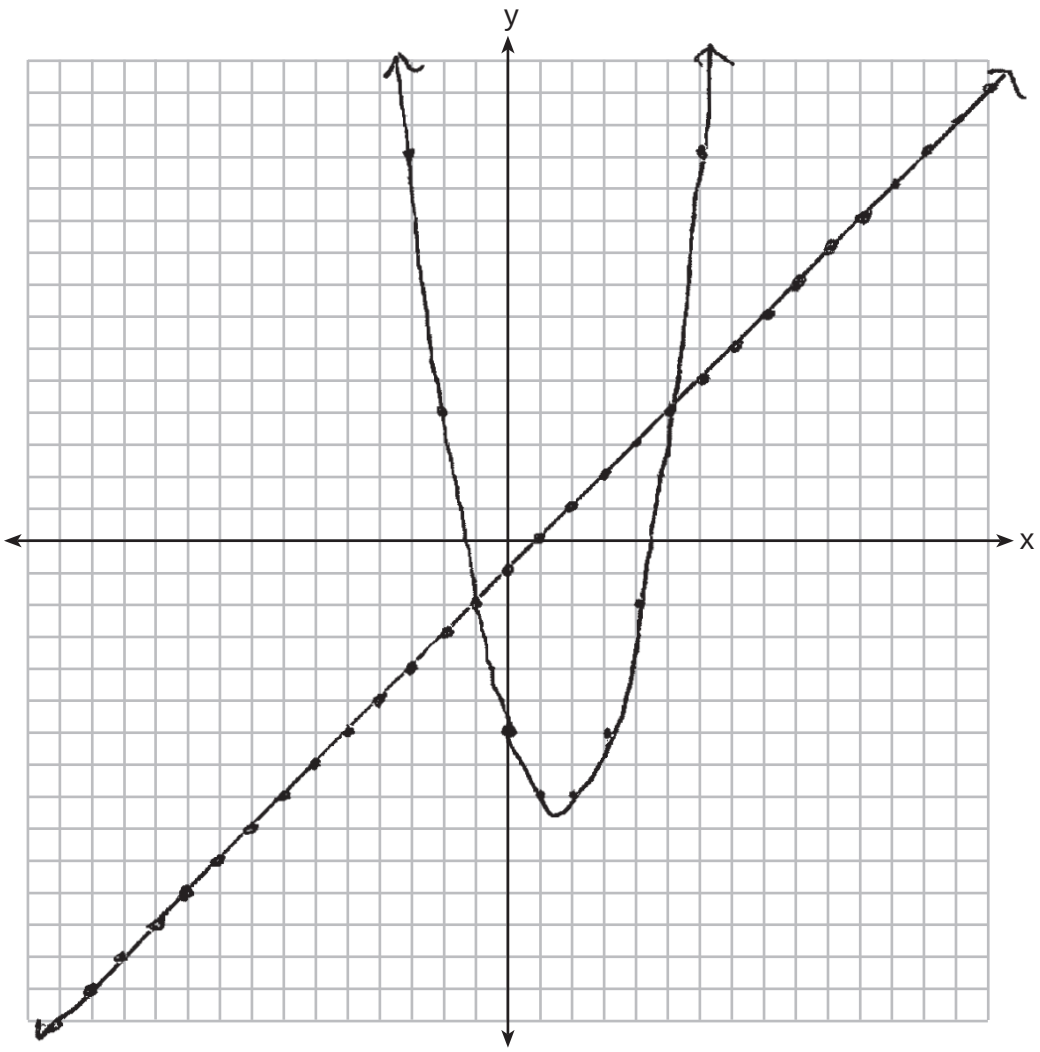
(-1,-2) and (5,4)

Score 3: The student made a graphing error by not including arrows on the graph of $y = x^2 - 3x - 6$.

Question 31

31 Graph the following system of equations on the set of axes below.

$$y = x^2 - 3x - 6$$
$$y = x - 1$$



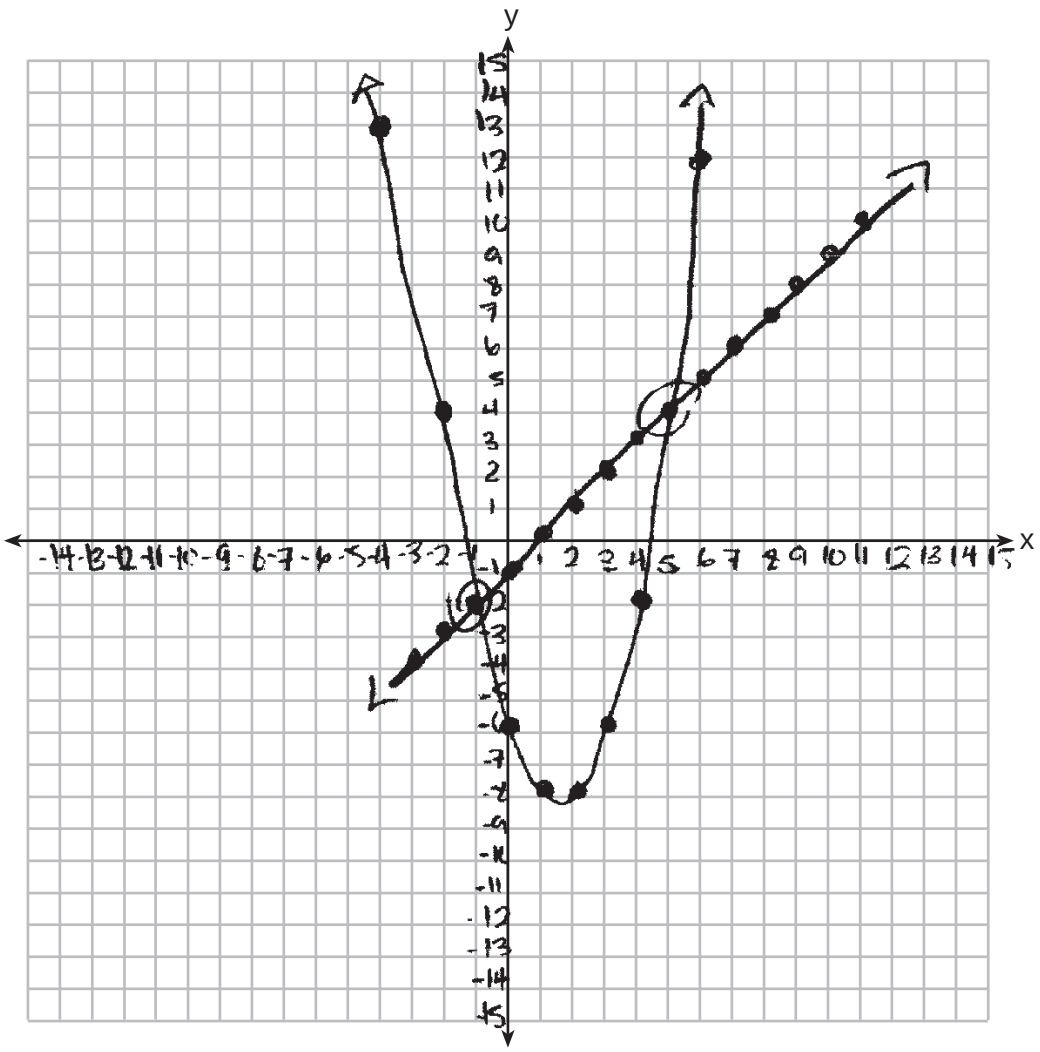
State the coordinates of all solutions.

Score 2: The student did not state the coordinates of the solutions.

Question 31

31 Graph the following system of equations on the set of axes below.

$$y = x^2 - 3x - 6$$
$$y = x - 1$$



State the coordinates of all solutions.

