The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I (Common Core)

Thursday, January 26, 2017 — 1:15 to 4:15 p.m., only

Student Name _____

School Name _____

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

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

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

This examination has four parts, with a total of 37 questions. You must answer all questions in this examination. Record your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in Parts II, III, and IV directly in this booklet. All work should be written in pen, except for graphs and drawings, which should be done in pencil. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale.

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

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

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

Notice …

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

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

ALGEBRA I (COMMON CORE)

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 Which expression is equivalent to $16x^2 - 36$?

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

(2) $4(2x + 3)(2x - 3)$ (4) $(4x + 6)(4x + 6)$

2 What is the solution set of the equation $(x - 2)(x - a) = 0$?

(1) -2 and a (3) 2 and a

(2) -2 and $-a$ (4) 2 and $-a$

3 Analysis of data from a statistical study shows a linear relationship in the data with a correlation coefficient of -0.524. Which statement best summarizes this result?

(1) There is a strong positive correlation between the variables.

(2) There is a strong negative correlation between the variables.

(3) There is a moderate positive correlation between the variables.

(4) There is a moderate negative correlation between the variables.

4 Boyle's Law involves the pressure and volume of gas in a container. It can be represented by the formula $P_1V_1 = P_2V_2$. When the formula is solved for P_2, the result is

(1) $P_1V_1V_2$ (3) $\dfrac{P_1V_1}{V_2}$

(2) $\dfrac{V_2}{P_1V_1}$ (4) $\dfrac{P_1V_2}{V_1}$

5 A radio station did a survey to determine what kind of music to play by taking a sample of middle school, high school, and college students. They were asked which of three different types of music they prefer on the radio: hip-hop, alternative, or classic rock. The results are summarized in the table below.

	Hip-Hop	Alternative	Classic Rock
Middle School	28	18	4
High School	22	22	6
College	16	20	14

What percentage of college students prefer classic rock?

(1) 14%   (3) 33%

(2) 28%   (4) 58%
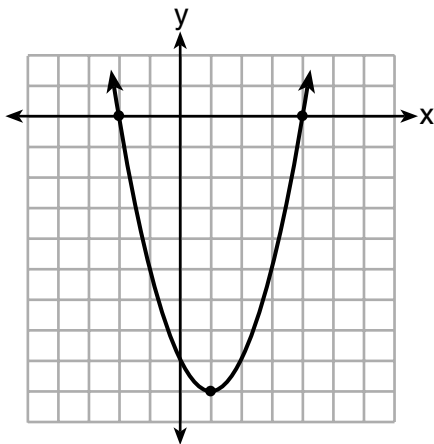
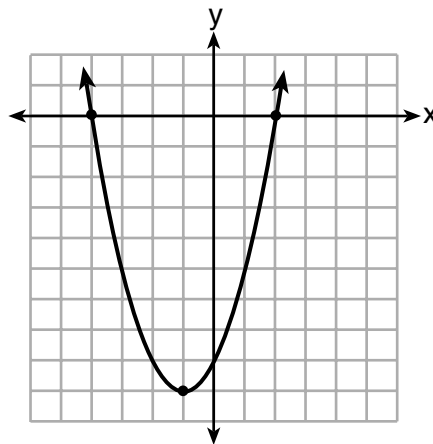**6** Which function has zeros of -4 and 2?

$$f(x) = x^2 + 7x - 8$$ $$g(x) = x^2 - 7x - 8$$

(1)   (3)

(2)   (4)

7 Which expression is equivalent to $2(3g - 4) - (8g + 3)$?

(1) $-2g - 1$ (3) $-2g - 7$

(2) $-2g - 5$ (4) $-2g - 11$

8 In 2014, the cost to mail a letter was 49¢ for up to one ounce. Every additional ounce cost 21¢. Which recursive function could be used to determine the cost of a 3-ounce letter, in cents?

(1) $a_1 = 49; a_n = a_{n-1} + 21$

(2) $a_1 = 0; a_n = 49a_{n-1} + 21$

(3) $a_1 = 21; a_n = a_{n-1} + 49$

(4) $a_1 = 0; a_n = 21a_{n-1} + 49$

9 A car leaves Albany, NY, and travels west toward Buffalo, NY. The equation $D = 280 - 59t$ can be used to represent the distance, D, from Buffalo after t hours. In this equation, the 59 represents the

(1) car's distance from Albany

(2) speed of the car

(3) distance between Buffalo and Albany

(4) number of hours driving

10 Faith wants to use the formula $C(f) = \frac{5}{9}(f - 32)$ to convert degrees Fahrenheit, f, to degrees Celsius, $C(f)$. If Faith calculated $C(68)$, what would her result be?

(1) 20° Celsius   (3) 154° Celsius

(2) 20° Fahrenheit   (4) 154° Fahrenheit

11 Which scenario represents exponential growth?

(1) A water tank is filled at a rate of 2 gallons/minute.

(2) A vine grows 6 inches every week.

(3) A species of fly doubles its population every month during the summer.

(4) A car increases its distance from a garage as it travels at a constant speed of 25 miles per hour.

12 What is the *minimum* value of the function $y = |x + 3| - 2$?

(1) -2 (3) 3

(2) 2 (4) -3

13 What type of relationship exists between the number of pages printed on a printer and the amount of ink used by that printer?

(1) positive correlation, but not causal

(2) positive correlation, and causal

(3) negative correlation, but not causal

(4) negative correlation, and causal

14 A computer application generates a sequence of musical notes using the function $f(n) = 6(16)^n$, where n is the number of the note in the sequence and $f(n)$ is the note frequency in hertz. Which function will generate the same note sequence as $f(n)$?

(1) $g(n) = 12(2)^{4n}$ (3) $p(n) = 12(4)^{2n}$

(2) $h(n) = 6(2)^{4n}$ (4) $k(n) = 6(8)^{2n}$

15 Which value of x is a solution to the equation $13 - 36x^2 = -12$?

(1) $\dfrac{36}{25}$ (3) $-\dfrac{6}{5}$

(2) $\dfrac{25}{36}$ (4) $-\dfrac{5}{6}$

16 Which point is a solution to the system below?

$$2y < -12x + 4$$
$$y < -6x + 4$$

(1) $\left(1, \dfrac{1}{2}\right)$ (3) $\left(-\dfrac{1}{2}, 5\right)$

(2) $(0,6)$ (4) $(-3,2)$

17 When the function $f(x) = x^2$ is multiplied by the value a, where $a > 1$, the graph of the new function, $g(x) = ax^2$

(1) opens upward and is wider

(2) opens upward and is narrower

(3) opens downward and is wider

(4) opens downward and is narrower

18 Andy has \$310 in his account. Each week, w, he withdraws \$30 for his expenses. Which expression could be used if he wanted to find out how much money he had left after 8 weeks?

