

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

ALGEBRA I (Common Core)

Monday, January 26, 2015 — 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 graphs and drawings, which should be done in pencil. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. 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. 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 owner of a small computer repair business has one employee, who is paid an hourly rate of \$22. The owner estimates his weekly profit using the function $P(x) = 8600 - 22x$. In this function, x represents the number of

- (1) computers repaired per week
- (2) hours worked per week
- (3) customers served per week
- (4) days worked per week

2 Peyton is a sprinter who can run the 40-yard dash in 4.5 seconds. He converts his speed into miles per hour, as shown below.

$$\frac{40 \text{ yd}}{4.5 \text{ sec}} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}}$$

Which ratio is *incorrectly* written to convert his speed?

- (1) $\frac{3 \text{ ft}}{1 \text{ yd}}$
- (2) $\frac{5280 \text{ ft}}{1 \text{ mi}}$
- (3) $\frac{60 \text{ sec}}{1 \text{ min}}$
- (4) $\frac{60 \text{ min}}{1 \text{ hr}}$

3 Which equation has the same solutions as $2x^2 + x - 3 = 0$?

- (1) $(2x - 1)(x + 3) = 0$
- (2) $(2x + 1)(x - 3) = 0$
- (3) $(2x - 3)(x + 1) = 0$
- (4) $(2x + 3)(x - 1) = 0$

**Use this space for
computations.**

4 Krystal was given \$3000 when she turned 2 years old. Her parents invested it at a 2% interest rate compounded annually. No deposits or withdrawals were made. Which expression can be used to determine how much money Krystal had in the account when she turned 18?

- (1) $3000(1 + 0.02)^{16}$ (3) $3000(1 + 0.02)^{18}$
(2) $3000(1 - 0.02)^{16}$ (4) $3000(1 - 0.02)^{18}$

5 Which table of values represents a linear relationship?

x	f(x)
-1	-3
0	-2
1	1
2	6
3	13

(1)

x	f(x)
-1	-3
0	-1
1	1
2	3
3	5

(3)

x	f(x)
-1	$\frac{1}{2}$
0	1
1	2
2	4
3	8

(2)

x	f(x)
-1	-1
0	0
1	1
2	8
3	27

(4)

6 Which domain would be the most appropriate set to use for a function that predicts the number of household online-devices in terms of the number of people in the household?

- (1) integers (3) irrational numbers
(2) whole numbers (4) rational numbers

Use this space for computations.

7 The inequality $7 - \frac{2}{3}x < x - 8$ is equivalent to

(1) $x > 9$

(3) $x < 9$

(2) $x > -\frac{3}{5}$

(4) $x < -\frac{3}{5}$

8 The value in dollars, $v(x)$, of a certain car after x years is represented by the equation $v(x) = 25,000(0.86)^x$. To the nearest dollar, how much more is the car worth after 2 years than after 3 years?

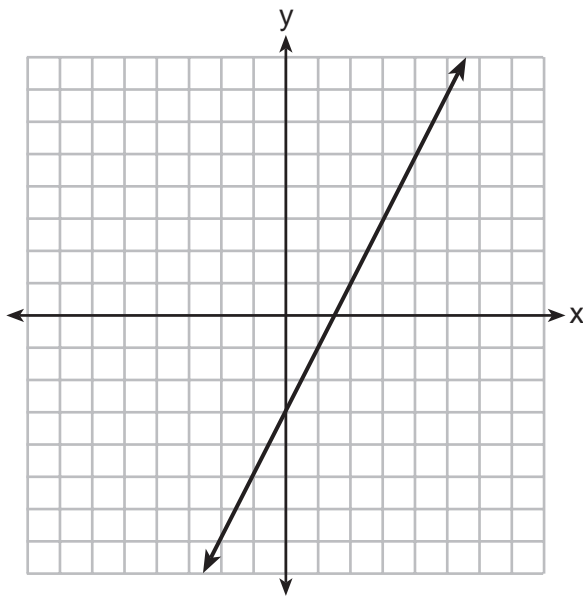
(1) 2589

(3) 15,901

(2) 6510

(4) 18,490

9 Which function has the same y -intercept as the graph below?



(1) $y = \frac{12 - 6x}{4}$

(3) $6y + x = 18$

(2) $27 + 3y = 6x$

(4) $y + 3 = 6x$

**Use this space for
computations.**

10 Fred is given a rectangular piece of paper. If the length of Fred's piece of paper is represented by $2x - 6$ and the width is represented by $3x - 5$, then the paper has a total area represented by

- (1) $5x - 11$ (3) $10x - 22$
(2) $6x^2 - 28x + 30$ (4) $6x^2 - 6x - 11$

11 The graph of a linear equation contains the points $(3,11)$ and $(-2,1)$. Which point also lies on the graph?

- (1) $(2,1)$ (3) $(2,6)$
(2) $(2,4)$ (4) $(2,9)$

12 How does the graph of $f(x) = 3(x - 2)^2 + 1$ compare to the graph of $g(x) = x^2$?

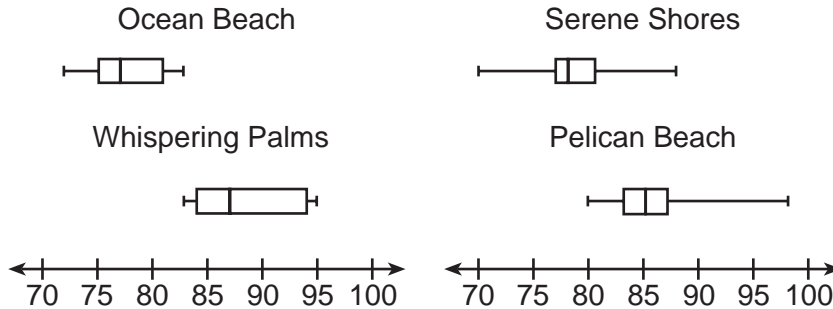
- (1) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
(2) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.
(3) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
(4) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.

13 Connor wants to attend the town carnival. The price of admission to the carnival is \$4.50, and each ride costs an additional 79 cents. If he can spend at most \$16.00 at the carnival, which inequality can be used to solve for r , the number of rides Connor can go on, and what is the maximum number of rides he can go on?

- (1) $0.79 + 4.50r \leq 16.00$; 3 rides
(2) $0.79 + 4.50r \leq 16.00$; 4 rides
(3) $4.50 + 0.79r \leq 16.00$; 14 rides
(4) $4.50 + 0.79r \leq 16.00$; 15 rides

Use this space for computations.

- 14 Corinne is planning a beach vacation in July and is analyzing the daily high temperatures for her potential destination. She would like to choose a destination with a high median temperature and a small interquartile range. She constructed box plots shown in the diagram below.



Which destination has a median temperature above 80 degrees and the smallest interquartile range?

- (1) Ocean Beach (3) Serene Shores
(2) Whispering Palms (4) Pelican Beach
- 15 Some banks charge a fee on savings accounts that are left inactive for an extended period of time. The equation $y = 5000(0.98)^x$ represents the value, y , of one account that was left inactive for a period of x years.

What is the y -intercept of this equation and what does it represent?

- (1) 0.98, the percent of money in the account initially
(2) 0.98, the percent of money in the account after x years
(3) 5000, the amount of money in the account initially
(4) 5000, the amount of money in the account after x years

**Use this space for
computations.**

16 The equation for the volume of a cylinder is $V = \pi r^2 h$. The positive value of r , in terms of h and V , is

(1) $r = \sqrt{\frac{V}{\pi h}}$

(3) $r = 2V\pi h$

(2) $r = \sqrt{V\pi h}$

(4) $r = \frac{V}{2\pi}$

17 Which equation has the same solutions as $x^2 + 6x - 7 = 0$?

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

(3) $(x - 3)^2 = 16$

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

(4) $(x + 3)^2 = 16$

18 Two functions, $y = |x - 3|$ and $3x + 3y = 27$, are graphed on the same set of axes. Which statement is true about the solution to the system of equations?

(1) $(3,0)$ is the solution to the system because it satisfies the equation $y = |x - 3|$.

(2) $(9,0)$ is the solution to the system because it satisfies the equation $3x + 3y = 27$.

(3) $(6,3)$ is the solution to the system because it satisfies both equations.

(4) $(3,0)$, $(9,0)$, and $(6,3)$ are the solutions to the system of equations because they all satisfy at least one of the equations.

**Use this space for
computations.**

19 Miriam and Jessica are growing bacteria in a laboratory. Miriam uses the growth function $f(t) = n^{2t}$ while Jessica uses the function $g(t) = n^{4t}$, where n represents the initial number of bacteria and t is the time, in hours. If Miriam starts with 16 bacteria, how many bacteria should Jessica start with to achieve the same growth over time?

- (1) 32
- (2) 16
- (3) 8
- (4) 4

20 If a sequence is defined recursively by $f(0) = 2$ and $f(n + 1) = -2f(n) + 3$ for $n \geq 0$, then $f(2)$ is equal to

- (1) 1
- (2) -11
- (3) 5
- (4) 17

21 An astronaut drops a rock off the edge of a cliff on the Moon. The distance, $d(t)$, in meters, the rock travels after t seconds can be modeled by the function $d(t) = 0.8t^2$. What is the average speed, in meters per second, of the rock between 5 and 10 seconds after it was dropped?

- (1) 12
- (2) 20
- (3) 60
- (4) 80

22 When factored completely, the expression $p^4 - 81$ is equivalent to

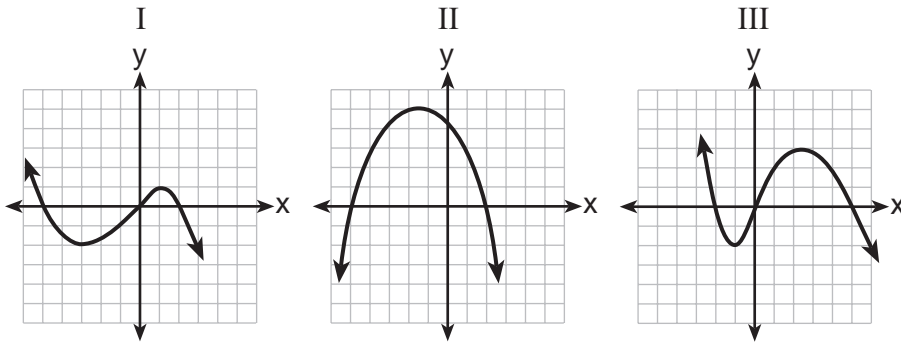
- (1) $(p^2 + 9)(p^2 - 9)$
- (2) $(p^2 - 9)(p^2 - 9)$
- (3) $(p^2 + 9)(p + 3)(p - 3)$
- (4) $(p + 3)(p - 3)(p + 3)(p - 3)$

**Use this space for
computations.**

23 In 2013, the United States Postal Service charged \$0.46 to mail a letter weighing up to 1 oz. and \$0.20 per ounce for each additional ounce. Which function would determine the cost, in dollars, $c(z)$, of mailing a letter weighing z ounces where z is an integer greater than 1?

- (1) $c(z) = 0.46z + 0.20$ (3) $c(z) = 0.46(z - 1) + 0.20$
(2) $c(z) = 0.20z + 0.46$ (4) $c(z) = 0.20(z - 1) + 0.46$

24 A polynomial function contains the factors x , $x - 2$, and $x + 5$. Which graph(s) below could represent the graph of this function?