(5,4) and (−1,2)

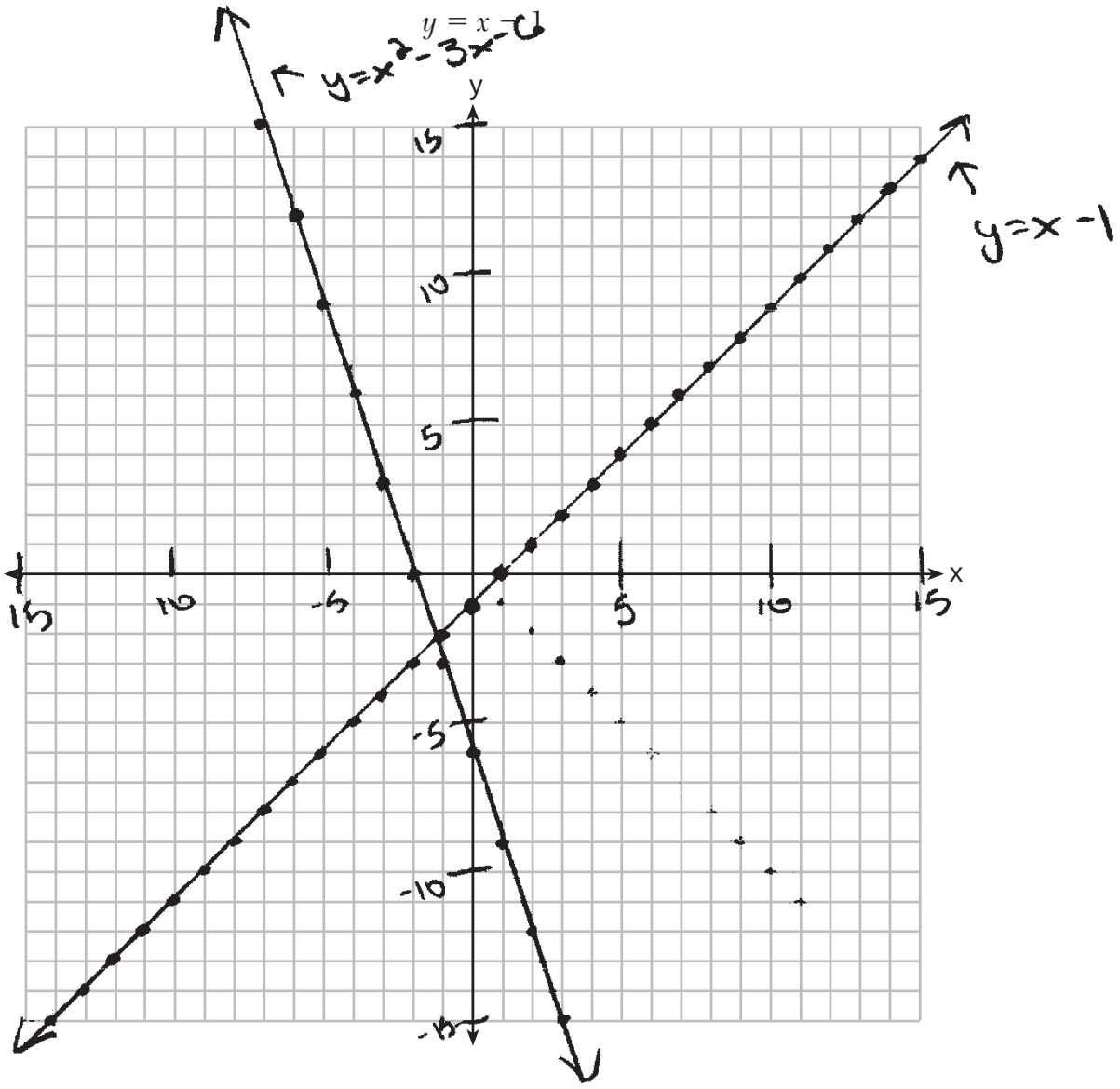
Score 2: The student made one graphing error at (−4,13), and one coordinate pair was stated incorrectly.

Question 31

31 Graph the following system of equations on the set of axes below.

$y = x^2 - 3x - 6$

$y = x - 1$



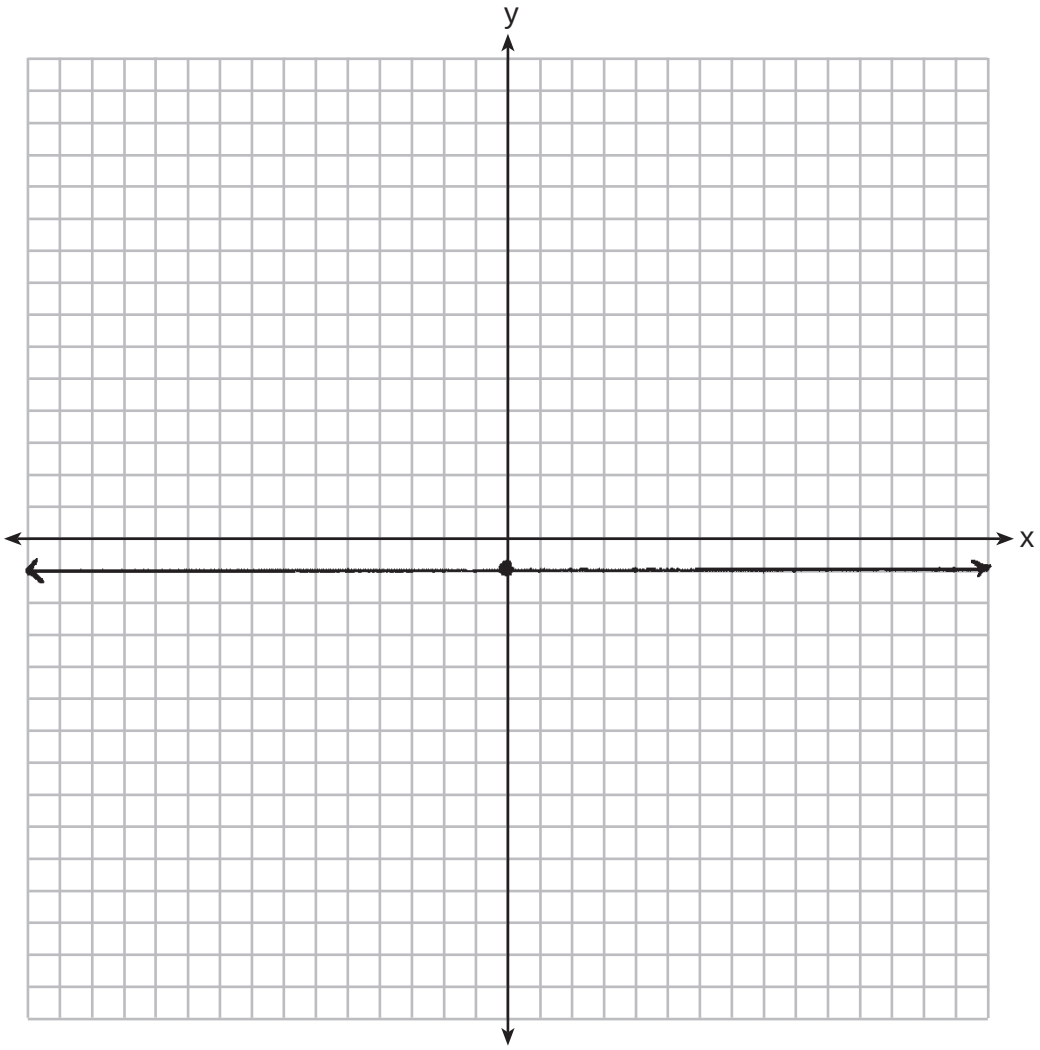
State the coordinates of all solutions.