(1) $310 - 8w$ (3) $310w - 30$

(2) $280 + 30(w - 1)$ (4) $280 - 30(w - 1)$

19 The daily cost of production in a factory is calculated using $c(x) = 200 + 16x$, where x is the number of complete products manufactured. Which set of numbers best defines the domain of $c(x)$?

(1) integers (3) positive rational numbers

(2) positive real numbers (4) whole numbers

20 Noah conducted a survey on sports participation. He created the following two dot plots to represent the number of students participating, by age, in soccer and basketball.
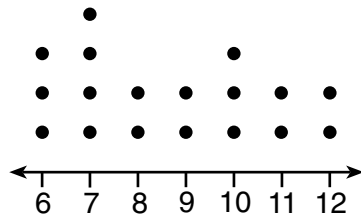

Soccer Players' Ages
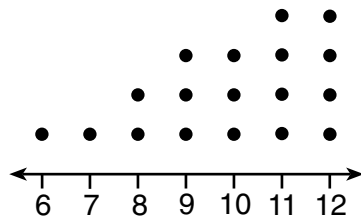
Basketball Players' Ages

Which statement about the given data sets is correct?

(1) The data for soccer players are skewed right.

(2) The data for soccer players have less spread than the data for basketball players.

(3) The data for basketball players have the same median as the data for soccer players.

(4) The data for basketball players have a greater mean than the data for soccer players.

21 A graph of average resting heart rates is shown below. The average resting heart rate for adults is 72 beats per minute, but doctors consider resting rates from 60-100 beats per minute within normal range.

Average Resting Heart Rate by Age
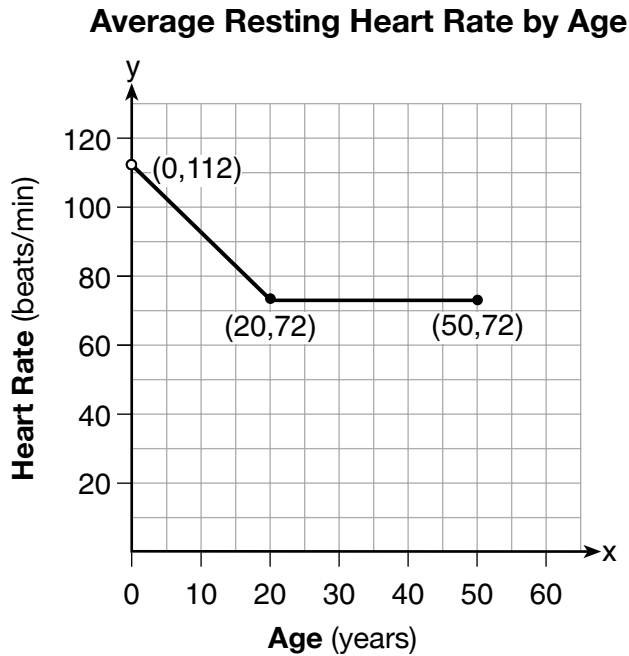
Which statement about average resting heart rates is *not* supported by the graph?

(1) A 10-year-old has the same average resting heart rate as a 20-year-old.

(2) A 20-year-old has the same average resting heart rate as a 30-year-old.

(3) A 40-year-old may have the same average resting heart rate for ten years.

(4) The average resting heart rate for teenagers steadily decreases.

22 The method of completing the square was used to solve the equation $2x^2 - 12x + 6 = 0$. Which equation is a correct step when using this method?

(1) $(x - 3)^2 = 6$ (3) $(x - 3)^2 = 3$

(2) $(x - 3)^2 = -6$ (4) $(x - 3)^2 = -3$

23 Nancy works for a company that offers two types of savings plans. Plan *A* is represented on the graph below.

Plan A
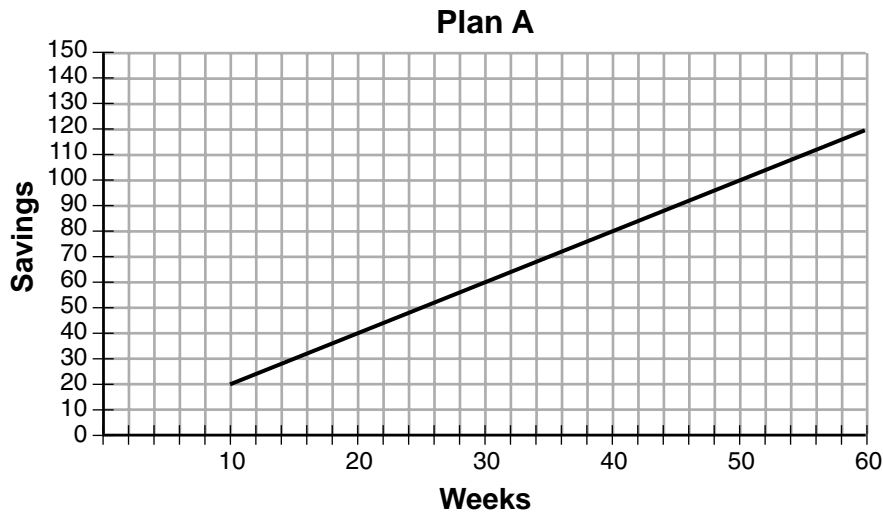
Plan *B* is represented by the function $f(x) = 0.01 + 0.05x^2$, where *x* is the number of weeks. Nancy wants to have the highest savings possible after a year. Nancy picks Plan *B*.

Her decision is

(1) correct, because Plan *B* is an exponential function and will increase at a faster rate

(2) correct, because Plan *B* is a quadratic function and will increase at a faster rate

(3) incorrect, because Plan *A* will have a higher value after 1 year

(4) incorrect, because Plan *B* is a quadratic function and will increase at a slower rate

24 The 2014 winner of the Boston Marathon runs as many as 120 miles per week. During the last few weeks of his training for an event, his mileage can be modeled by $M(w) = 120(.90)^{w-1}$, where *w* represents the number of weeks since training began. Which statement is true about the model $M(w)$?