- (1) I, only (3) I and III
(2) II, only (4) I, II, and III
-

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. 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 Ms. Fox asked her class “Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?” Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

26 The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9 th	90	33	12
10 th	125	12	15
11 th	87	22	18
12 th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

27 A function is shown in the table below.

x	f(x)
-4	2
-1	-4
0	-2
3	16

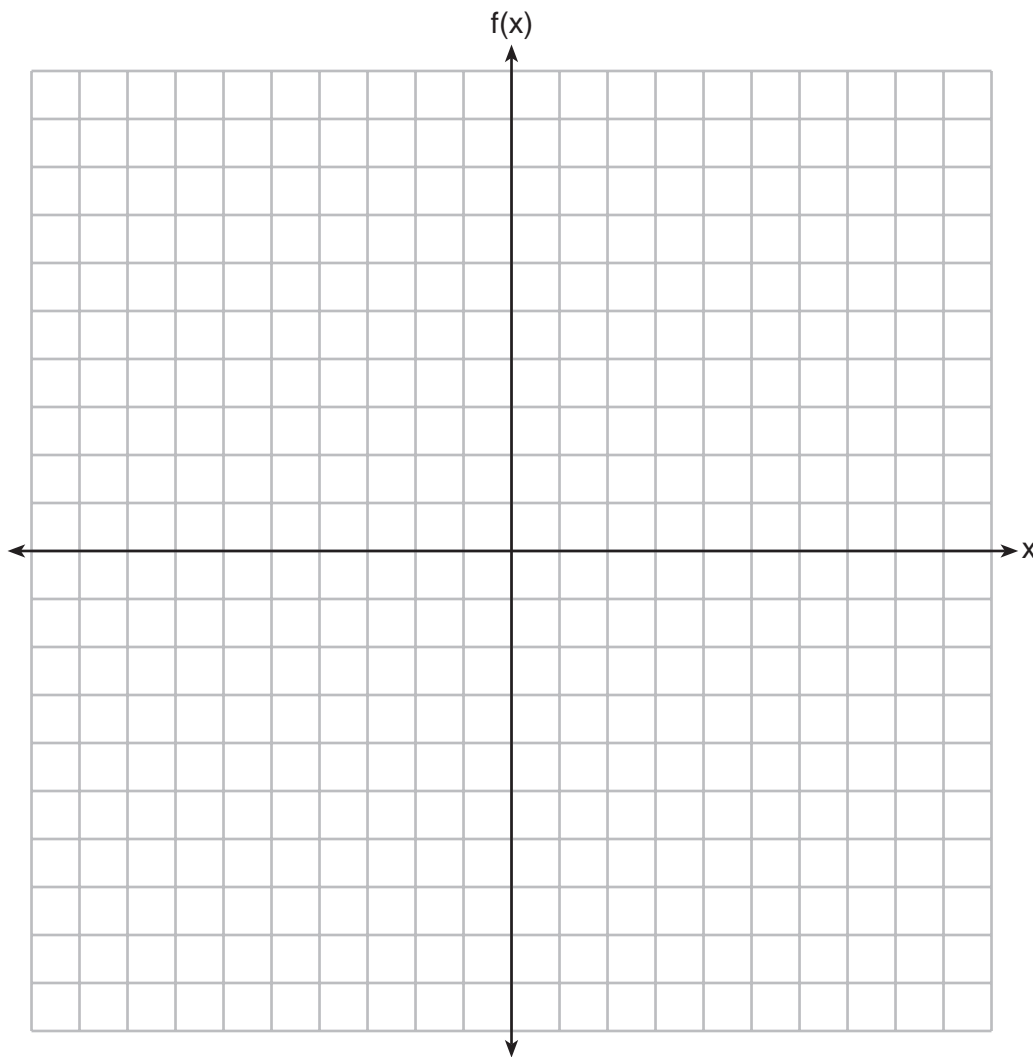
If included in the table, which ordered pair, $(-4,1)$ or $(1,-4)$, would result in a relation that is no longer a function? Explain your answer.

28 Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.

29 Solve the equation $4x^2 - 12x = 7$ algebraically for x .

30 Graph the following function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -3 \leq x < 1 \\ 4, & 1 \leq x \leq 8 \end{cases}$$



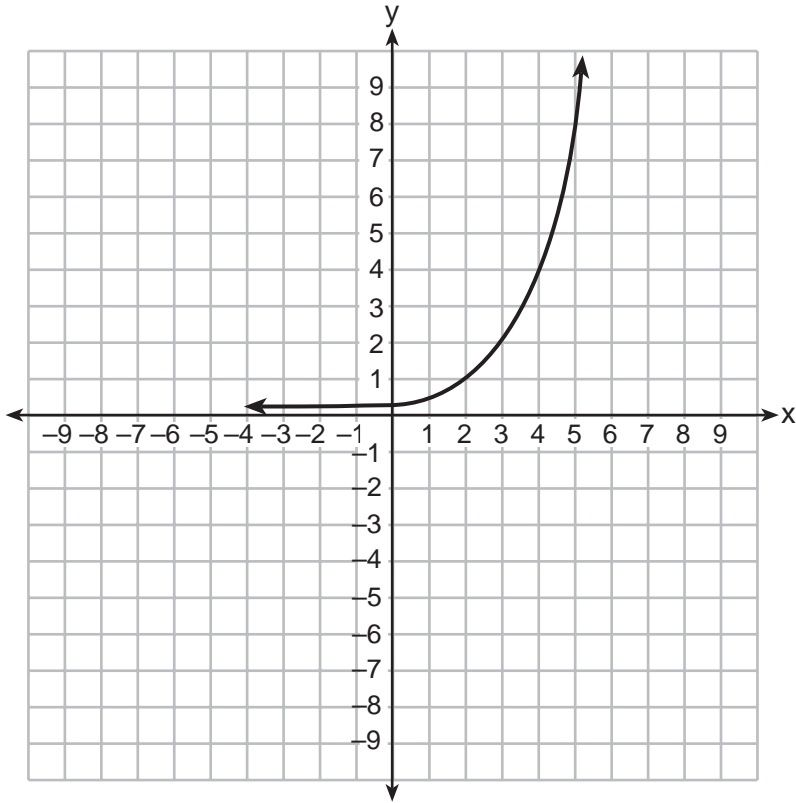
31 A gardener is planting two types of trees:

Type *A* is three feet tall and grows at a rate of 15 inches per year.

Type *B* is four feet tall and grows at a rate of 10 inches per year.

Algebraically determine exactly how many years it will take for these trees to be the same height.

32 Write an exponential equation for the graph shown below.



Explain how you determined the equation.

Part III

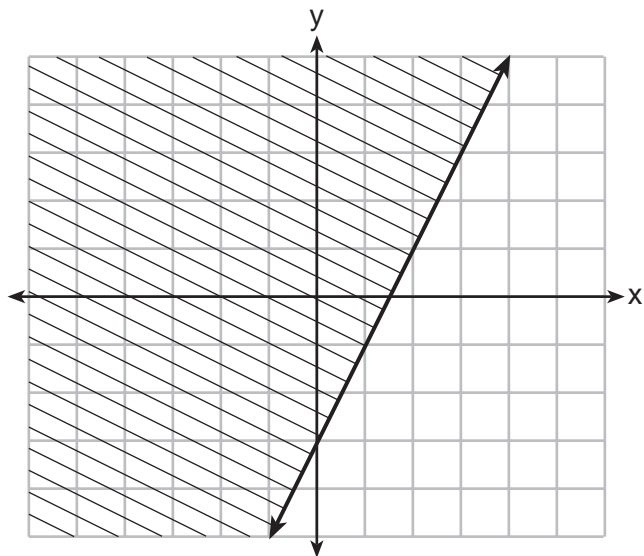
Answer all 4 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

34 The graph of an inequality is shown below.



a) Write the inequality represented by the graph.

b) On the same set of axes, graph the inequality $x + 2y < 4$.

c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point (2,1) is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

35 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth*.

b) Explain what the correlation coefficient suggests in the context of this problem.

36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

b) Rewrite $f(x)$ in vertex form by completing the square.

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. 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 written in pencil. [6]

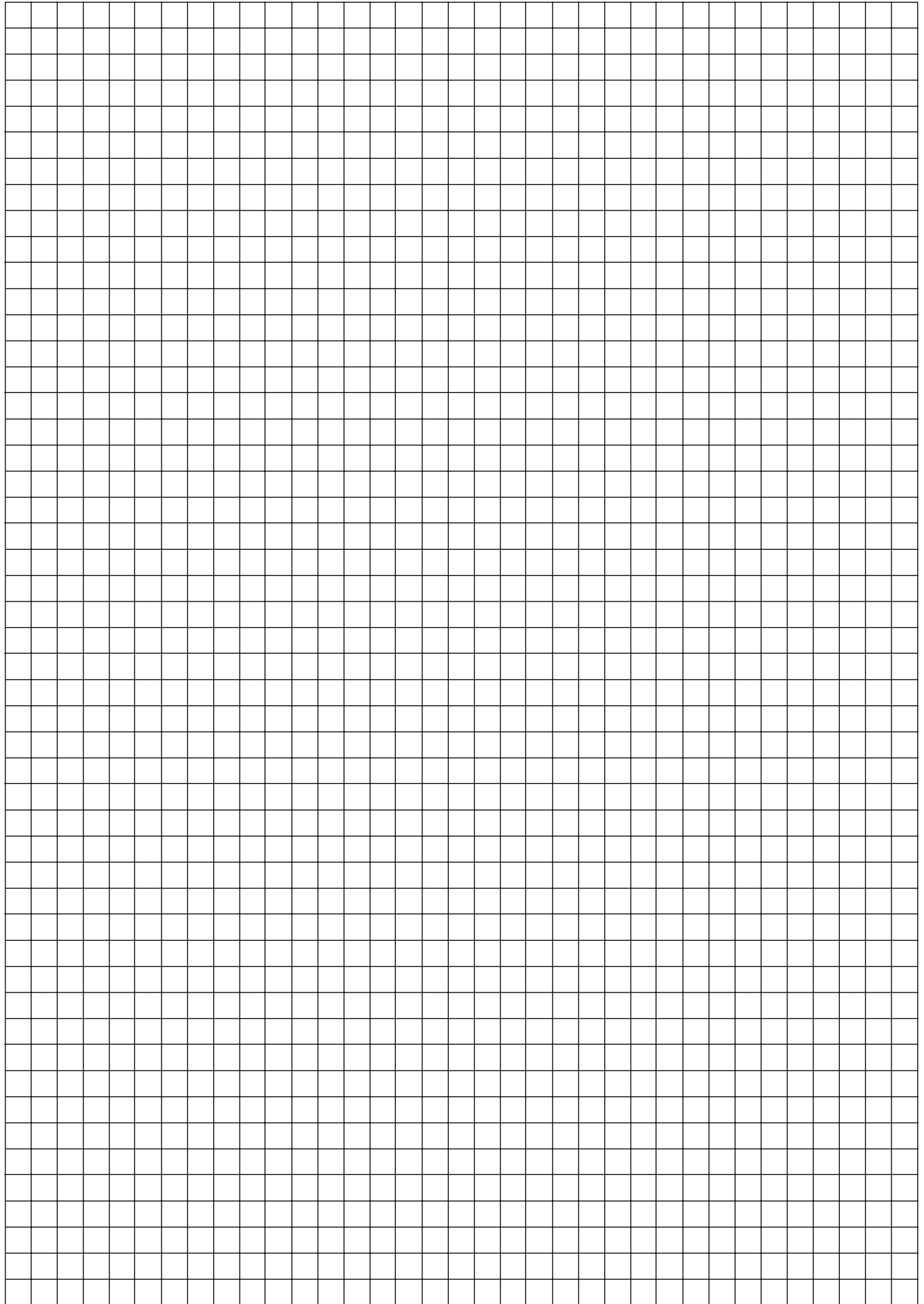
37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

Explain how your equation models the situation.