Score 1: The student only graphed $y = x - 1$ correctly.

Question 31

31 Graph the following system of equations on the set of axes below.

$$y = x^2 - 3x - 6$$
$$y = x - 1$$



State the coordinates of all solutions.

(-1, -2)

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

Question 32

32 The table below shows the amount of money a popular movie earned, in millions of dollars, during its first six weeks in theaters.

Week (x)	1	2	3	4	5	6
Dollars Earned, in Millions (y)	185	150	90	50	25	5

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

a = -37.57
b = 215.67
r = -.98

$y = -37.57x + 215.67$

State the correlation coefficient to the *nearest hundredth*.

−.98

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

There is a strong negative correlation between the weeks & how much money is earned.

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

Question 32

32 The table below shows the amount of money a popular movie earned, in millions of dollars, during its first six weeks in theaters.

Week (x)	1	2	3	4	5	6
Dollars Earned, in Millions (y)	185	150	90	50	25	5

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

$y = mx+b$

$y = -37.57x+215.67$

State the correlation coefficient to the *nearest hundredth*.

r-value = 0.98

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

The correlation coefficient indicates a strong positive correlation, because the coefficient is close to 1.

Score 3: The student wrote an incorrect correlation coefficient, but gave an appropriate indication about the linear fit.

Question 32

32 The table below shows the amount of money a popular movie earned, in millions of dollars, during its first six weeks in theaters.

Week (x)	1	2	3	4	5	6
Dollars Earned, in Millions (y)	185	150	90	50	25	5

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

$y = -37.57x + 215.67$

State the correlation coefficient to the *nearest hundredth*.

-37.57

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

It indicates how much the dollars earned in millions changes each week.

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

Question 32

32 The table below shows the amount of money a popular movie earned, in millions of dollars, during its first six weeks in theaters.

Week (x)	1	2	3	4	5	6
Dollars Earned, in Millions (y)	185	150	90	50	25	5

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

$a = -37.57142857 = -37.57$

$b = 215.0666667 = 215.67$

State the correlation coefficient to the *nearest hundredth*.

$-.98$

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

That every week, the dollars earned in millions decreases by -.98.

Score 2: The student did not write a regression equation and wrote an incorrect indication about the linear fit.

Question 32

32 The table below shows the amount of money a popular movie earned, in millions of dollars, during its first six weeks in theaters.

Week (x)	1	2	3	4	5	6
Dollars Earned, in Millions (y)	185	150	90	50	25	5

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

y=-37.6x + 215.7

State the correlation coefficient to the *nearest hundredth*.

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

Score 1: The student made a rounding error by rounding to the tenths place.

Question 32

32 The table below shows the amount of money a popular movie earned, in millions of dollars, during its first six weeks in theaters.

Week (x)	1	2	3	4	5	6
Dollars Earned, in Millions (y)	185	150	90	50	25	5

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

$y = ax + b$
$y = 37.5x + 226.$

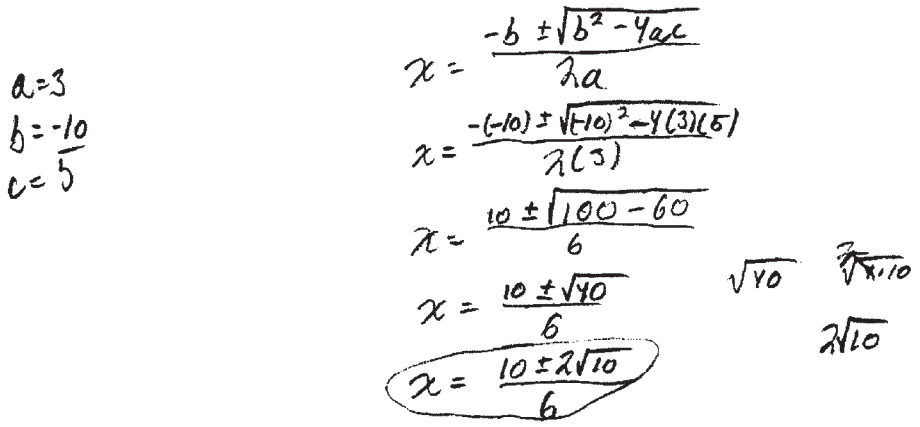
State the correlation coefficient to the *nearest hundredth*.

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 33

33 Use the quadratic formula to solve the equation $3x^2 - 10x + 5 = 0$. Express the answer in simplest radical form.



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

Question 33

33 Use the quadratic formula to solve the equation $3x^2 - 10x + 5 = 0$. Express the answer in simplest radical form.

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $a=3$ $b=-10$ $c=5$

$x = \frac{10 \pm \sqrt{100-60}}{6}$

40 | 2
20 | 2
10 | 2
5 | 5

$x = \frac{10 \pm \sqrt{40}}{6}$

$x = \frac{10 \pm 2\sqrt{10}}{6}$ (5)

$\boxed{x = \frac{5 \pm \sqrt{10}}{3}}$

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

Question 33

33 Use the quadratic formula to solve the equation $3x^2 - 10x + 5 = 0$. Express the answer in simplest radical form.

a b c quadratic formula =

$3x^2 - 10x + 5 = 0$ $\quad \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$= \frac{10 \pm \sqrt{10^2 - 4 \cdot 3 \cdot 5}}{2 \cdot 3}$

$= \frac{10 \pm \sqrt{100 - 60}}{6}$

$= \frac{10 \pm \sqrt{40}}{6}$

$= \frac{10 \pm 2\sqrt{10}}{6}$ $\quad \frac{10 \pm 6.32\ldots}{6}$

$= 2.72, 0.61$

Score 3: The student converted $\frac{10 \pm 2\sqrt{10}}{6}$ to decimals.

Question 33

33 Use the quadratic formula to solve the equation $3x^2 - 10x + 5 = 0$. Express the answer in simplest radical form.

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

$$x = \frac{-(-10) \pm \sqrt{(-10)^2-4(3)(5)}}{2(3)}$$

$$x = \frac{5\cancel{0} \pm \sqrt{100-60}}{\cancel{6}3}$$

$$x = \frac{5 \pm \sqrt{40}}{3}$$

$$x = \frac{5 \pm \sqrt{4 \cdot 10}}{3}$$

$$x = \frac{5 \pm 2\sqrt{10}}{3}$$

$$x = \frac{5-2\sqrt{10}}{3}$$

or

$$x = \frac{5+2\sqrt{10}}{3}$$

Score 3: The student made a simplification error.

Question 33

33 Use the quadratic formula to solve the equation $3x^2 - 10x + 5 = 0$. Express the answer in simplest radical form.

A B C

$3x^2 - 10x + 5 = 0$

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

$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(3)(5)}}{2(3)}$

$x = \frac{10 \pm \sqrt{100 - 60}}{6}$

$x = \frac{10 \pm \sqrt{40}}{6}$

$x = \frac{10}{6} \pm \frac{\sqrt{40}}{6}$

$x = 1.67 \pm 1.05$

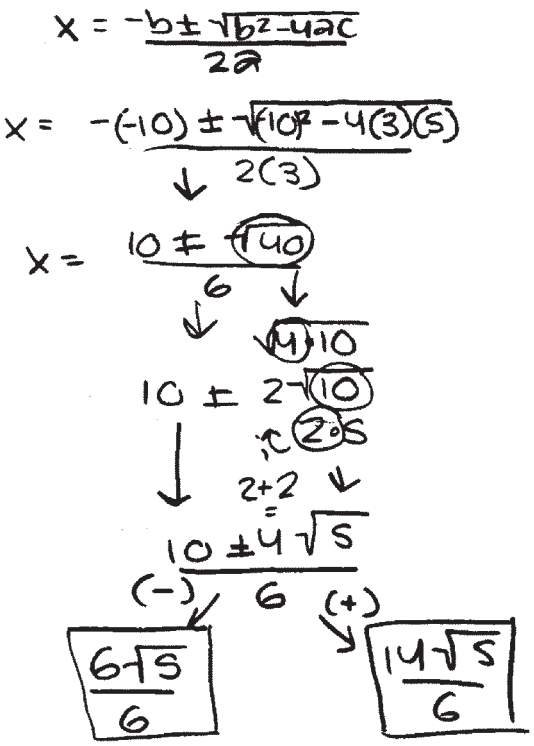
$x = 1.67 + 1.05$ $\quad$ $x = 1.67 - 1.05$

$x = 2.72$ $\quad$ $x = .62$

Score 2: The student found $x = \frac{10 \pm \sqrt{40}}{6}$.