(1) The number of miles he runs will increase by 90% each week.

(2) The number of miles he runs will be 10% of the previous week.

(3) $M(w)$ represents the total mileage run in a given week.

(4) *w* represents the number of weeks left until his marathon.

Part II

Answer all 8 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

26 A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

27 Solve the inequality below:

$$1.8 - 0.4y \geq 2.2 - 2y$$

28 Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

29 Graph the inequality $y > 2x - 5$ on the set of axes below. State the coordinates of a point in its solution.
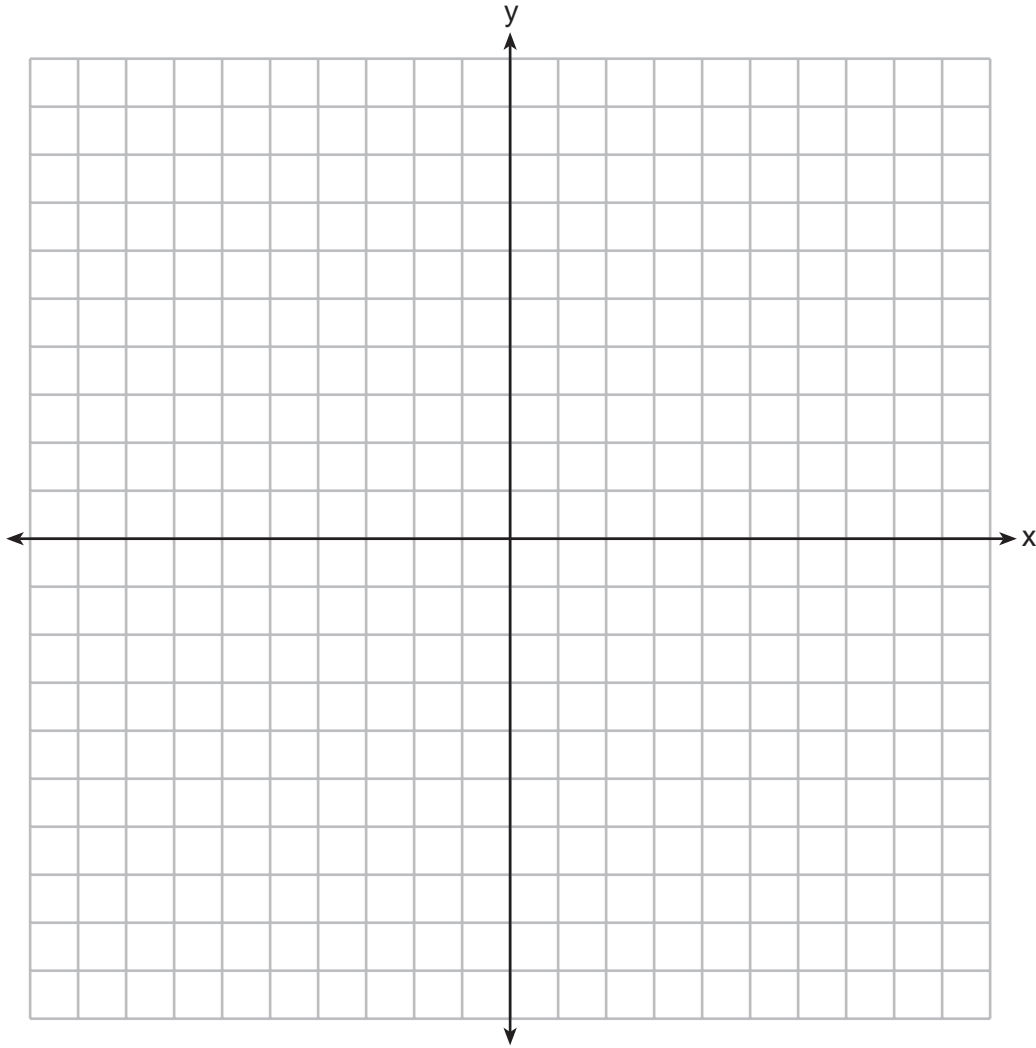
30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

31 A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

Time (hrs)	0	2	5	7
Distance (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value.

Determine if either one is correct, and justify your answer completely.

Part III

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

33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
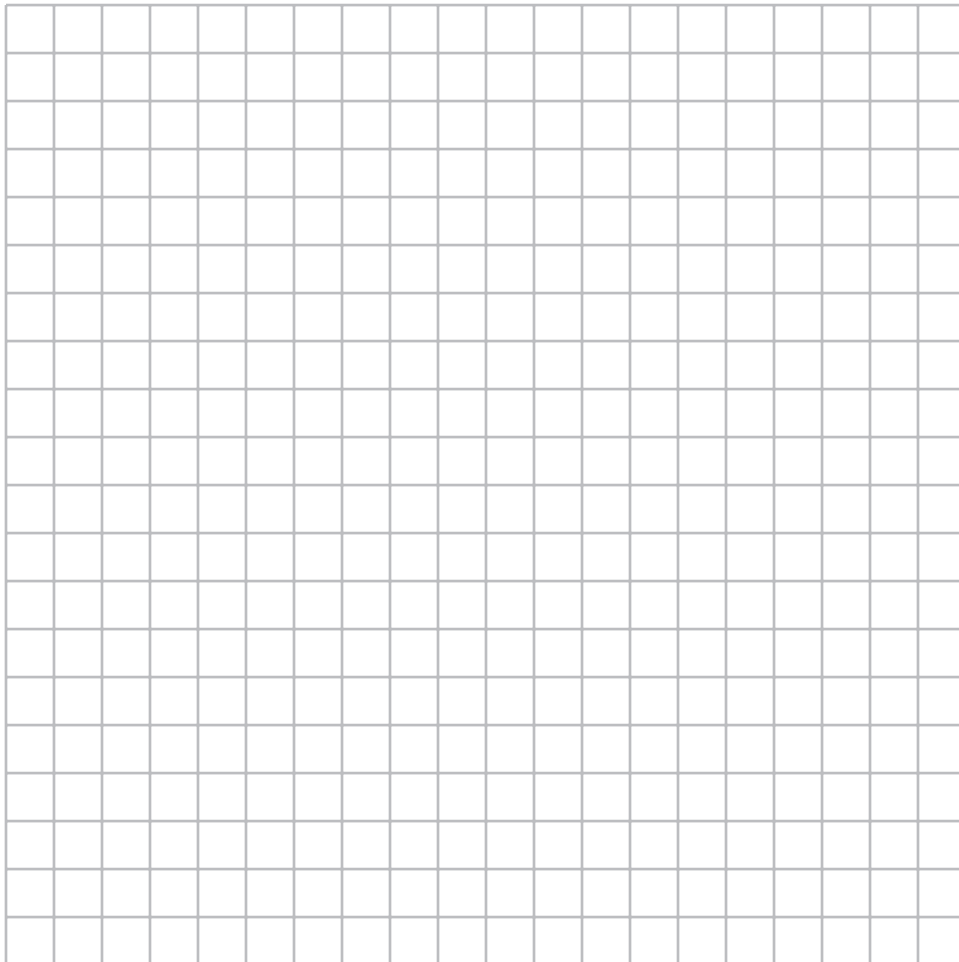
Does $f(-2) = g(-2)$? Use your graph to explain why or why not.