Determine the area, in square meters, of the new rectangular garden.

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



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



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High School Math Reference Sheet

1 inch = 2.54 centimeters	1 kilometer = 0.62 mile	1 cup = 8 fluid ounces
1 meter = 39.37 inches	1 pound = 16 ounces	1 pint = 2 cups
1 mile = 5280 feet	1 pound = 0.454 kilogram	1 quart = 2 pints
1 mile = 1760 yards	1 kilogram = 2.2 pounds	1 gallon = 4 quarts
1 mile = 1.609 kilometers	1 ton = 2000 pounds	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	$S_n = \frac{a_1 - a_1 r^n}{1 - r}$ 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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FOR TEACHERS ONLY

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

ALGEBRA I (Common Core)

Monday, January 26, 2015 — 1:15 to 4:15 p.m., only

SCORING KEY AND RATING GUIDE

Mechanics of Rating

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

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 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.

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: <http://www.p12.nysed.gov/assessment/> by Monday, January 26, 2015. 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.

If the student's responses for the multiple-choice questions are being hand scored prior to being scanned, the scorer must be careful not to make any marks on the answer sheet except to record the scores in the designated score boxes. Marks elsewhere on the answer sheet will interfere with the accuracy of the scanning.

Part I

Allow a total of 48 credits, 2 credits for each of the following.

(1) 2	(9) 4	(17) 4
(2) 2	(10) 2	(18) 3
(3) 4	(11) 4	(19) 4
(4) 1	(12) 2	(20) 3
(5) 3	(13) 3	(21) 1
(6) 2	(14) 4	(22) 3
(7) 1	(15) 3	(23) 4
(8) 1	(16) 1	(24) 1

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: <http://www.p12.nysed.gov/assessment/> 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 (Common Core). This guidance is recommended 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 <http://www.nysedregents.org/algebraone/>.

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 (Common Core) 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 (Common Core)*, 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 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] Correct is stated 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.
- [0] Correct is stated, but no work or justification is given.
- or*
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- (26) [2] 25, 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 the answer is expressed as a decimal or a fraction.
- or*
- [1] 25, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

- (27) [2] $(-4,1)$, and a correct explanation is given.
- [1] Appropriate work is shown, but one conceptual error is made.
- or***
- [1] $(-4,1)$, but an incomplete or incorrect explanation is given.
- [0] $(-4,1)$, but no explanation is given.
- or***
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- (28) [2] $-2x^2 + 6x + 4$ or equivalent trinomial, 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] $-2x^2 + 6x + 4$, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- (29) [2] $\frac{7}{2}$ and $-\frac{1}{2}$, and correct algebraic 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] $\frac{7}{2}$ and $-\frac{1}{2}$, but a method other than algebraic is used.
- or***
- [1] $\frac{7}{2}$ and $-\frac{1}{2}$, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

- (30) [2] A correct graph is drawn.
- [1] Appropriate work is shown, but one graphing error is made, such as not drawing an open circle at (1,1) or extending beyond the given domain.
- or**
- [1] Appropriate work is shown, but one conceptual error is made.
- or**
- [1] Only one piece of the function is graphed correctly.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- (31) [2] $\frac{12}{5}$ or 2.4, 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] $\frac{12}{5}$ or 2.4, but a method other than algebraic is used.
- or**
- [1] $\frac{12}{5}$ or 2.4, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- (32) [2] $y = 0.25(2)^x$ or an equivalent equation is written, and a correct explanation is given.
- [1] Appropriate work is shown, but one conceptual error is made.
- or**
- [1] A correct equation is written, but no further correct work is shown.
- or**
- [1] The expression $0.25(2)^x$ is written and a correct explanation is given.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
-

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 system of equations is written, popcorn = 5.75, drink = 2.25 and correct work is shown.

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

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

or

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

or

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

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

or

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

or

[1] Popcorn = 5.75 and drink = 2.25, but no further correct work is shown.

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

- (34) [4] $y \geq 2x - 3$, a correct graph, and disagree, and a correct explanation is written.
- [3] Appropriate work is shown, but one computational or graphing error is made.
- or**
- [3] $y \geq 2x - 3$ or a correct graph, and a correct explanation is written.
- [2] Appropriate work is shown, but one conceptual error is made.
- or**
- [2] Disagree and a correct explanation are written, but no further correct work is shown.
- or**
- [2] $y \geq 2x - 3$, and a correct graph is drawn, but no further correct work is shown.
- [1] Appropriate work is shown, but one conceptual and one graphing error are made.
- or**
- [1] $y \geq 2x - 3$ or a correct graph is drawn, but no further correct work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

- (35) [4] 0.94 and a correct explanation is written.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or***
- [3] 0.94 and an incomplete explanation is written, such as not referring to the context of the problem.
- [2] Appropriate work is shown, but one conceptual error is made.
- or***
- [2] One rounding error is made, and a correct explanation without reference to the context of the problem is given.
- or***
- [2] 0.94, but no further correct work is shown.
- [1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
- or***
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

(36) [4] Maximum is stated, a correct explanation is written, and $f(x) = -(x - 4)^2 + 25$, and correct work is shown using completing the square.

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

or

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

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

or

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

or

[2] Appropriate work is shown to find $f(x) = -(x - 4)^2 + 25$, but no further correct work is shown.

or

[2] Maximum and a correct explanation is given, but no further correct work is shown.

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

or

[1] $f(x) = -(x - 4)^2 + 25$, but no work is shown.

[0] Maximum is stated, but no further correct work is shown.

or

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

Part IV

For each 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] $(x - 3)(2x) = 1.25x^2$ or an equivalent quadratic in one variable is written, a correct explanation is written, 80, and correct work is shown.

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

or

[5] Appropriate work is shown to find 8, but the original area, 64, is found.

or

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

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

or

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

or

[4] Appropriate work is shown to find 8, but the area is missing or is incorrect.

[3] Appropriate work is shown, but three or more computational errors are made.

or

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

or

[3] A correct equation in one variable and a correct explanation are written, but no further correct work is shown.

[2] Appropriate work is shown, but two conceptual errors are made.

or

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

or

[2] A correct equation in one variable is written, but no further correct work is shown.

[1] Appropriate work is shown, but two conceptual and one computational errors are made.

or

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

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

**Map to the Common Core Learning Standards
Algebra I (Common Core)
January 2015**

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

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

Regents Examination in Algebra I (Common Core)

January 2015

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

The *Chart for Determining the Final Examination Score for the January 2015 Regents Examination in Algebra I (Common Core)* will be posted on the Department's web site at: <http://www.p12.nysed.gov/assessment/> by Monday, January 26, 2015.

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 <http://www.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm>.
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 (Common Core)

Monday, January 26, 2015 — 1:15 to 4:15 p.m.

MODEL RESPONSE SET

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Question 25

25 Ms. Fox asked her class “Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?” Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

Patrick is correct.
4.2 is rational. $\sqrt{2}$ is irrational.
A rational number plus
an irrational number
always gives you
an irrational.

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

Question 25

25 Ms. Fox asked her class “Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?” Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

Patrick is right because

$$\begin{array}{ccccccc} 4.2 & + & \sqrt{2} & = & I \\ R & & I & & \end{array}$$

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

Question 25

25 Ms. Fox asked her class “Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?” Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

The sum of 4.2 and $\sqrt{2}$ has
an answer of 5.61421356237.
Therefore it is irrational, leaving
Patrick with the correct answer.

Score 1: The student did not justify that the decimal answer written is irrational.

Question 25

25 Ms. Fox asked her class “Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?” Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

Patrick is incorrect because the sum of 4.2 and $\sqrt{2}$ is 5.614213562. This number is rational because the numbers stop.

$$4.2 + \sqrt{2} = 5.614213562$$

$$\sqrt{2} = 1.414213562$$

$$\begin{array}{r} 1.414213562 \\ + 4.200000000 \\ \hline 5.614213562 \end{array}$$

Score 1: The student made a conceptual error in interpreting the sum as a terminating decimal.

Question 25

25 Ms. Fox asked her class “Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?” Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

yes patrick is correct.

Score 0: The student gave no work or justification.

Question 26

26 The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9 th	90	33	12
10 th	125	12	15
11 th	87	22	18
12 th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

$$33 + 12 = 45$$
$$\frac{45}{180} = .25 \Rightarrow \boxed{25\%}$$

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

Question 26

26 The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9 th	90	33	12
10 th	125	12	15
11 th	87	22	18
12 th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

$$\frac{45}{180} = \frac{9}{36} = \frac{3}{12} = \frac{1}{4}$$

Score 1: The student made an error by expressing the answer as a fraction.

Question 26

26 The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9 th	90	33	12
10 th	125	12	15
11 th	87	22	18
12 th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

$$90 + 33 + 12 = 135$$

180 total # of students in 9th grade

$$\frac{135}{180} = .75 = \boxed{75\%}$$

Score 1: The student made a conceptual error by including 90 with the sum for more than one club.

Question 26

26 The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9 th	90	33	12
10 th	125	12	15
11 th	87	22	18
12 th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

$$\begin{array}{r} 90 \\ + 33 \\ \hline 12 \\ \hline 135 \end{array}$$

$$\frac{135}{180} = 81\%$$

Score 0: The student made one conceptual and one computational error.

Question 27

27 A function is shown in the table below.

x	f(x)
-4	2
-1	-4
0	-2
3	16

If included in the table, which ordered pair, $(-4,1)$ or $(1,-4)$, would result in a relation that is no longer a function? Explain your answer.

IF $(-4,1)$ is added to the table, then the relation would no longer be a function, because you can't have one input, with 2 different outputs.

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

Question 27

27 A function is shown in the table below.

x	$f(x)$
-4	2
-1	-4
0	-2
3	16

If included in the table, which ordered pair, $(-4,1)$ or $(1,-4)$, would result in a relation that is no longer a function? Explain your answer.

$(1,-4)$ would no longer give a function because you can't have a y -value with 2 different x -values.

Score 1: The student stated an appropriate answer based on a conceptual error in their definition for a function.

Question 27

27 A function is shown in the table below.

x	$f(x)$
-4	2
-1	-4
0	-2
3	16

If included in the table, which ordered pair, $(-4,1)$ or $(1,-4)$, would result in a relation that is no longer a function? Explain your answer.

ordered pair $(-4,1)$
would make it not a
function anymore.

Score 0: The student stated $(-4,1)$, but gave no explanation.

Question 28

28 Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.

$$\begin{array}{r} 3x^2 + 8x - 7 \\ + \\ -5x^2 - 2x + 11 \\ \hline -2x^2 + 6x + 4 \end{array}$$

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

Question 28

28 Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.

$$\begin{array}{r} 5x^2 + 2x - 11 \\ - 3x^2 - 8x + 7 \\ \hline \end{array}$$

$$\begin{array}{r} 5x^2 + 2x - 11 \\ - 3x^2 - 8x + 7 \\ \hline \end{array}$$

$$\begin{array}{r} 3x^2 + 8x - 7 \\ - 5x^2 + 2x - 11 \\ \hline -2x^2 - 6x + 4 \end{array}$$

Score 1: The student made one computational error by stating $-6x$.