Question 33

33 Use the quadratic formula to solve the equation $3x^2 - 10x + 5 = 0$. Express the answer in simplest radical form.



Score 2: The student found $x = \frac{10 \pm \sqrt{40}}{6}$, but then made multiple simplification errors.

Question 33

33 Use the quadratic formula to solve the equation $3x^2 - 10x + 5 = 0$. Express the answer in simplest radical form.

$a = 3$
$b = -10$
$c = 5$

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

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(3)(5)}}{2(3)}$$

$$x = \frac{20 \pm \sqrt{40}}{6}$$

$X = 4.4$
$X = 2.3$

Score 1: The student made a correct substitution into the quadratic formula.

Question 33

33 Use the quadratic formula to solve the equation $3x^2 - 10x + 5 = 0$. Express the answer in simplest radical form.

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

$X = \frac{10 \pm \sqrt{-10^2 - 4(3)(5)}}{2(3)}$

$X = \frac{10 \pm -160}{6}$

$X = \frac{10 + -160}{6} = -25$

$X = \frac{10 - -160}{6} = 28.3$

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

Question 34

34 Graph the system of inequalities on the set of axes below.

$3y + 2x \leq 15$

$y - x \geq 12$

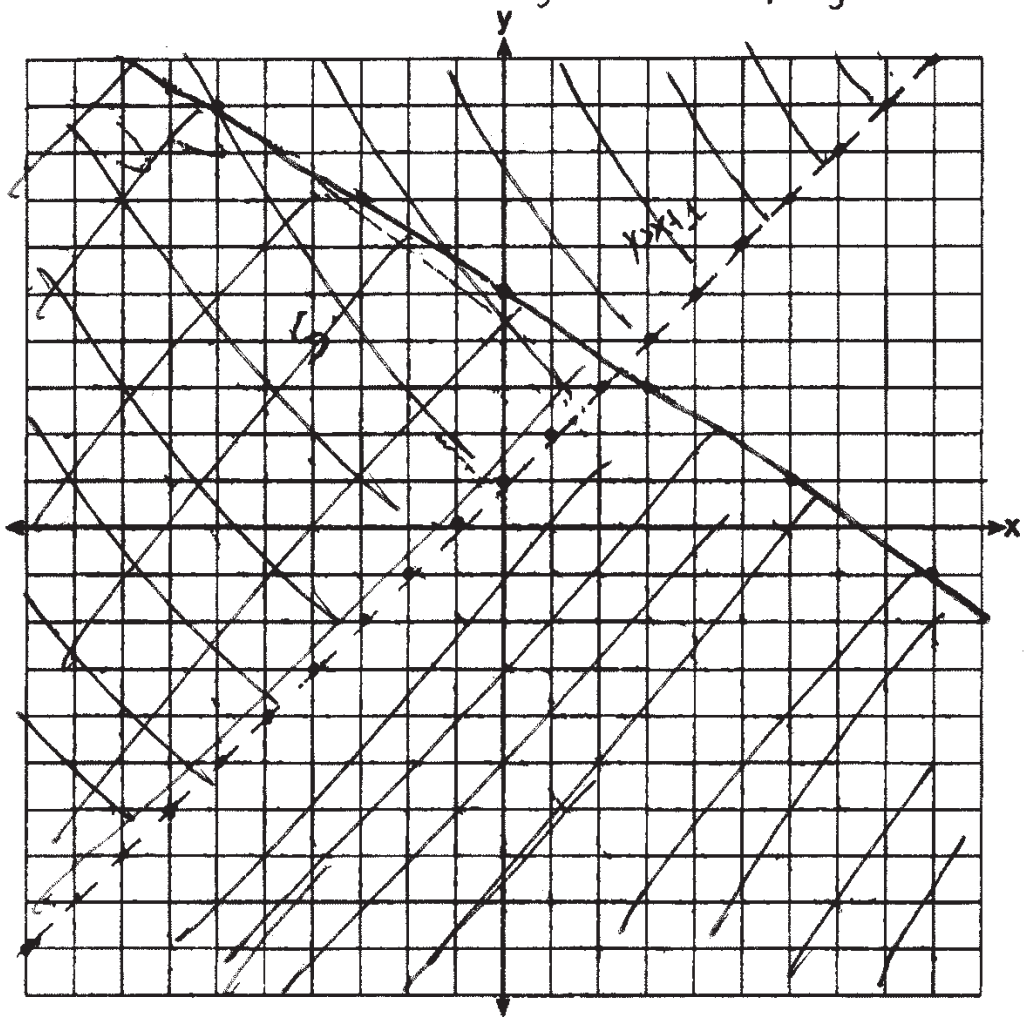
$3y + 2x \leq 15$

$-2x \quad -2x$

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

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

$y > x + 1$



State the coordinates of a point in the solution to this system. Justify your answer.

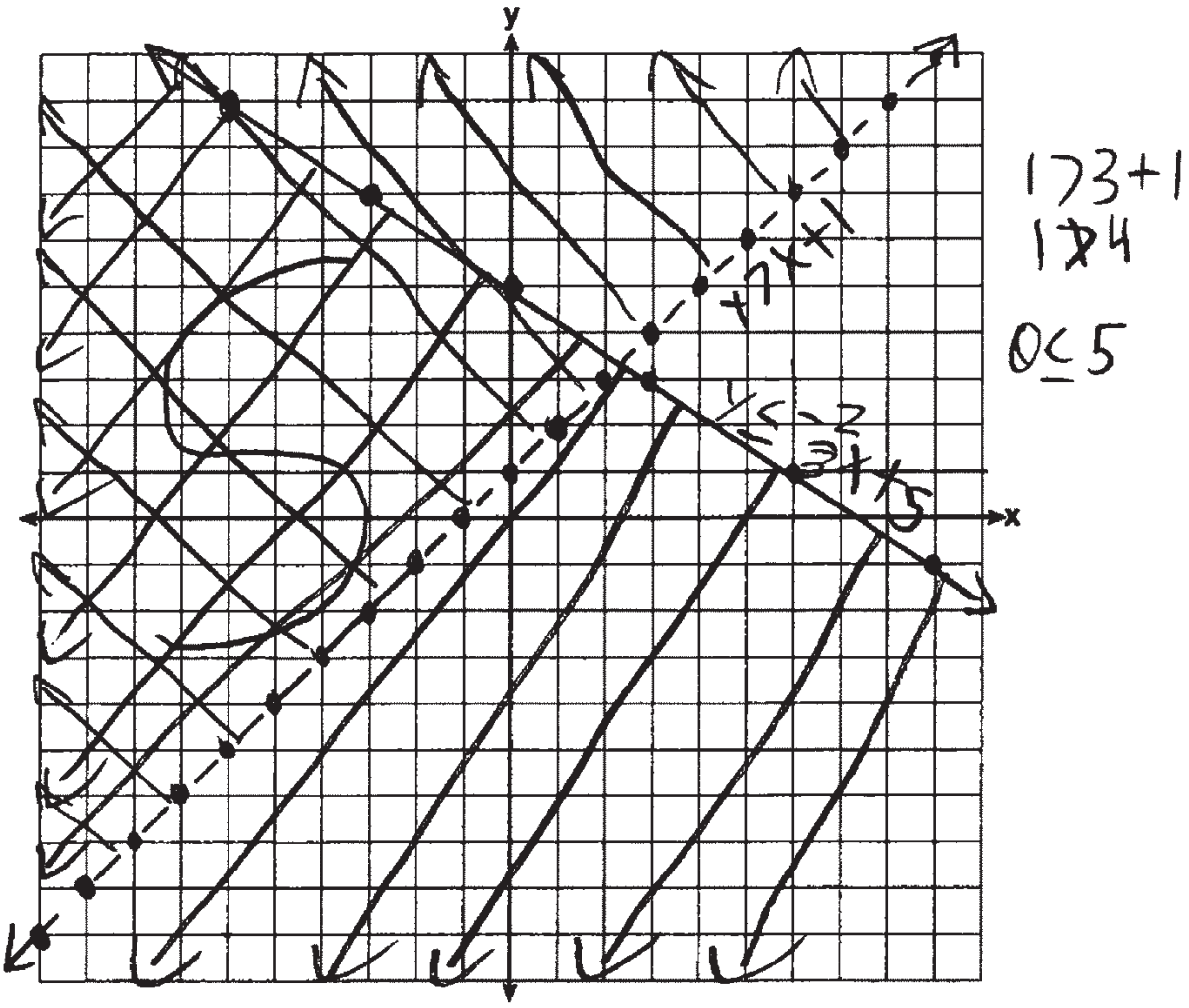
(-8,3). This point is in the area where the 2 shaded sections overlap.