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.

Height (units)

Time (in seconds)
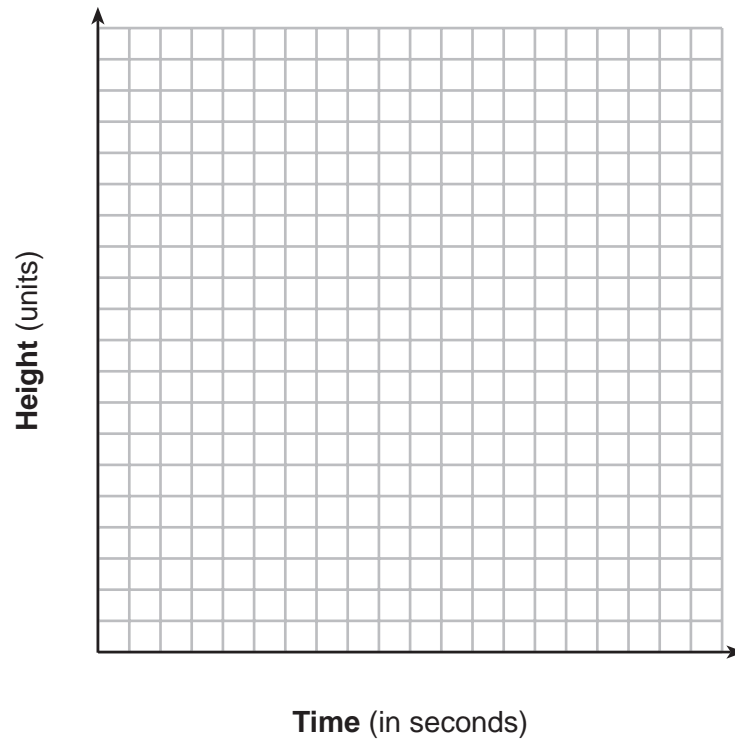
State the coordinates of the vertex and explain its meaning in the context of the problem.