Question 28

28 Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.

$$\begin{aligned} & (5x^2 + 2x - 11) - (3x^2 + 8x - 7) \\ & \left[\begin{array}{r} 5x^2 + 2x - 11 \\ -3x^2 - 8x + 7 \\ \hline 2x^2 - 6x - 4 \end{array} \right] \end{aligned}$$

Score 1: The student made a conceptual error by subtracting the trinomials in the wrong order.

Question 28

28 Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.

$$\begin{array}{r} \underline{5x^2} + \underline{2x} - \underline{11} - \underline{3x^2} + \underline{8x} - \underline{7} \\ \hline 2x^2 + 10x - 18 \end{array}$$

Score 0: The student made 2 errors by subtracting in the wrong order and only applying subtraction to the first term of the trinomial.

Question 29

29 Solve the equation $4x^2 - 12x = 7$ algebraically for x .

$$\begin{array}{l} \cancel{4x^2 - 12x = 7} \\ \quad \quad \quad \cancel{-7 - 7} \\ \hline 4x^2 - 12x - 7 = 0 \\ (2x+1)(2x-7) = 0 \\ \begin{array}{l} 2x+1=0 \\ \hline 2x = -1 \\ \frac{2x}{2} = \frac{-1}{2} \\ x = -\frac{1}{2} \end{array} \quad \begin{array}{l} 2x-7=0 \\ \hline 2x = 7 \\ \frac{2x}{2} = \frac{7}{2} \\ x = \frac{7}{2} \end{array} \\ \boxed{x = -\frac{1}{2}, x = 3\frac{1}{2}} \end{array}$$
$$\begin{array}{l} 4x^2 - 12x - 28 = 0 \\ (4(x+2))(4x-14) \\ \cancel{\times(2x+1)} \cancel{\times(2x-7)} \end{array}$$

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

Question 29

29 Solve the equation $4x^2 - 12x = 7$ algebraically for x .

$$4x^2 - 12x - 7 = 0$$

$$(a = 4, b = -12, c = -7)$$

$$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(4)(-7)}}{2(4)}$$

$$x = \frac{12 \pm \sqrt{144 - (-112)}}{8}$$

$$x = \frac{12 \pm \sqrt{256}}{8}$$

$$x = \frac{12 + 16}{8} = \frac{28}{8} = \frac{14}{4} = \frac{7}{2} = 3\frac{1}{2}$$

or

$$x = \frac{12 - 16}{8} = \frac{-4}{8} = \frac{-1}{2}$$

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

Question 29

29 Solve the equation $4x^2 - 12x = 7$ algebraically for x .

$$4x^2 - 12x - 7 = 0$$
$$(2x+4)(2x-3) = 0$$

$$\begin{array}{r} 2x+4=0 \\ -4 \quad -4 \\ \hline 2x = -4 \\ \frac{2}{2} \quad \frac{2}{2} \\ x = -2 \end{array} \quad \begin{array}{r} 2x-3=0 \\ +3 \quad +3 \\ \hline 2x = 3 \\ \frac{2}{2} \quad \frac{3}{2} \\ x = \frac{3}{2} \end{array}$$

$$x = -2 \text{ and } x = \frac{3}{2}$$

Score 1: The student made one factoring error.

Question 29

29 Solve the equation $4x^2 - 12x = 7$ algebraically for x .

$$4x^2 - 12x - 7 \quad -28$$
$$4x^2 + 2x - 14x - 7$$
$$2x(2x+1) - 7(2x+1)$$
$$(2x-7)(2x+1)$$

Score 1: The student factored correctly, but showed no further correct work.

Question 29

29 Solve the equation $4x^2 - 12x = 7$ algebraically for x .

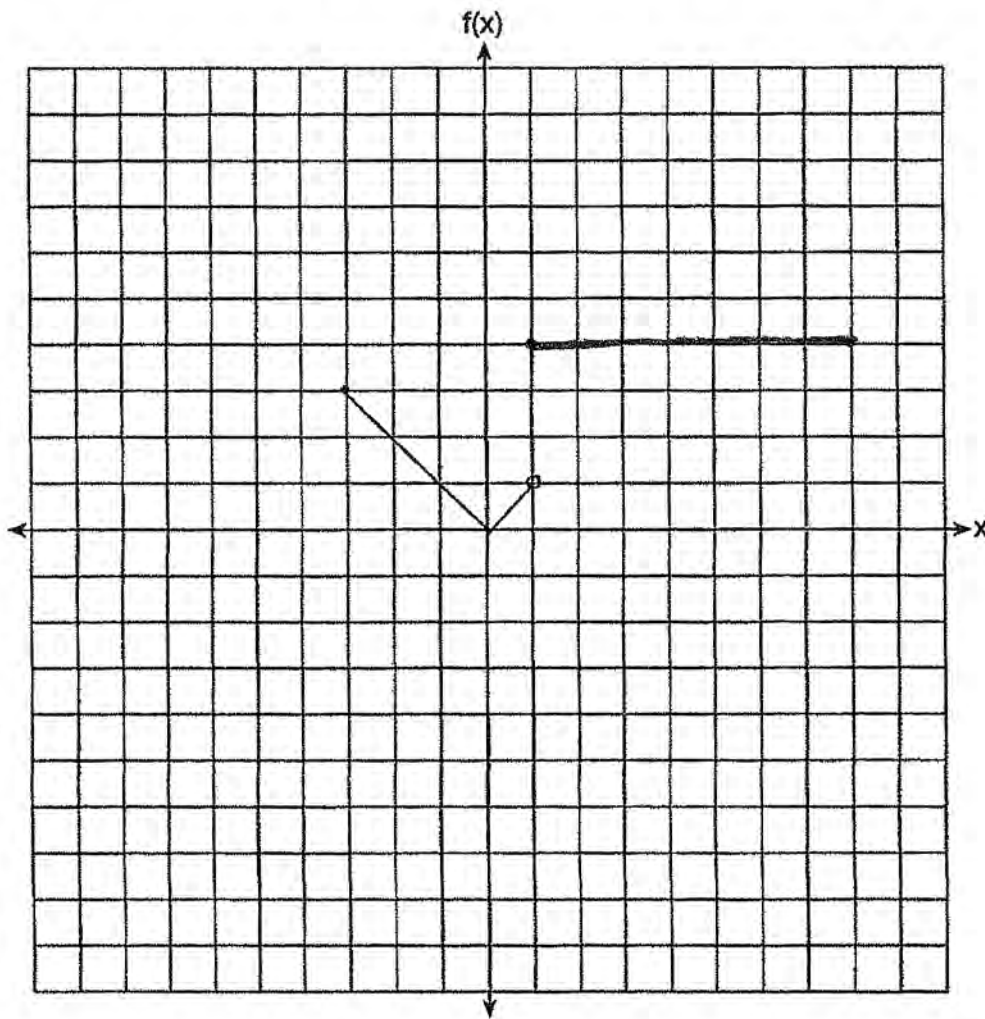
$$\begin{array}{r} 4x^2 - 12x = 7 \\ -7 \quad -7 \\ \hline 4x^2 - 12x - 7 = 0 \end{array}$$

Score 0: The student wrote the equation in standard form, but showed no further correct work.

Question 30

30 Graph the following function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -3 \leq x < 1 \\ 4, & 1 \leq x \leq 8 \end{cases}$$

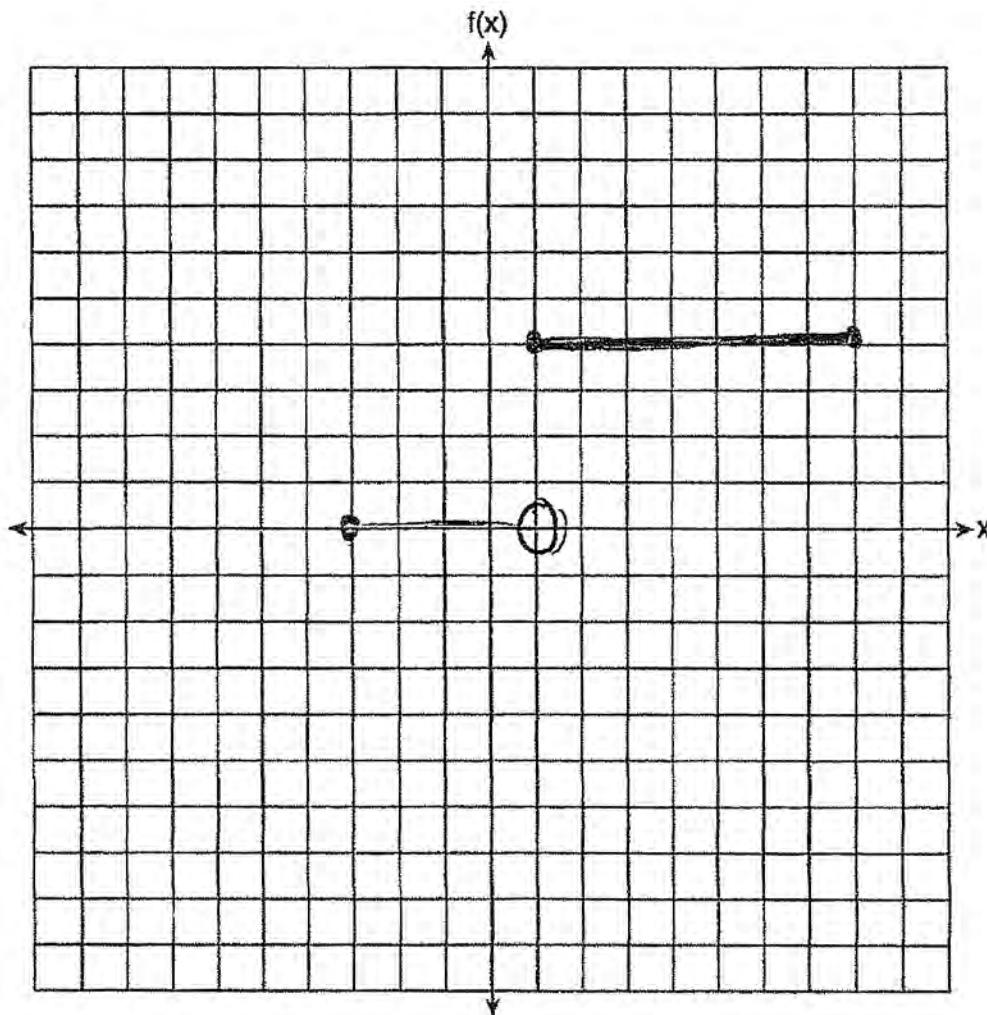


Score 2: The student has a complete and correct response.