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

Question 34

34 Graph the system of inequalities on the set of axes below.

$3y + 2x \leq 15$
$y - x > 1$



State the coordinates of a point in the solution to this system. Justify your answer.

(-9, 1) (-9,1) is in the solution set on the graph and works out in both inequalities

$1 \leq -\frac{2}{3}(-9) + 5$
$1 \leq 11$ ✓

$1 > -9 + 1$
$1 > -8$ ✓

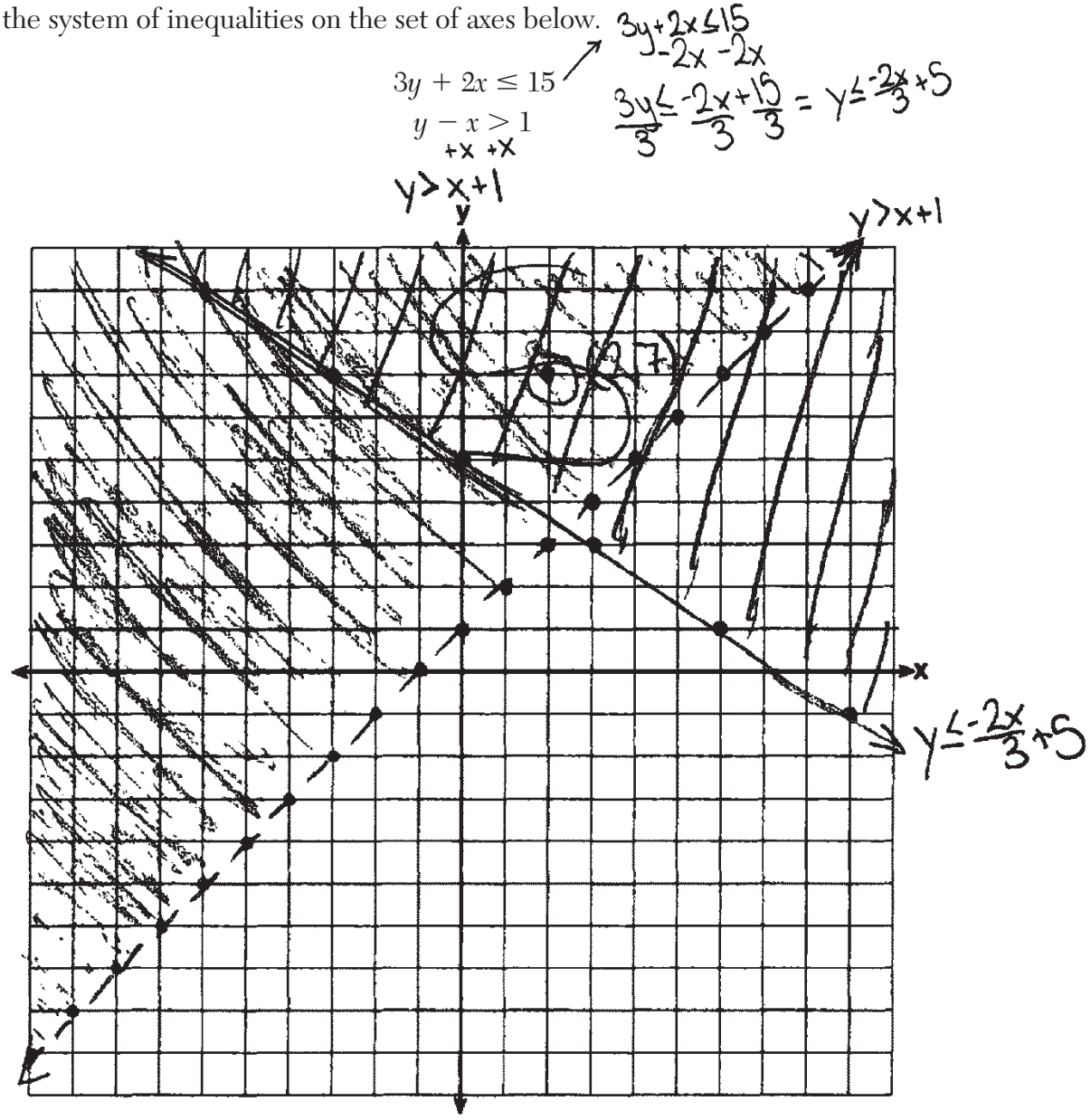
Score 4: The student gave a complete and correct response.

Question 34

34 Graph the system of inequalities on the set of axes below.

$3y + 2x \leq 15$

$y - x > 1$



State the coordinates of a point in the solution to this system. Justify your answer.