Part IV

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

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.
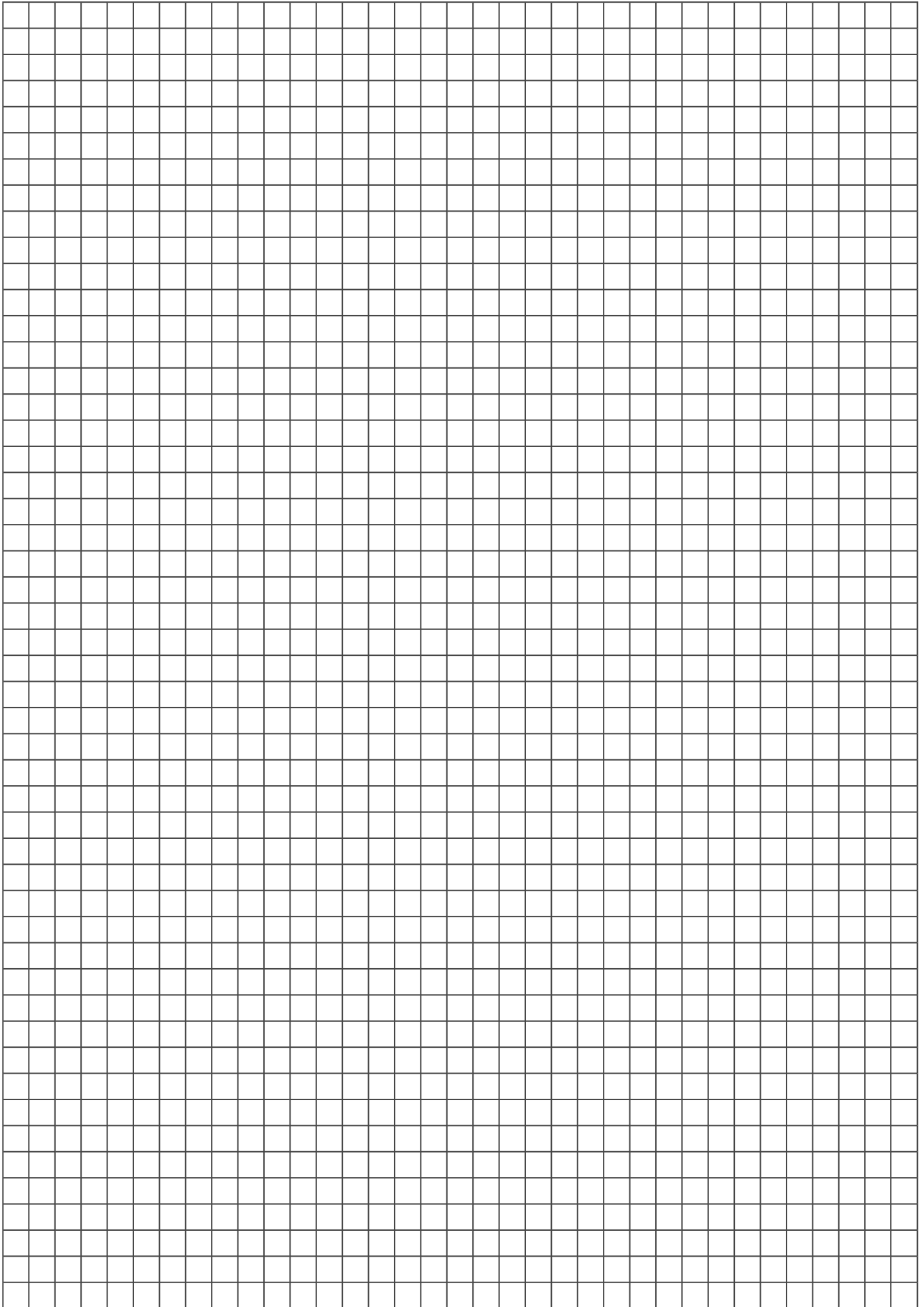
Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.
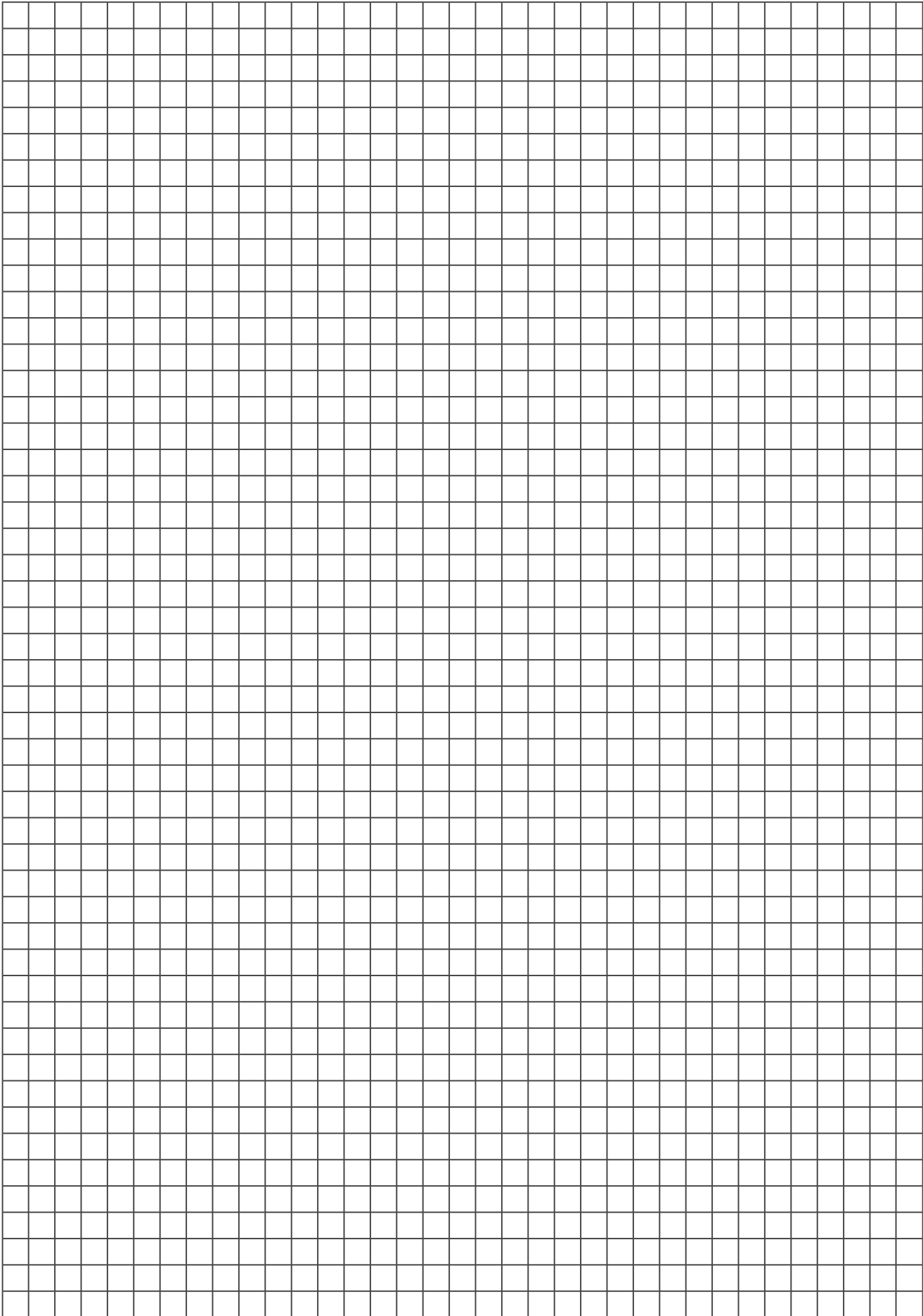
Tear Here

Tear Here

Scrap Graph Paper — This sheet will not be scored.

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	$A = \dfrac{1}{2}bh$
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	$V = \dfrac{4}{3}\pi r^3$
Cone	$V = \dfrac{1}{3}\pi r^2 h$
Pyramid	$V = \dfrac{1}{3}Bh$

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

Tear Here

FOR TEACHERS ONLY

ALGEBRA I (Common Core)

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 Thursday, January 26, 2017. 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) 2	(17) . . . . . 2 . . . . .
(2) 3	(10) 1	(18) . . . . . 4 . . . . .
(3) 4	(11) 3	(19) . . . . . 4 . . . . .
(4) 3	(12) 1	(20) . . . . . 4 . . . . .
(5) 2	(13) 2	(21) . . . . . 1 . . . . .
(6) 4	(14) 2	(22) . . . . . 1 . . . . .
(7) 4	(15) 4	(23) . . . . . 2 . . . . .
(8) 1	(16) 4	(24) . . . . . 3 . . . . .

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 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]** No, and a correct explanation is written.

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

or

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

or

       [1] No, but an incomplete explanation is written.

       [0] No is stated, but the explanation is missing.

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]** 3.5, and a correct justification is given.

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

or

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

or

       [1] 3.5, 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]** $y \geq .25$, 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] $y \geq .25$, 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.

(28)   **[2]** No, and a correct explanation is written.

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

<div align="center">*or*</div>

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

<div align="center">*or*</div>

     [1] No, but the explanation is incomplete.

<div align="center">*or*</div>

     [1] No and $\frac{7 + 18\sqrt{5}}{21}$ are written, but the explanation is missing or incorrect.