Question 30

30 Graph the following function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -3 \leq x < 1 \\ 4, & 1 \leq x \leq 8 \end{cases}$$

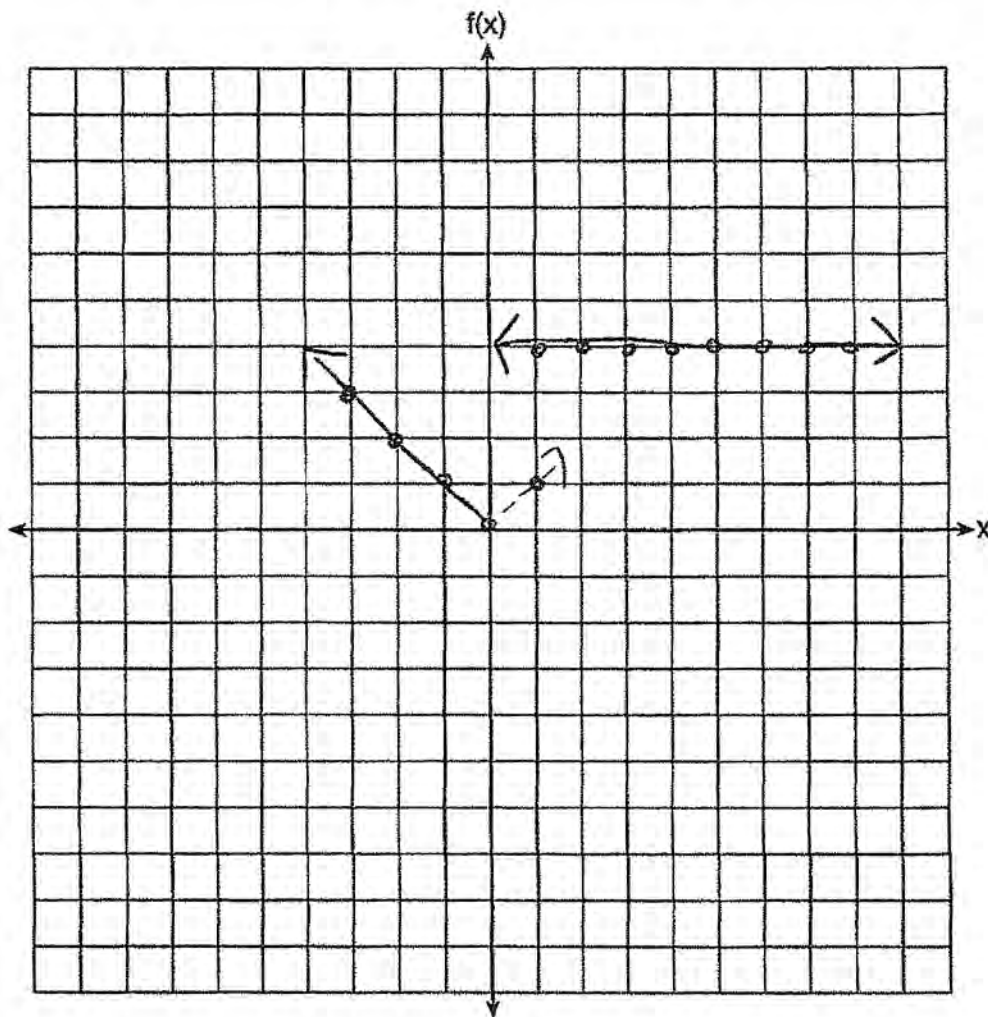


Score 1: The student graphed only one piece of the function correctly.

Question 30

30 Graph the following function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -3 \leq x < 1 \\ 4, & 1 \leq x \leq 8 \end{cases}$$



$$\begin{array}{r} |x| \\ \hline 3 \leq x < 1 \\ 1 \leq x \leq 8 \\ \hline 0 \quad 0 \\ \hline \end{array}$$

Score 0: The student made two errors by not drawing an open circle at (1,1) and extending beyond the given domain.

Question 31

31 A gardener is planting two types of trees:

Type A is three feet tall and grows at a rate of 15 inches per year.

Type B is four feet tall and grows at a rate of 10 inches per year.

Algebraically determine exactly how many years it will take for these trees to be the same height.

let $x =$ number of years
~~that each~~ take for each
tree to be the same height

$$36 \text{ in} + 15 \text{ in}x = 48 \text{ in} + 10x$$
$$5 \text{ in}x = \frac{36}{12}$$

$$x = 2.4$$

2

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

Question 31

31 A gardener is planting two types of trees:

Type A is three feet tall and grows at a rate of 15 inches per year.

Type B is four feet tall and grows at a rate of 10 inches per year.

Algebraically determine exactly how many years it will take for these trees to be the same height.

$$\begin{array}{l} A) y = 3 + 15x \leftarrow x = \text{years} \\ \phantom{x = \text{years}} y = 15x + 3 \\ B) y = 4 + 10x \leftarrow \\ \phantom{x = \text{years}} \end{array}$$
$$\begin{array}{l} -y = -10x - 4 \\ \hline 0 = 5x - 1 \\ 1 = 5x \\ \frac{1}{5} = x \end{array}$$
$$\begin{array}{l} 15x + 3 = 10x + 4 \\ 5x + 3 = 4 \\ 5x = 1 \\ x = \frac{1}{5} \end{array}$$

Score 1: The student made an error by not converting to an equation with the same units.

Question 31

31 A gardener is planting two types of trees:

Type A is $\overset{+3}{3}$ feet tall and grows at a rate of $\overset{15(x)}{15}$ inches per year. $f(x)$

Type B is $\overset{+4}{4}$ feet tall and grows at a rate of $\overset{10(x)}{10}$ inches per year. $g(x)$

Algebraically determine exactly how many years it will take for these trees to be the same height.

0.2, 1/5, 6 feet tall

$$f(x) = 15x + 3$$

$$f(2) = 15(2) + 3$$

$$f(2) = 33$$

$$f(2) = 15(2) + 3$$

$$f(2) = 6^{3+3}$$

$$f(x) = g(x) \quad 6 = 6$$

$$g(x) = 10x + 4$$

$$g(2) = 10(2) + 4$$

$$g(2) = 20 + 4$$

$$g(2) = 24$$

$$g(2) = 10(2) + 4$$

$$g(2) = 2 + 4$$

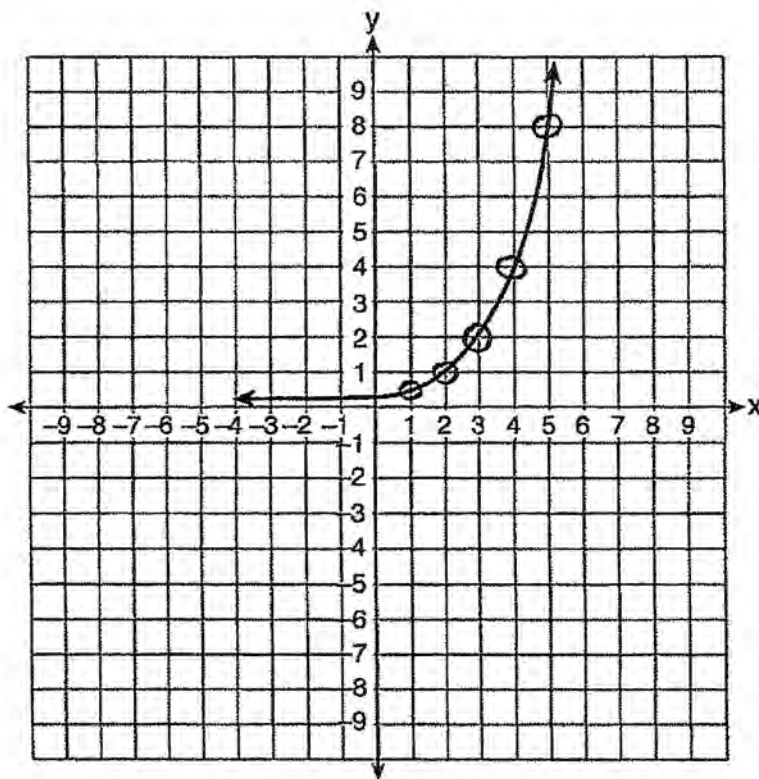
$$g(2) = 6$$

Score 0: The student made two errors by using a method other than algebraic and not converting to the same units.

Question 32

32 Write an exponential equation for the graph shown below.

$$y = .25 \times 2^x$$



Explain how you determined the equation.

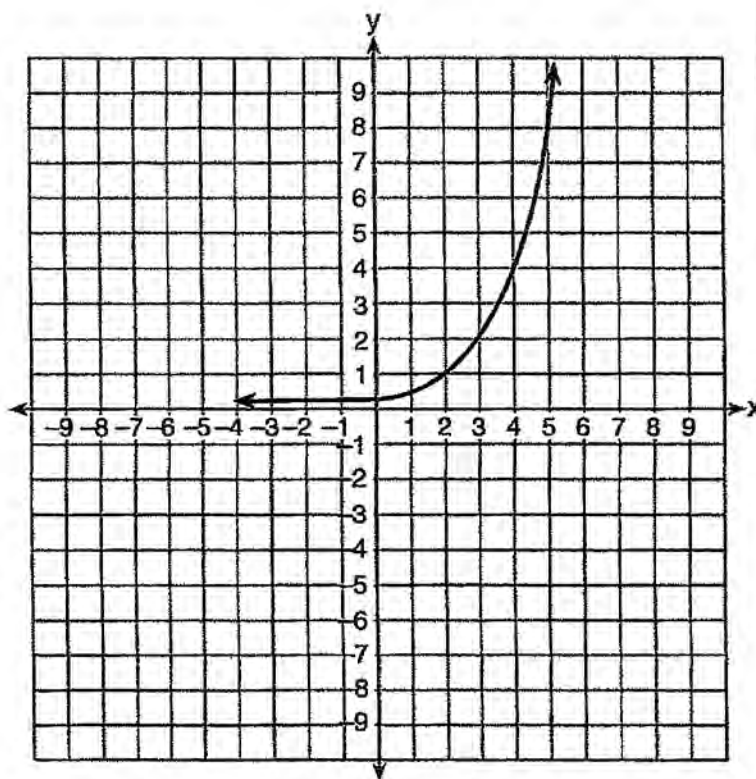
I did this by taking the y-values of the domains 1-5 (x) and putting them into my calculator. Then I used ExpReg under STATISTICS and used that equation

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

Question 32

32 Write an exponential equation for the graph shown below.

$$y = 0.25(2)^x$$



$$y = 0.25(2)^x$$

Explain how you determined the equation.

I determined my answer by using my calculator

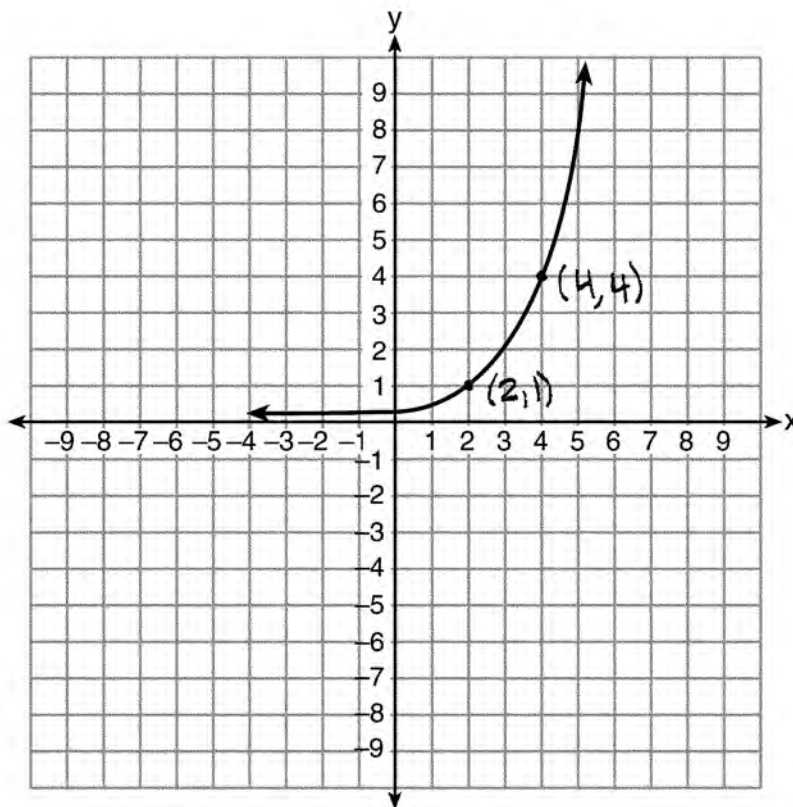
Score 1: The student gave an insufficient explanation.