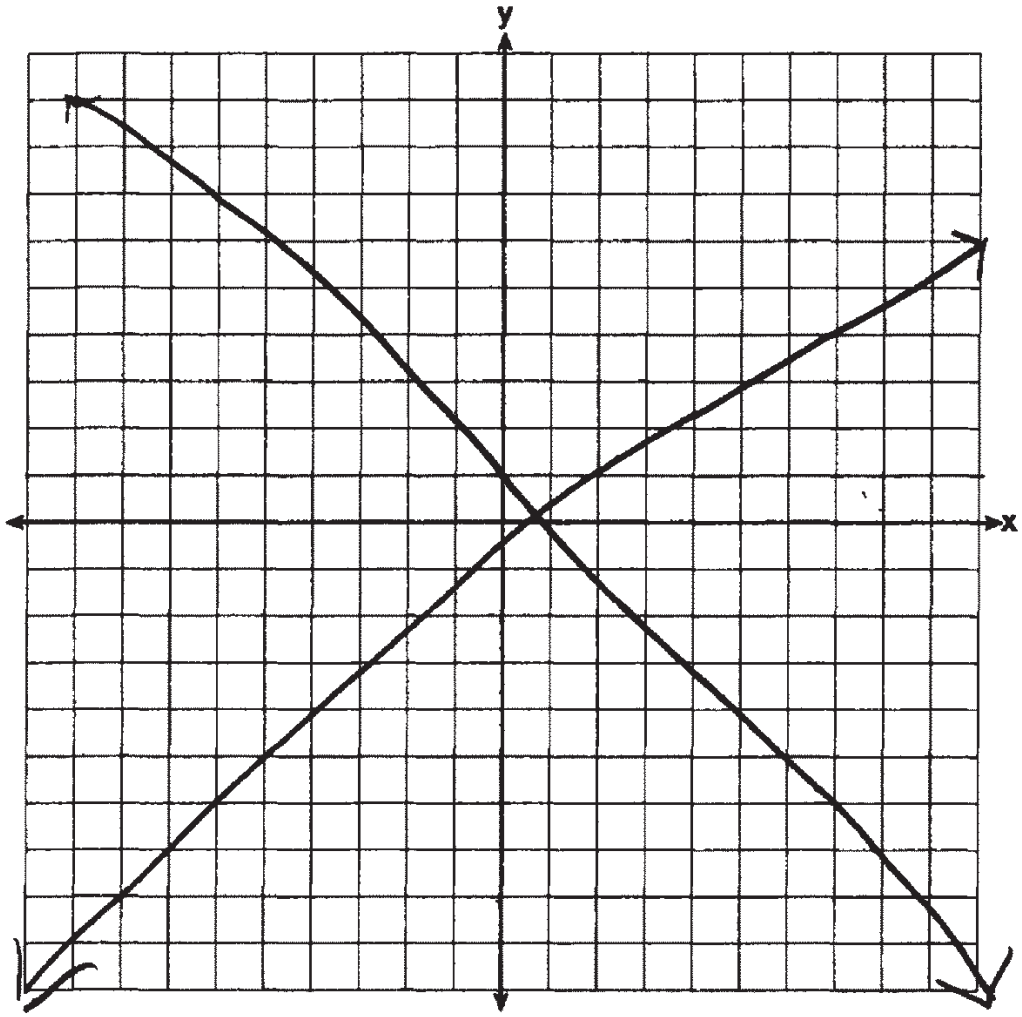
(2,7) is in the shaded region of the solution!

Score 3: The student shaded the region for $3y + 2x \leq 15$ incorrectly.

Question 34

34 Graph the system of inequalities on the set of axes below.

$$3y + 2x \leq 15$$
$$y - x > 1$$



State the coordinates of a point in the solution to this system. Justify your answer.

$3 \cdot 4 + 2 \cdot 1 = 14 \leq 15$

(1, 4)

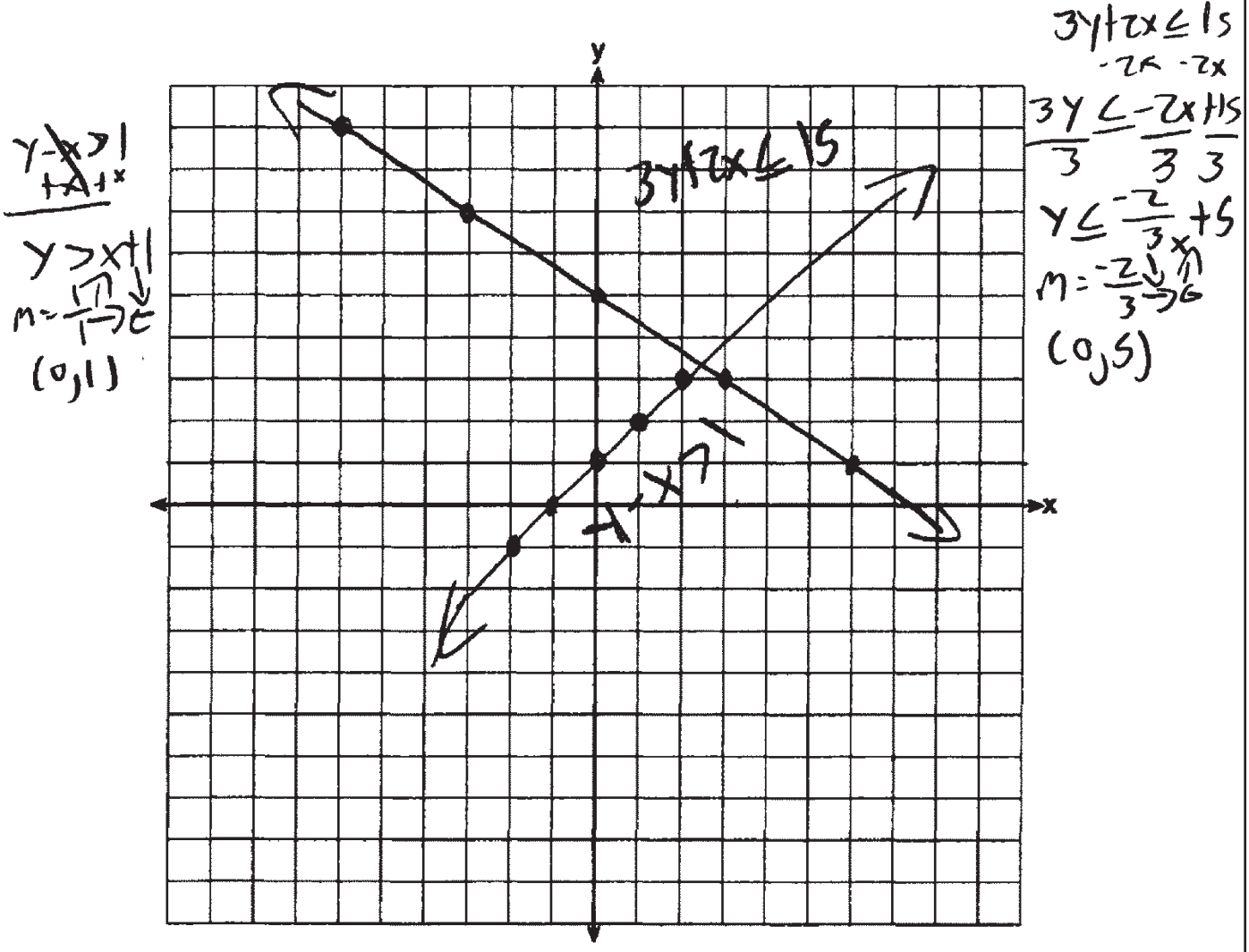
$4 - 1 = 3 > 1$

Score 2: The student showed that (1,4) lies in the solution set.

Question 34

34 Graph the system of inequalities on the set of axes below.

$$3y + 2x \leq 15$$
$$y - x > 1$$



State the coordinates of a point in the solution to this system. Justify your answer.