     [0] No is stated, but the explanation is missing.

<div align="center">*or*</div>

     [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]** The inequality is graphed correctly, and correct coordinates are stated.

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

<div align="center">*or*</div>

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

<div align="center">*or*</div>

     [1] The inequality is graphed correctly, but the coordinates are missing or incorrect.

<div align="center">*or*</div>

     [1] The coordinates of a point in the solution set are stated and checked, but no graph is drawn.

     [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]** $C = 1.29 + .99(s - 1)$ or $C = .99s + .30$, and a justification indicating she is not correct is given.

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

or

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

or

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

or

   [1] Appropriate work is shown, but the equation is not written in terms of C and s.

or

   [1] A justification indicating she is not correct is given, but no further correct work is shown.

   [0] No 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.

(31)   **[2]** 68 mph, 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 to find 68, but the units are not labeled.

or

   [1] 68 mph, 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]** Neither, and a correct justification is given.

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

or

[1] Neither, but an incomplete justification is given.

[0] Neither 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 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]** Correct graphs are drawn, and a correct explanation, based on the graph, indicating they are equal is written.

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

or

[3] Both graphs are drawn correctly, but the explanation is missing or incorrect.

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

or

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

or

[2] The parabola is graphed correctly, but no further correct work is shown.

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

or

[1] Yes is stated, and an appropriate algebraic justification is given, but no further correct work is shown.

or

[1] The absolute value function is graphed correctly, but no further correct work is shown.

[0] Yes 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.

(34) **[4]** A correct system of equations is written, 12.05, and correct algebraic work is shown.

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

or

[3] Appropriate work is shown to find 1.95, the price of a soda, but no further correct work is shown.

[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.

or

[2] 12.05, but a method other than algebraic is used.

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

or

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

or

[1] 12.05, 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.

(35)   **[4]** $f(x) = .75x + 4.5$, and correct explanations are written.

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

or

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

or

[3] Appropriate work is shown, but the equation is not written in terms of $f(x)$.

or

[3] Appropriate work is shown, but the explanations are incomplete.

[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 equation in terms of $f(x)$ is written, but no further correct work is shown.

or

[2] Correct explanations are written, but the equation is missing or incorrect.

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

or

[1] The expression $.75x + 4.5$ is written, 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.

(36)   **[4]** A correct graph is drawn, (2.5,55), and a correct explanation, which includes time and height, is written.

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

or

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

or

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

or

[2] (2.5,55), and a correct explanation is written, but no further correct work is shown.

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

or

[1] (2.5,55), but no further correct work is shown.

or

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

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

Part IV

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

(37)   **[6]** A correct equation is written and solved algebraically, 10, 400, and a correct explanation stating that Ian is not correct is given.

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

or

   [5] Appropriate work is shown, but the explanation is incomplete.

   [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 10 and 400, but no further correct work is shown.

or

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

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

or

   [3] Appropriate work is shown to find either 10 or 400, but no further correct work is shown.

or

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

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

or

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

or

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

or

[2] Appropriate work is shown to determine that Ian is incorrect, and a correct explanation is given, but no further correct work is shown.

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

or

[1] Two correct individual equations are written for Ian and Ken, but no further correct work is shown.

or

[1] 10 and 400, but no work is shown.

[0] Ian is incorrect, but no 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.

Map to the Common Core Learning Standards
Algebra I (Common Core)
January 2017

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

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

Regents Examination in Algebra I (Common Core)
January 2017
Chart for Converting Total Test Raw Scores to
Final Examination Scores (Scale Scores)

> **The *Chart for Determining the Final Examination Score for the January 2017 Regents Examination in Algebra I (Common Core)* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ by Thursday, January 26, 2017. Conversion charts provided for previous administrations of the Regents Examination in Algebra I (Common Core) 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 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.

ALGEBRA I (Common Core)

Thursday, January 26, 2017 — 1:15 to 4:15 p.m.

MODEL RESPONSE SET

Table of Contents

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

No he is not correct because they are the same line so all points on $y=3x-2$ are on the line $6x-2y=4$

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

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

$y = 3x - 2$ $6x - 2y = 4$

$6x - 4 = 2y$

$3x - 2 = y$

John is incorrect, because the equations are the same, the solution set is any point on the line.

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

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

$$6x - 2y = 4$$
$$6x - 4 = 2y$$
$$3x - 2 = y$$

No, they are
the same line

Score 1: The student wrote an incomplete explanation.

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

The two lines are the same so there are
an infinite number of solutions.

Score 1: The student wrote a correct explanation, but did not indicate he is incorrect.

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

$$6X - 2Y = 4$$
$$-2Y = 4 - 6X$$
$$Y = 3X - 2$$

He is correct. Because this two equations is have same answer. Both is Y=3X-2. That is why is only have one line.

Score 0: The student wrote an incomplete explanation, and stated "he is correct" instead of "he is incorrect."

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

He is wrong

Score 0: The student did not write an explanation.

26 A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

$$1 \text{ mile} = 1.609 \text{ Kilometers}$$

$$\frac{1 \text{ mi}}{1.609 \text{ km}} = \frac{26.2 \text{ mi}}{X \text{ km}}$$

$$X = 42.1558 \text{ Km} / \text{marathon}$$

$$\frac{12 \text{ km}}{1 \text{ hr}} = \frac{42.1558}{X \text{ hrs.}}$$

$$12x = 42.1558$$

$$X = 3.5129.8\overline{3}$$

$$X \approx \boxed{3.5 \text{ hrs.}}$$

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

26 A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

1 km = .62 mile

.62 · 12 = 7.44

$\dfrac{26.2}{7.44} \approx 3.5$

3.5 hrs

I got 3.5 hrs because first I found out how many miles Allan can run in an hour. Then I did the total miles over the # of miles he can run in 1 hr and I got roughly 3.5.

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

26 A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

1 mile = 1.609 kilometers

1.609 km · 26.2 = 16.28

$\frac{16.28}{12}$ = 1.35 ≈ 1.4 hrs

Allan can complete the marathon in 1.4 hours

Score 1: The student made an error when converting 26.2 miles to km.

26 A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

26.2 miles (.62) = 16.244 km

16.244 km · $\dfrac{1 HR}{12 km}$ = 1.3536 HRS

↓

1.3 HRS

Score 0: The student made more than one error.