Question 32

32 Write an exponential equation for the graph shown below.

$$m = \frac{4-1}{4-2} = \frac{3}{2}$$

$$y = mx + b$$
$$y = \frac{3}{2}x$$



Explain how you determined the equation.

by using slope intercept form

Score 0: The student gave a completely incorrect response.

Question 33

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$\begin{aligned} (2p + 3d = 18.25) - 2 \\ \underline{4p + 2d = 27.50} \\ \hline \cancel{4p} - 6d = -36.50 \\ \cancel{4p} + 2d = 27.50 \\ \hline -4d = -9 \\ d = 2.25 \end{aligned}$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

$$\begin{aligned} \text{drink is } \$2.25 \\ 4p + 4.50 = 27.50 \\ 4p = 23 \\ \text{popcorn is } \$5.75 \end{aligned}$$

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

Question 33

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$\begin{array}{l} b = \text{bag} \\ d = \text{drink} \\ \begin{array}{r} (1) \quad 18.25 = 2b + 3d \\ (2) \quad 27.50 = 4b + 2d \\ \hline -9 = -4d \\ 2.25 = d \end{array} \\ \begin{array}{r} 18.25 = 2b + 3d \\ 18.25 = 2b + 3(2.25) \\ 18.25 = 2b + 6.75 \\ -6.75 \quad -6.75 \\ \hline 11.5 = 2b \\ 5.75 = b \end{array} \end{array}$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

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

Question 33

- 33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

Let x = the price of one bag of popcorn
Let y = the price of one drink.

$$18.25 = 2x + 3y$$

$$27.50 = 4x + 2y$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the nearest cent.

The price of one bag of popcorn = \$5.38
The price of one drink = \$3.00

$$\begin{aligned} 27.50 &= 4x + 2y \\ -2(18.25 &= 2x + 3y) \\ \hline &= -36.5 = -4x - 6y \end{aligned}$$

$$\begin{aligned} -36.5 &= -4x - 6y \\ + 27.5 &= 4x + 2y \\ \hline &= -9 = -4y \\ \frac{-9}{-3} &= \frac{-4y}{-3} \\ 3 &= y \end{aligned}$$

$$\begin{aligned} 27.50 &= 4x + 2(3) \\ 27.50 &= 4x + 6 \\ \frac{21.5}{4} &= \frac{4x}{4} \\ \underline{x} &= \underline{5.38} \end{aligned}$$

Score 3: The student made a computational error when adding $-6y$ and $2y$.

Question 33

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$\begin{aligned} \text{let } x &= \text{popcorn} \\ y &= \text{drinks} \end{aligned}$$

$$\begin{aligned} 2x + 3y &= 18.25 \\ 4x + 2y &= 27.50 \end{aligned}$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

$$\begin{array}{r} 2x + 3y = 18.25 \\ 2(7.67) + 3y = 18.25 \\ 15.33 + 3y = 18.25 \\ -15.33 \quad -15.33 \\ \hline 3y = 2.92 \\ \frac{3y}{3} = \frac{2.92}{3} \\ y = 97 \end{array}$$

$$\begin{array}{r} -2(2x + 3y = 18.25) \\ 3(4x + 2y = 27.50) \\ \hline -4x - 6y = -36.50 \\ 12x + 6y = 82.50 \\ \hline 8x = 46 \\ \frac{8x}{8} = \frac{46}{8} \\ x = 7.67 \end{array}$$

Score 2: The student made multiple computational errors: adding $-4x$ and $12x$, and multiplying $2(7.67)$.

Question 33

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$2p + 3d = 18.25$$

$$4p + 2d = 27.50$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

$$4p + 2d = 27.50$$

$$2p + 3d + 18.25 = 4p + 2d + 27.50$$

$$2p - 1d + 9.25 = 0$$
$$-9.25$$

$$\frac{2p - 1d}{2p} = \frac{-9.25}{2p}$$

$$\frac{-1d}{-1} = \frac{-4.625}{-1}$$

$$d = 4.63$$

$$2p - d + 9.25$$

$$2p - 4.63 + 9.25 = 0$$

$$\frac{2p}{2} = \frac{-4.62}{2}$$

$$p = 2.31$$

Score 2: The student wrote a correct system of equations, but showed no further correct work.

Question 33

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$4p - 2d = 27.50$$

$$2p - 3d = 18.25$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

$$4p - 2d = 27.50$$

$$-2(2p - 3d = 18.25)$$

$$4p - 2d = 27.50$$

$$-4p + 6d = -36.50$$

$$\frac{4d}{4} = \frac{9}{4}$$

$$d = 2.25$$

$$4p - 2(2.25) = 27.50$$

$$4p - 4.50 = 27.50$$
$$+4.50 \quad +4.50$$

$$\frac{4p}{4} = \frac{32.00}{4}$$

$$p = 8$$

Score 1: The student made one conceptual error when writing the system and one computational error when adding 27.50 and -36.50 .

Question 33

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$\begin{aligned} 2x + 3y &= 18.25 \\ 4x + 2y &= 27.50 \end{aligned}$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

$$y = 9.25$$

Score 1: The student wrote one equation correctly, but showed no further correct work.

Question 33

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of \$18.25 on two bags of popcorn and three drinks. Zachary spends a total of \$27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$\begin{aligned} \text{Jacob} &= 18.25 - 2b \text{ of pop} + 3 \text{ drinks} \\ \text{Zachary} &= 27.50 - 4b \text{ of pop and } 2 \text{ drinks} \end{aligned}$$

$$Y = 3$$

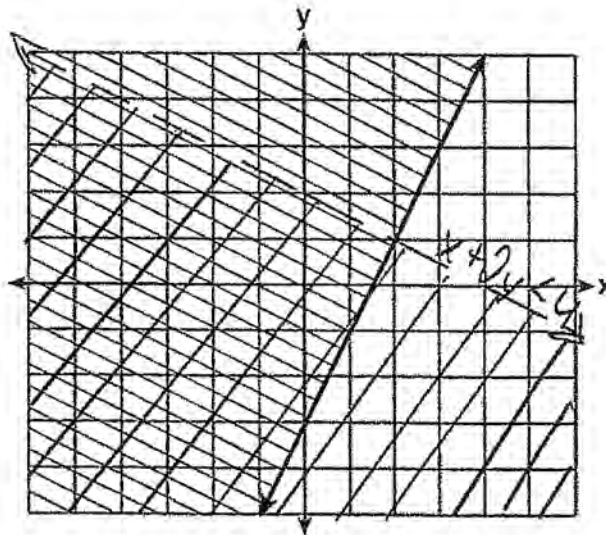
Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

$$\begin{aligned} 1 \text{ bag of popcorn} &= 5.56 \$ \\ 1 \text{ drink} &= 2.25 \end{aligned}$$

Score 0: The student stated one correct solution, but showed no further correct work.

Question 34

34 The graph of an inequality is shown below.



a) Write the inequality represented by the graph.

$$y \geq 2x - 3$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$\begin{aligned} x + 2y &< 4 \\ 2y &< 4 - x \\ y &< 2 - \frac{1}{2}x \end{aligned}$$

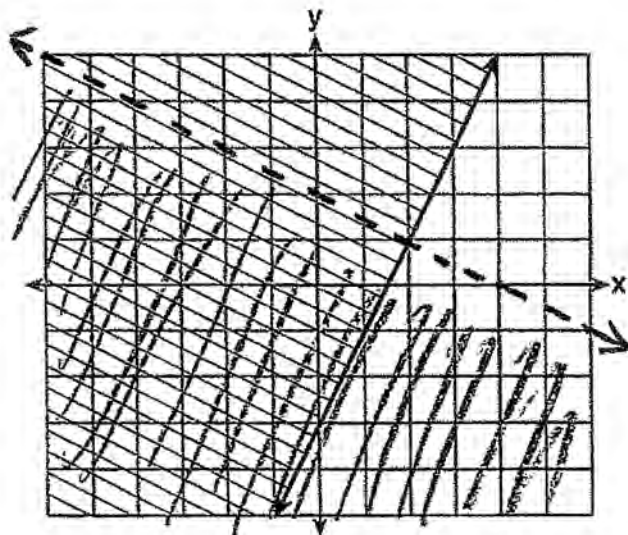
c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point (2,1) is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

I disagree with Oscar. While it would make $y \geq 2x - 3$ true ($1 \geq 2(2) - 3$) the other can't be on the line of $y < 2 - \frac{1}{2}x$ ($1 < 2 - \frac{1}{2}(2)$).

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

Question 34

34 The graph of an inequality is shown below.



$$y < -\frac{1}{2}x + 2$$

a) Write the inequality represented by the graph.

$$y > 2x - 3$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$\frac{2y < -x + 4}{-x} \quad \frac{2y < -x + 4}{2}$$

$$y < -\frac{1}{2}x + 2$$

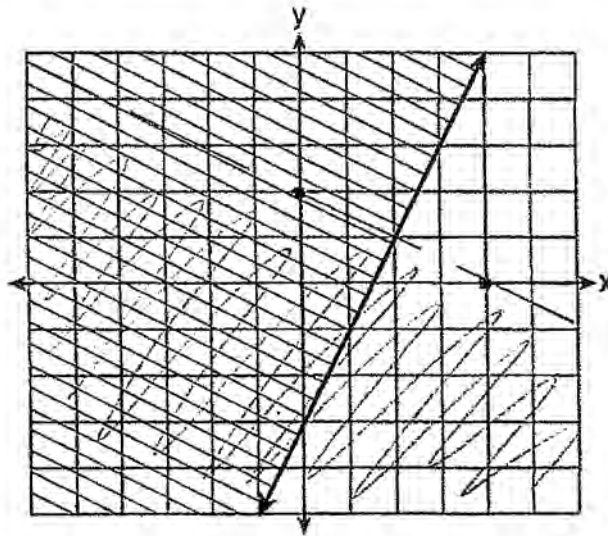
c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point (2,1) is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

no, because (2,1) is not a solution to $y < -\frac{1}{2}x + 2$

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

Question 34

34 The graph of an inequality is shown below.



$$\frac{y^2 - 4^2}{x^2 - x^1}$$

$$\frac{3 - 1}{0 - 2}$$

$$\frac{2}{-2}$$

a) Write the inequality represented by the graph.

$$y \geq -x - 3$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$\frac{2y < 4 - x}{2} \quad y < \frac{4 - x}{2}$$

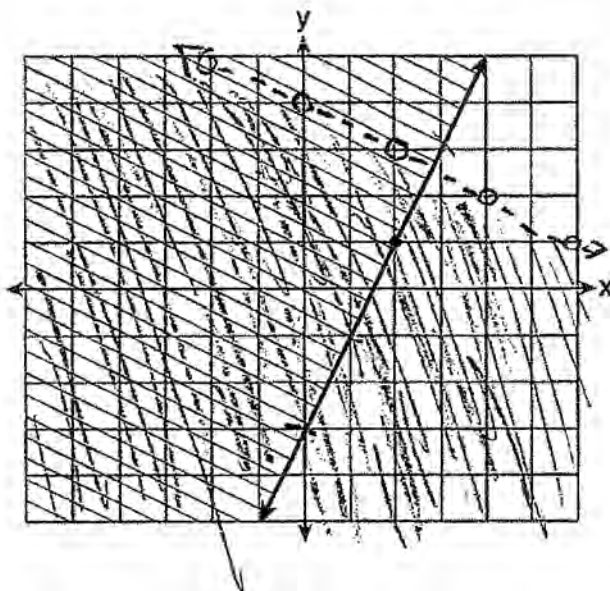
c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point (2,1) is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

I disagree because $y < \frac{4-x}{2}$ is dotted and a solution can't be on a dotted line.