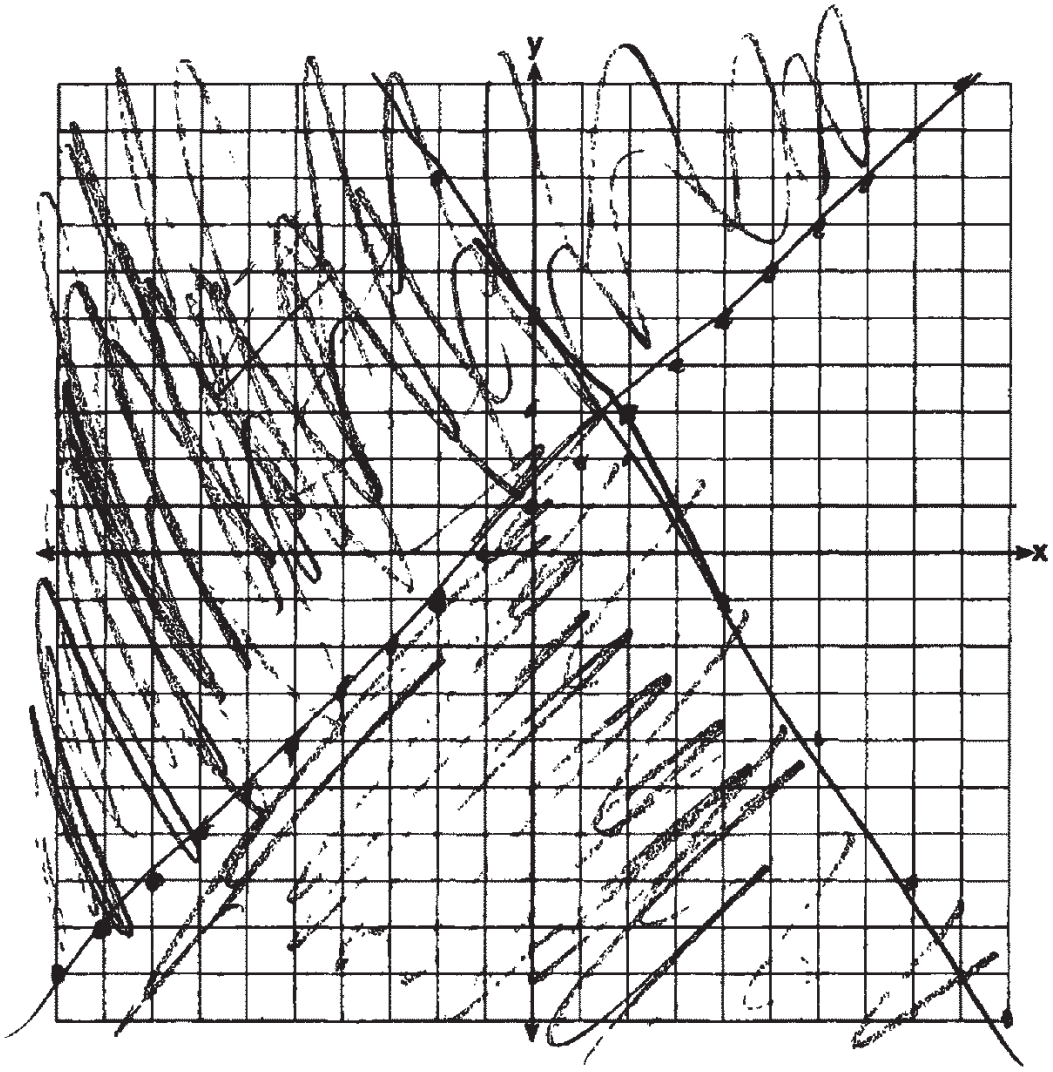
(1,2) $3(2)+2(1)\leq 15$
$6+2\leq 15$
$8\leq 15$ ✓

Score 1: The student graphed two equations instead of a system of inequalities.

Question 34

34 Graph the system of inequalities on the set of axes below.

$$3y + 2x \leq 15$$
$$y - x > 1$$



State the coordinates of a point in the solution to this system. Justify your answer.

(3, 2) where the lines intersect

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

Question 35

35 Courtney went to a coffee shop to purchase lattes and donuts for her friends. One day she spent a total of $15.50 on four lattes and two donuts. The next day she spent a total of $18.10 on three lattes and five donuts. All prices included tax.

If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

$4x + 2y = 15.50$

$3x + 5y = 18.10$

Courtney thinks that one latte costs $2.75 and one donut costs $2.25.
Is Courtney correct? Justify your answer.

$4(2.75) + 2(2.25) = 15.50$ $3(2.75) + 5(2.25) = 18.10$

$11 + 4.5 = 15.5$ $8.25 + 11.25 \neq 18.10$

Courtney is incorrect since when you plug in 2.75 and 2.25, they are not solutions for both equations.

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

$4x + 2y = 15.50 \Rightarrow y = -2x + 7.75$

$3x + 5y = 18.10$

$3(2.95) + 5y = 18.10$

$8.85 + 5y = 18.10$

$-8.85 \quad -8.85$

$\frac{5y}{5} = \frac{9.25}{5}$

$y = 1.85$

$3x + 5(-2x + 7.75) = 18.10$

$3x - 10x + 38.75 = 18.10$

$-7x + 38.75 = 18.10$

$-38.75 \quad -38.75$

$-7x = -20.65$

$\frac{-7x}{-7} = \frac{-20.65}{-7}$

$x = 2.95$

A latte costs $2.95

A donuts costs $1.85

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

Question 35

35 Courtney went to a coffee shop to purchase lattes and donuts for her friends. One day she spent a total of $15.50 on four lattes and two donuts. The next day she spent a total of $18.10 on three lattes and five donuts. All prices included tax.

If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

$4x + 2y = 15.50$
$3x + 5y = 18.10$

Courtney thinks that one latte costs $2.75 and one donut costs $2.25.
Is Courtney correct? Justify your answer.

No, one donut costs $1.85 and one latte costs $2.95

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

$x = 2.95$
$y = 1.85$

$-3(4x + 2y = 15.50)$
$4(3x + 5y = 18.10)$

$-12x - 6y = -46.5$
$12x + 20y = 72.4$

$\frac{14y}{14} = \frac{25.9}{14}$

$y = 1.85$

$4x + 3.7 = 15.50$
$-3.7 \quad -3.7$

$\frac{4x}{4} = \frac{11.8}{4}$

$x = 2.95$

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

Question 35

35 Courtney went to a coffee shop to purchase lattes and donuts for her friends. One day she spent a total of $15.50 on four lattes and two donuts. The next day she spent a total of $18.10 on three lattes and five donuts. All prices included tax.

If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

$4y + 2x = 15.50$

$3y + 5x = 18.10$

Courtney thinks that one latte costs $2.75 and one donut costs $2.25.
Is Courtney correct? Justify your answer.

$(4 \cdot 2.75) + (2 \cdot 2.25) = 15.50$

$11 + 4.5 = 15.50$ ✓

$(3 \cdot 2.75) + (2.25 \cdot 5) = 18.10$

$8.25 + 11.25 = 18.10$ ✗

She is not correct because if you do $3y+5x$ = you don't get 18.10 you get 19.5.

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

$3 \cdot 4y + 2x = 15.50$

$-4 \cdot 3y + 5x = 18.10$

$-12y - 6x = -46.5$

$-14y - 20x = -72.4$

$-20x + 72.4 + 6x = 46.5$

$\frac{-14x}{-14} = \frac{-25.9}{-14}$

$x = 1.85$

$4y + (2 \cdot 1.85) = 15.50$

$4y + 3.7 = 15.50$

$\frac{4y}{4} = \frac{11.8}{4}$

$y = 2.95$

$y = \$2.95 \quad x = \$1.85$

Score 5: The student reversed the variables.

Question 35

35 Courtney went to a coffee shop to purchase lattes and donuts for her friends. One day she spent a total of $15.50 on four lattes and two donuts. The next day she spent a total of $18.10 on three lattes and five donuts. All prices included tax.

If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

$4x + 2y = 15.50$
$3x + 5y = 18.10$

Courtney thinks that one latte costs $2.75 and one donut costs $2.25.
Is Courtney correct? Justify your answer.