27 Solve the inequality below:

$$1.8 - 0.4y \geq 2.2 - 2y$$

$$1.8 - 0.4y \geq 2.2 - 2y$$
$$+2y \qquad\qquad +2y$$

$$1.8 + 1.6y \geq 2.2$$
$$-1.8 \qquad -1.8$$

$$\frac{1.6y}{1.6} \geq \frac{.4}{1.6}$$

$$y \geq .25$$

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

27 Solve the inequality below:

$$1.8 - 0.4y \geq 2.2 - 2y$$

$$+2y \qquad +2y$$

$$1.8 + 1.6y = 2.2$$
$$-1.8 \qquad -1.8$$

$$\frac{1.6y}{1.6} = \frac{-.4}{1.6}$$

$$\boxed{y = .25}$$

$$1.8 - 0.4y > 2.2 - 2y$$
$$1.8 - 0.4(.25) \geq 2.2 - 2(.25)$$

$$1.8 - 1 \geq 2.2 - .5$$

$$\boxed{1.7 \geq 1.7}$$

Score 1: The student solved the inequality as an equation.

27 Solve the inequality below:

$$1.8 - 0.4y \geq 2.2 - 2y$$

$$+2y+2y$$

$$1.8 - 1.6y \geq 2.2$$
$$-1.8 -1.8$$

$$-1.6y \geq .4$$
$$\overline{-1.6} \overline{-1.6}$$

$$y \leq -.25$$

Score 1: The student made an error when adding $+2y$ to both sides of the equation.

27 Solve the inequality below:

$$1.8 - 0.4y \geq 2.2 - 2y$$

$$+0.4y \qquad +0.4y$$

$$1.8 \geq 2.2 - 1.6y$$
$$-2.2 \quad -2.2$$

$$\frac{-0.4 \geq -1.6y}{-1.6 \qquad -1.6}$$

$$-0.25 \geq y$$

Score 0: The student made more than one error.

Question 28

---

28 Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

No Jacob is not correct because everytime a rational number and an irrational number are added the outcome is always irrational.

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

28 Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

$$\frac{1}{3} + \frac{6\sqrt{5}}{7} = \boxed{\frac{7+18\sqrt{5}}{21}}$$ No Jakob is not correct

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

28 Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

$.3\overline{3} + 1.916$

NO because $\frac{1}{3}$ is an irration #
and so is $\frac{6\sqrt{5}}{7}$ and

irrational # + irrational # =

irrational #

Score 1: The student incorrectly identified $\frac{1}{3}$ as being an irrational number.

28 Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

$$\left(\frac{7}{7}\right)\frac{1}{3} + \frac{6\sqrt{5}}{7}\left(\frac{3}{3}\right)$$

$$\frac{7}{21} + \frac{18\sqrt{5}}{21} = \frac{25\sqrt{5}}{21}$$

It is irrational.

Score 0: The student made an error adding the fractions and did not write an explanation or answer no.

29 Graph the inequality $y > 2x - 5$ on the set of axes below.
State the coordinates of a point in its solution.
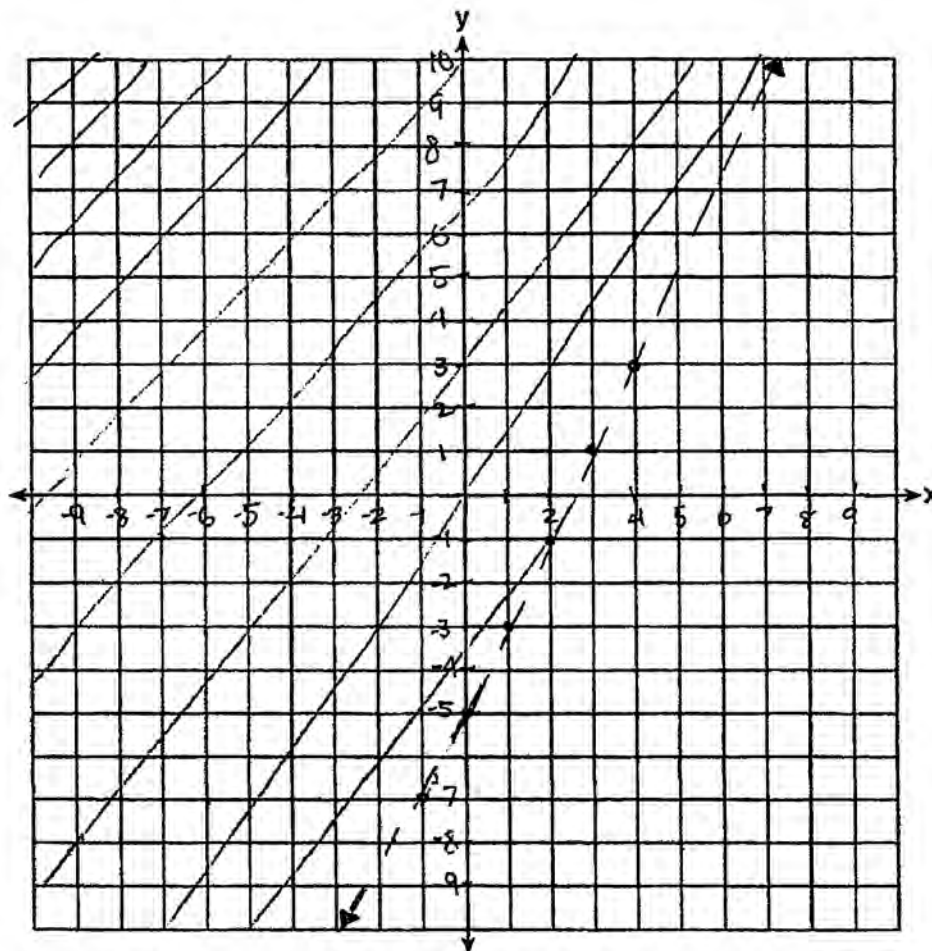
$0 \geq 2(0) - 5$