Score 3: The student wrote an incorrect inequality in part a.

Question 34

34 The graph of an inequality is shown below.



a) Write the inequality represented by the graph.

$$y \geq 2x - 3$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$2y < -x + 4$$
$$y < -\frac{1}{2}x + 2$$

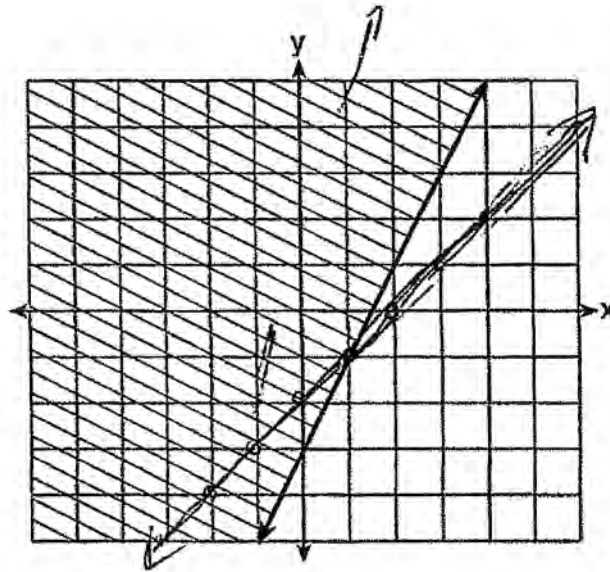
c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point (2,1) is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

yes point (2, 1) is part of the system of inequalities because the point is covered by both inequalities

Score 3: The student made one error in part b.

Question 34

34 The graph of an inequality is shown below.



a) Write the inequality represented by the graph.

$$y < -\frac{1}{2}x + 5$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$x + 2y < 4$$

$$0 + 2(0) < 4$$

$$0 + 0 < 4$$

$$0 < 4$$

$$0 < 4$$

true

c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point (2,1) is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

$$x + 2y < 4$$

$$2 + 2(1) < 4$$

$$2 + 2 < 4$$

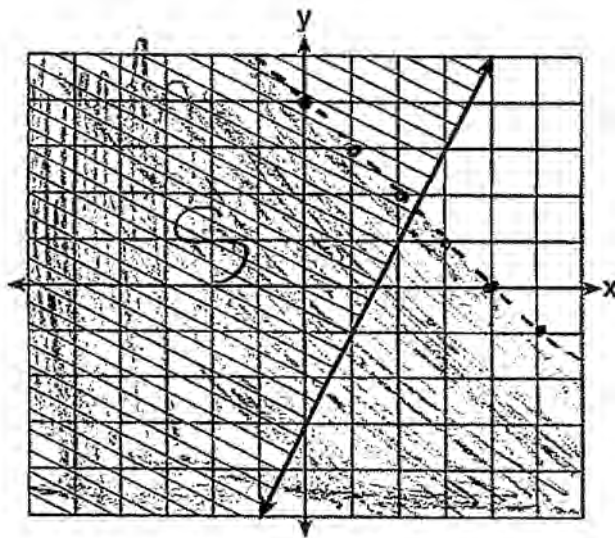
$$4 < 4$$

No because $0 < 4$ or not then does not work for (2,1).

Score 2: The student disagreed and wrote a correct explanation, but showed no further correct work.

Question 34

34 The graph of an inequality is shown below.



a) Write the inequality represented by the graph.

$$y \geq 2x - 3$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$2y < -x + 4$$

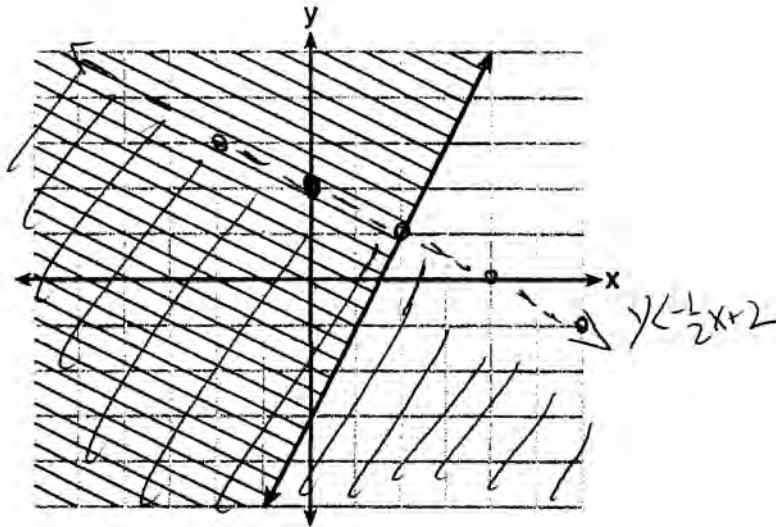
c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point (2,1) is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

yes because a solid line means it is included in the solution.

Score 2: The student wrote a correct inequality in part a and gave a partially correct explanation based on an incorrect graph.

Question 34

34 The graph of an inequality is shown below.



a) Write the inequality represented by the graph.

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$\begin{aligned} -x & -x \\ \hline 2y & < -x + 4 \\ \frac{\quad}{2} & \quad \frac{\quad}{2} \\ y & < -\frac{1}{2}x + 2 \end{aligned}$$

$$\begin{aligned} y & < -\frac{1}{2}x + 2 \\ 0 & < 0 + 2 \\ 0 & < 2 \\ & \text{True} \end{aligned}$$

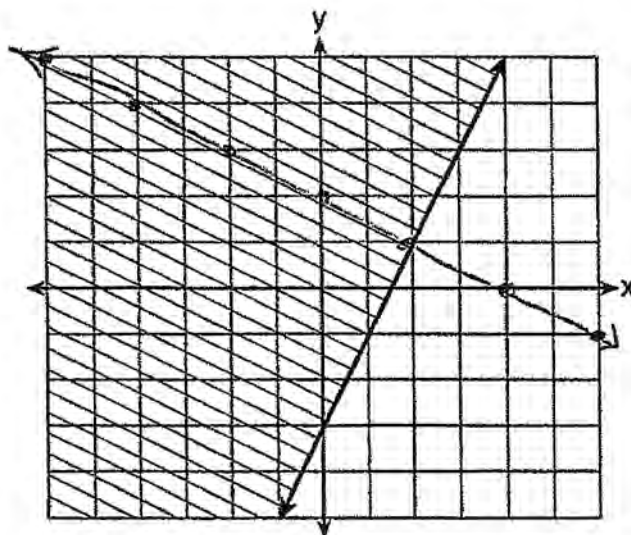
c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point (2,1) is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

Yes he's correct !!

Score 1: The student graphed the inequality for part b correctly, but showed no further correct work.

Question 34

34 The graph of an inequality is shown below.



a) Write the inequality represented by the graph.

$$y \geq -\frac{5}{3}x - 3$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$\begin{aligned} x + 2y &< 4 \\ -x & \quad -x \\ \hline 2y &< -x + 4 \\ \hline y &< -\frac{1}{2}x + 2 \end{aligned}$$

c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point (2,1) is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

No, he is incorrect because the solution of the system shouldn't be on the line but where both areas are shaded together.

Score 0: The student has a completely incorrect response.

Question 35

35 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth*.

$$r = .94$$

b) Explain what the correlation coefficient suggests in the context of this problem.

the line is a good model which shows as the calories increase so does the milligrams of sodium

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

Question 35

35 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth*.

.44

b) Explain what the correlation coefficient suggests in the context of this problem.

It is a strong correlation.

Score 3: The student's explanation was incomplete because it did not refer to the context of the problem.

Question 35

35 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth*.

$$r = .9422$$

b) Explain what the correlation coefficient suggests in the context of this problem.

there is a strong linear relationship

Score 2: The student made a rounding error in part a and the explanation was incomplete because it did not refer to the context of the problem.

Question 35

35 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth*.

$$r = .942$$

b) Explain what the correlation coefficient suggests in the context of this problem.

The r value shows that 94.2% of the time you will have a hotdog with a lot of calories that has a lot of milligrams also.

Score 1: The student made one rounding error and one conceptual error.

Question 35

35 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth*.

b) Explain what the correlation coefficient suggests in the context of this problem.

~~The~~ The correlation coefficient suggests in this context of this problem that the less milligrams of Sodium per beef hot dog, the less calories per beef hot dog.

Score 0: The student's explanation was not based on a stated correlation coefficient.

Question 36

- 36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

$$y = -x^2 + 8x + 9$$

The vertex represents a maximum point for the function because the function is negative, as stated by the $-x^2$. Therefore, we know that the parabola opens downward making the vertex a maximum and not a minimum.



- b) Rewrite $f(x)$ in vertex form by completing the square.

$$y = -x^2 + 8x + 9$$

$$-\frac{8}{2} = -4 = h$$

$$y = -(x^2 - 8x) + 9$$

$$y = -(x^2 - 8x + 16) - (-16) + 9$$

$$y = -(x - 4)^2 + 16 + 9$$

$$y = -(x - 4)^2 + 25 \quad (h, k)$$

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

Question 36

- 36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

max because of the -1 ,
coeff of x^2

- b) Rewrite $f(x)$ in vertex form by completing the square.

$$- f(x) = x^2 - 8x - 9$$

$$- f(x) = (x^2 - 8x + 16) - 9 - 16$$

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

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

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

Question 36

- 36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

Maximum because the quadratic is a negative which means it's facing down. Therefore the vertex is the highest point which makes it a maximum.

- b) Rewrite $f(x)$ in vertex form by completing the square.

$$f(x) = -x^2 + 8x + 9$$
$$-1(x^2 - 8x - 9) = 0$$

$$-4r = 16$$
$$16 = -9 + n$$
$$+9 + 9 \quad n = 25$$

$$-1(x^2 - 8x - 9 + 25) - 25(-1) = 0$$

$$-1(x^2 - 8x + 16) + 25 = 0$$

$$-1(x-4)^2 + 25 = 0$$

Score 3: The student made an error in setting the correct expression equal to zero.

Question 36

- 36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

$$y = -x^2 + 8x + 9$$

The vertex represents a maximum point for the function. The y values leading up to $(4, 25)$ are increasing, and the y values after that point are decreasing.

- b) Rewrite $f(x)$ in vertex form by completing the square.

$$-x^2 + 8x + 9 = 0$$

$$\cdot -1 \quad \underline{-9} \quad \underline{-9}$$

$$x^2 - 8x - 9 = 0$$

$$-x \quad \underline{9} = 9$$

$$x^2 - 8x + 16 = 25$$

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

$$(\sqrt{(x-4)^2} = \sqrt{25+4})$$

$$x-4 = \pm 5$$

$$\underline{+4} \quad \underline{+4}$$

$$x = 4 \pm 5$$

$$-x^2 - 4x + 4x + 16$$

Score 2: The student stated a correct maximum and gave a correct explanation, but showed no further correct work.

Question 36

- 36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

The vertex represents a maximum because the number in front of the x^2 is negative.