Courtney is incorrect. Plugging in her costs to the the inequality you get $19.50 and $19.50 ≠ $18.10

$2.75(4) + 2(2.25) = 15.50$
$11 + 4.5 = 15.50$

$3(2.75) + 5(2.25) = 18.10$
$8.25 + 11.25 = 19.5$
$18.10 \neq 19.50$

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

$3(4x + 2y = 15.50)$
$-4(3x + 5y = 16.10)$

$12x + 6y = 46$
$+ -12x - 20y = -72.40$
$\frac{-14y}{-14} = \frac{-26.4}{-14}$

$y = \$1.89$

$4x + 2(1.89) = 15.50$
$4x + 3.78 = 15.50$
$-3.78 \quad -3.78$
$\frac{4x}{4} = \frac{11.72}{4}$

$x = 2.93$

latte donut
(2.93, 1.89)

Score 5: The student made one computational error.

Question 35

35 Courtney went to a coffee shop to purchase lattes and donuts for her friends. One day she spent a total of $15.50 on four lattes and two donuts. The next day she spent a total of $18.10 on three lattes and five donuts. All prices included tax.

If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

$15.50 = 4x + 2y$

$18.10 = 3x + 5y$

Courtney thinks that one latte costs $2.75 and one donut costs $2.25.
Is Courtney correct? Justify your answer.

$15.50 = 4(2.75) + 2(2.25) = 11 + 4.5 = 15.50$

$18.10 = 3(2.75) + 5(2.25) = 8.25 + 11.25 = 19.50$

no, she is not correct

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

$15.50 = 4x + 2y$

$x = 2.75$

$y = 2.25$

$18.10 = 3x + 5y$

$x = 2.09$

$y = 1.55$

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

Question 35

35 Courtney went to a coffee shop to purchase lattes and donuts for her friends. One day she spent a total of $15.50 on four lattes and two donuts. The next day she spent a total of $18.10 on three lattes and five donuts. All prices included tax.

If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

$4x + 2y = 15.50$

$3x + 5y = 18.10$

Courtney thinks that one latte costs $2.75 and one donut costs $2.25.
Is Courtney correct? Justify your answer.

Courtney is correct because if you plugged in the numbers for x and y in the equation $4x+2y=15.50$ with the prices courtney determined, the equation is true. $4(2.75) + 2(2.25) = 15.50$

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

$5(4x + 2y = 15.50)$

$2(3x + 5y = 18.10)$

Score 3: The student wrote a correct system of equations, but only substituted into the first equation to indicate a positive response.

Question 35

35 Courtney went to a coffee shop to purchase lattes and donuts for her friends. One day she spent a total of $15.50 on four lattes and two donuts. The next day she spent a total of $18.10 on three lattes and five donuts. All prices included tax.

If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

$4x + 2y = 15.50$
$3x + 5y = 18.10$

Courtney thinks that one latte costs $2.75 and one donut costs $2.25.
Is Courtney correct? Justify your answer.

NO, $4(2.75) + 2(2.25) \neq 15.50$

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

$x = 2.35$
$y = 2.95$

$5(4x + 2y = 15.50)$
$-2(3x + 5y = 18.10)$
$20 \quad -10y$
$+10y$
$14y = 41.3$
$\frac{14y}{14}$
$y = 2.95$

$4x + 5.90 = 15.50$
$-5.90 \quad -5.90$
$\frac{4x}{4} = \frac{9.40}{4}$
$x = 2.35$

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

Question 35

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If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

X = cost of one latte

Y = cost of one donut.

$18.10 ÷ 3 = X $15.50 ÷ 2 = Y

Courtney thinks that one latte costs $2.75 and one donut costs $2.25.
Is Courtney correct? Justify your answer.

Second day

2.75 · 3 = 8.25

2.25 · 5 = 11.25 (195) NO

First day

2.75 · 4 = 11

2.25 · 2 = 4.5

= $15.50 Yes

only one is correct

No. The numbers do not add up correctly.

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

($15.50 ÷ 6) = 2.58.

(18.10 ÷ 8) = 2.26

donuts = 2.26 each

latte = 2.58 each

Score 2: The student justified the middle section correctly.

Question 35

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If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

Linear Equation Slope Intercept
$y = mx + b$

Courtney thinks that one latte costs $2.75 and one donut costs $2.25.
Is Courtney correct? Justify your answer.

$2.75 \cdot 4 = 11.00$
$2.25 \cdot 2 = 4.5$
$11.00 + 4.50 = 15.50$

Courtney is correct on the amount of money one latte and one donut cost because in her first order it was 15.50 for 4 latte's and 2 donuts and I did the math everything looks good.

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

$2.25 = 2.75x + b$
$-b \quad -b$
$2.25b = 2.75x$
$\frac{2.25}{2.75} \quad \frac{2.75}{2.75}$
$1x =$

?

Score 1: The student only justified by substituting into the first equation to indicate a positive response.

Question 35

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If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

$x + y = \$15.50$
$x + y = \$18.10$

Courtney thinks that one latte costs $2.75 and one donut costs $2.25.
Is Courtney correct? Justify your answer.

one latte = $2.75
one donut = $2.25

$2.25
+2.25
4.50
+8.80
$13.30

answer: courtney is correct because the total is equal to the total she has spent on both days.

$8.80

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

$15.50 + $2.75 = ?
$18.10 + $2.25 = ?

$15.50 + $18.10 = $96.60
$2.75 + $2.25 = 5.00

96.60
- 5.00
91.60
2.25
10.40

2.85
2.85
2.10
2.10
2.10
2.10
10.50

one latte = $2.75
one donut = $2.25

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

Question 35

35 Courtney went to a coffee shop to purchase lattes and donuts for her friends. One day she spent a total of $15.50 on four lattes and two donuts. The next day she spent a total of $18.10 on three lattes and five donuts. All prices included tax.

If x represents the cost of one latte and y represents the cost of one donut, write a system of equations that can be used to model this situation.

$x^2, y = .15.50x + 18.10$

Courtney thinks that one latte costs $2.75 and one donut costs $2.25.
Is Courtney correct? Justify your answer.

yes because she spent in one day 15.50
on four lattes and two donuts

Use your equations to determine algebraically the exact cost of one latte and the exact cost of one donut.

$y = 15.50x + 18.10$

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

Regents Examination in Algebra I – June 2024

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

(Use for the June 2024 exam only.)

Raw Score	Scale Score	Performance Level
82	**100**	5
81	**99**	5
80	**98**	5
79	**96**	5
78	**95**	5
77	**94**	5
76	**92**	5
75	**91**	5
74	**90**	5
73	**89**	5
72	**88**	5
71	**87**	5
70	**86**	5
69	**85**	5
68	**84**	4
67	**84**	4
66	**83**	4
65	**83**	4
64	**82**	4
63	**81**	4
62	**81**	4
61	**80**	4
60	**79**	4
59	**79**	4
58	**78**	4
57	**78**	4
56	**77**	4
55	**77**	4

Raw Score	Scale Score	Performance Level
54	**76**	4
53	**76**	4
52	**75**	4
51	**75**	4
50	**75**	4
49	**74**	3
48	**74**	3
47	**73**	3
46	**73**	3
45	**72**	3
44	**72**	3
43	**72**	3
42	**71**	3
41	**71**	3
40	**70**	3
39	**70**	3
38	**69**	3
37	**69**	3
36	**69**	3
35	**68**	3
34	**68**	3
33	**67**	3
32	**67**	3
31	**66**	3
30	**66**	3
29	**65**	3
28	**64**	2
27	**64**	2

Raw Score	Scale Score	Performance Level
26	**63**	2
25	**62**	2
24	**61**	2
23	**61**	2
22	**60**	2
21	**59**	2
20	**58**	2
19	**56**	2
18	**55**	2
17	**54**	1
16	**52**	1
15	**50**	1
14	**49**	1
13	**47**	1
12	**44**	1
11	**42**	1
10	**40**	1
9	**37**	1
8	**34**	1
7	**31**	1
6	**27**	1
5	**23**	1
4	**19**	1
3	**15**	1
2	**10**	1
1	**5**	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.