- b) Rewrite $f(x)$ in vertex form by completing the square.

$$\begin{array}{r} f(x) = -x^2 + 8x + 9 \\ -9 \qquad \qquad \qquad -9 \\ \hline -9 = -x^2 + 8x \end{array} \quad -a^2 \rightarrow$$

Score 2: The student stated maximum and gave a correct explanation, but showed no further correct work.

Question 36

- 36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

The vertex represents a minimum point because the coefficient of the a value is negative.

- b) Rewrite $f(x)$ in vertex form by completing the square.

~~$$-x^2 + 8x + 16 + 9 = 16$$
$$f(x) = (x+4)^2 - 7$$~~

$$-x^2 + 8x + 9$$

$$x^2 = 8x - 9$$

$$x^2 - 8x + 16 - 9 = 16$$

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

Score 1: The student made one error in completing the square, but showed no further correct work.

Question 36

- 36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

maximum

- b) Rewrite $f(x)$ in vertex form by completing the square.

$$\begin{aligned} f(x) &= -x^2 + 8x + 9 \\ &= -(x^2 + 8x) + 9 \\ &= -(x^2 + 8x) + 16 \\ f(x) &= -(x^2 + 8x) + 25 \end{aligned}$$

Score 0: The student stated maximum, but showed no further correct work.

Question 36

- 36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

Maximum, it is a maximum because the graph is at the maximum point it can be at

- b) Rewrite $f(x)$ in vertex form by completing the square.

$$f(x) = -x^2 + 8x + 9$$

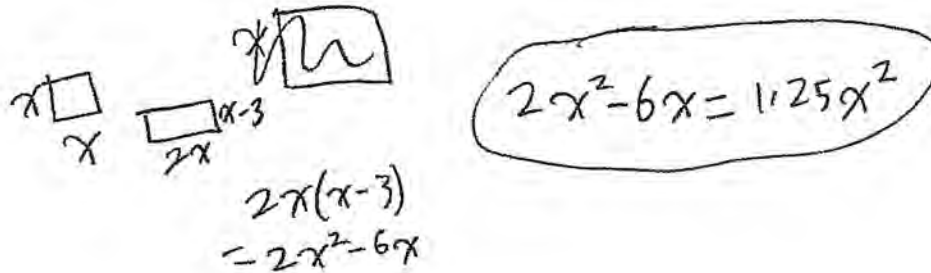
$$f(x) = -(x+4)^2 - 8 + 9$$

Score 0: The student stated maximum, but showed no further correct work.

Question 37

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.



Explain how your equation models the situation.

My equation models the situation because it shows $2x^2 - 6x$, the area of the new garden, is 1.25 times larger than the area of the original garden, x^2 with x being the length of a side of the original square garden.

Determine the area, in square meters, of the new rectangular garden.

$$\begin{aligned}
 2x^2 - 6x &= 1.25x^2 \\
 0.75x^2 - 6x &= 0 \\
 x(0.75x - 6) &= 0 \\
 \hline
 x=0 & \quad 0.75x = 6 \\
 & \quad x = 8 \\
 6 \div 0.75 &= 8
 \end{aligned}$$

$$\begin{aligned}
 2(8)^2 - 6(8) &= 2(64) - 48 \\
 &= 128 - 48 \\
 &= 80
 \end{aligned}$$

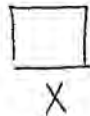
80 square units

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

Question 37

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.



$$\begin{aligned}
 2X \cdot (X-3) &= \frac{5}{4} X^2 \\
 2X^2 - 6X &= \frac{5}{4} X^2 \\
 -\frac{5}{4} X^2 + 2X^2 - 6X &= 0 \\
 \boxed{.75X^2 - 6X = 0}
 \end{aligned}$$

Explain how your equation models the situation.

$2X$ is the side length doubled and $X-3$ is the side decreased by 3 meters, its product $2X^2 - 6X$ should equal to 125% of the original field which is X^2 .
 X is the original side length of the garden.

Determine the area, in square meters, of the new rectangular garden.

$$\begin{aligned}
 -\frac{5}{4} X^2 + 2X^2 - 6X &= 0 & 2X \cdot (X-3) \\
 .75X^2 - 6X &= 0 & 2(8) \cdot (8-3) \\
 X(.75X - 6) &= 0 & 16 \cdot (5) \\
 & & 80 \\
 .75X - 6 &= 0 & \text{The new field} \\
 .75X &= 6 & \text{will be } 80 \text{ sq meters} \\
 \frac{.75}{.75} \cdot .75 & & \\
 \boxed{X = 8} & &
 \end{aligned}$$

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

Question 37

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

~~let L=length, w=w~~ let s=side of square,
~~a=area~~

$$2s(s-3) = 1.25s^2$$

Explain how your equation models the situation.

My equation models the situation because $2s(s-3)$ explains one side of the square is being doubled while the other side is decreased by 3 m. $(1.25)(s^2)$ represents the area of the original square s^2 , being increased by 25%.

Determine the area, in square meters, of the new rectangular garden.

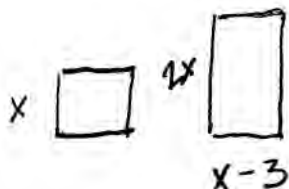
$$\begin{array}{r} 2s^2 - 6s = 1.25s^2 \\ -1.25s^2 \qquad -1.25s^2 \\ \hline .75s^2 - 6s = 0 \\ .75s(s-8) = 0 \\ s=0 \quad \boxed{s=8} \\ \uparrow \\ \text{REJECT} \end{array} \qquad 8^2 = \boxed{64} \text{ area}$$

Score 5: The student made an error in finding 64, the area of the original.

Question 37

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.



$2x(x-3) = 1.25x^2$

Explain how your equation models the situation.

it just does

Determine the area, in square meters, of the new rectangular garden.

$2(20)(17) = 680$	$1.25(400) = 500$	
$2(10)(7) = 140$	$1.25(100) = 125$	NO
$2(5)(2) = 20$	$1.25(25) = 31.25$	NO
$2(8)(5) = 80$	$1.25(64) = 80$	

Score 5: The student has an incorrect explanation.

Question 37

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

Explain how your equation models the situation.

Determine the area, in square meters, of the new rectangular garden.

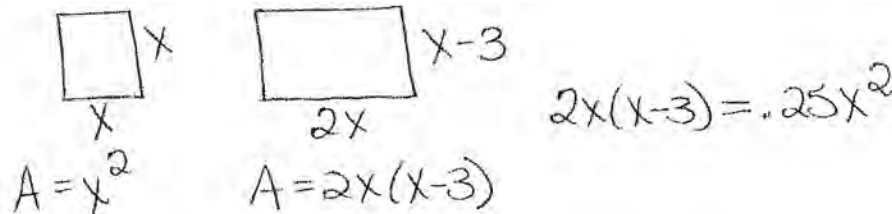
$$\begin{aligned}2L(L-3) &= 1.25L^2 \\2L^2 - 6L - 1.25L^2 &= 0 \\0.75L^2 - 6L &= 0 & \text{AREA} &= \\L(0.75L - 6) &= 0 & 16(5) &= 80 \\0.75L - 6 &= 0 \\L &= 8\end{aligned}$$

Score 5: The student did not write an explanation.

Question 37

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.



Explain how your equation models the situation.

My equation models the situation because $x-3$ represents the side of the square decreased by 3 and $2x$ represents the side of the square doubled. The original square has an area of x^2 and the rectangle's area is $2x(x-3)$. 25% more than the original square's area is $.25x^2$.

Determine the area, in square meters, of the new rectangular garden.

$$\begin{aligned}
 2x(x-3) &= .25x^2 \\
 2x^2 - 6x &= .25x^2 \\
 1.75x^2 - 6x &= 0 \\
 x(1.75x - 6) &= 0 \\
 x \neq 0 & \quad | \quad 1.75x - 6 = 0 \\
 \text{reject} & \quad | \quad 1.75x = 6 \\
 & \quad \quad \quad x = \frac{24}{7}
 \end{aligned}$$

Area of New Field
 $A = 2\left(\frac{24}{7}\right)^2 - 6\left(\frac{24}{7}\right)$
 $A = \frac{144}{49}$

Score 4: The student made one conceptual error by using .25 instead of 1.25.

Question 37

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

$$1.25(x^2) = 2x(x-3)$$

Explain how your equation models the situation.

The original sides, - which were equal to each other, are represented by x . One side was doubled ($2x$) while the other had 3 yards subtracted from it. Then these quantities are multiplied together is equal to 1.25 times the old area; x^2 .

Determine the area, in square meters, of the new rectangular garden.

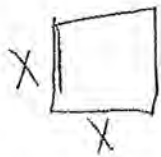
$$\begin{aligned} 1.25(x^2) &= 2x(x-3) \\ \frac{1.25x^2}{x^2} &= \frac{2x^2}{x^2} - \frac{6x}{x^2} \\ 1.25 &= 2 \end{aligned}$$

Score 3: The student wrote a correct equation in one variable and a correct explanation, but showed no further correct work.

Question 37

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.



$$2x(x-3) = 1.25x^2$$

Explain how your equation models the situation.

Determine the area, in square meters, of the new rectangular garden.

Score 2: The student wrote a correct equation in one variable, but showed no further correct work.

Question 37

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.



Explain how your equation models the situation.

You would have to times the new double side by the side that is 3 shorter and that is the new area.
The new area is 1.25 times the old area.
Put those equal and you have an equation.

Determine the area, in square meters, of the new rectangular garden.

Score 1: The student wrote a correct explanation, but showed no further correct work.

Question 37

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.



The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

original
x=length

$$2L - 3 \cdot W = G \cdot 1.25$$

width

Length of adjusted garden decrease three meters original garden 25% more

G = Original garden

Explain how your equation models the situation.

Using the original length and garden of the original garden X will be the length and G will be the garden which wasn't shown. To find the area of an we need to multiply the length and width. So the length is $2x - 3$ when adjusted and multiplied by the width which will equal to the original garden when multiplied by 1.25.

Determine the area, in square meters, of the new rectangular garden.

undi

Score 0: The student wrote an incorrect explanation, and showed no further correct work.

Regents Examination in Algebra I (Common Core) – January 2015

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

(Use for the January 2015 exam only.)

Raw Score	Scale Score	Performance Level	Raw Score	Scale Score	Performance Level	Raw Score	Scale Score	Performance Level
86	100	5	57	75	4	28	64	2
85	98	5	56	74	4	27	63	2
84	97	5	55	74	4	26	62	2
83	96	5	54	74	4	25	61	2
82	94	5	53	73	3	24	60	2
81	93	5	52	73	3	23	59	2
80	92	5	51	73	3	22	58	2
79	90	5	50	72	3	21	57	2
78	89	5	49	72	3	20	55	2
77	88	5	48	72	3	19	54	1
76	87	5	47	72	3	18	52	1
75	86	5	46	71	3	17	50	1
74	85	5	45	71	3	16	49	1
73	84	4	44	71	3	15	47	1
72	83	4	43	70	3	14	45	1
71	82	4	42	70	3	13	43	1
70	82	4	41	70	3	12	40	1
69	81	4	40	70	3	11	38	1
68	80	4	39	69	3	10	35	1
67	80	4	38	69	3	9	33	1
66	79	4	37	69	3	8	30	1
65	78	4	36	68	3	7	27	1
64	78	4	35	68	3	6	23	1
63	77	4	34	67	3	5	20	1
62	77	4	33	67	3	4	16	1
61	76	4	32	66	3	3	12	1
60	76	4	31	66	3	2	9	1
59	75	4	30	65	3	1	4	1
58	75	4	29	64	2	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 (Common Core).