$0 > -5 \checkmark$

$(0,0)$

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

29 Graph the inequality $y > 2x - 5$ on the set of axes below.
   State the coordinates of a point in its solution.
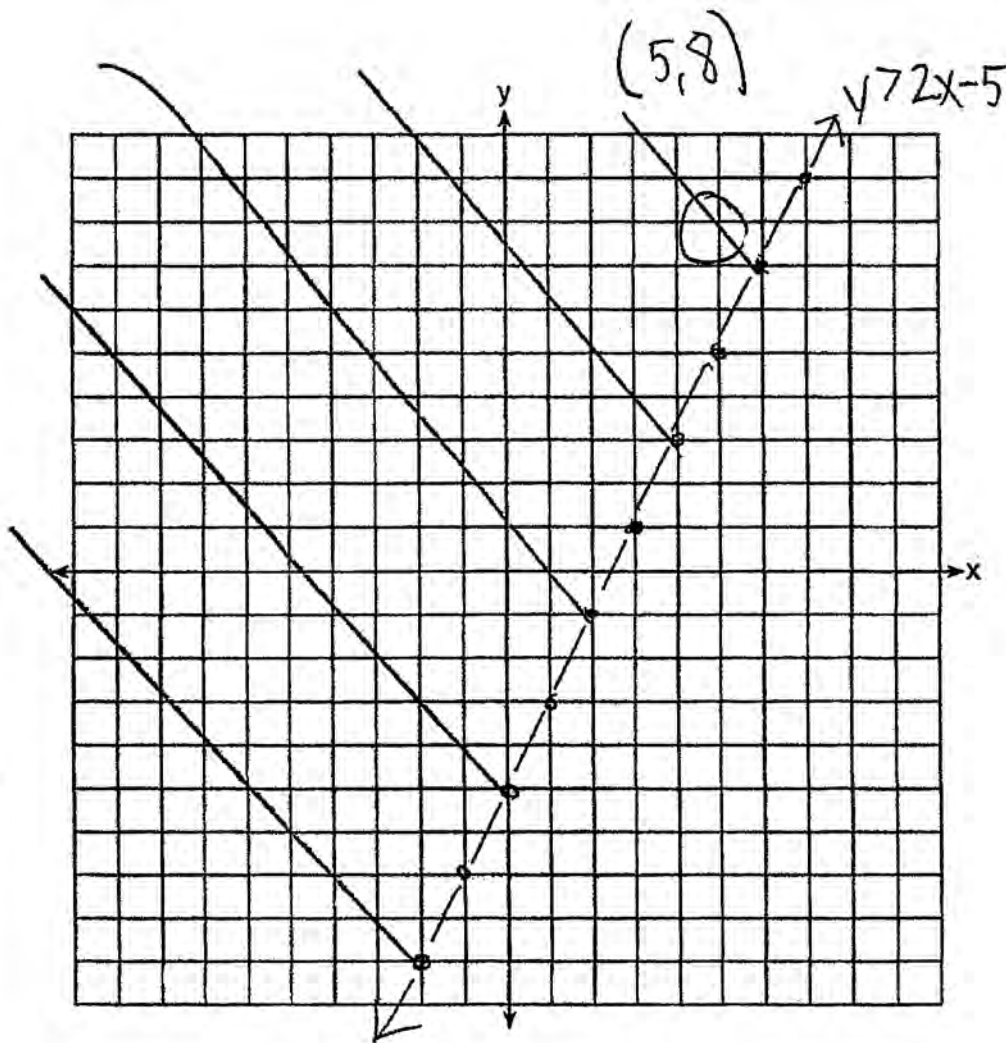
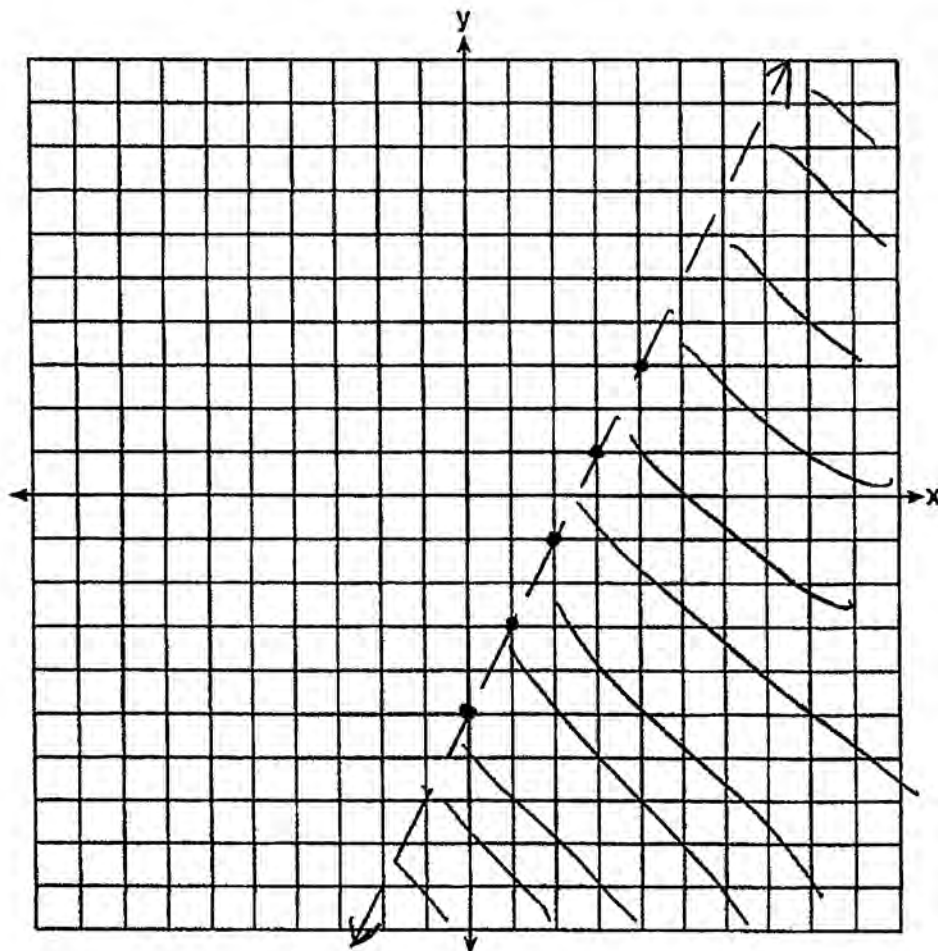**Score 2:** The student gave a complete and correct response.

29 Graph the inequality $y > 2x - 5$ on the set of axes below.
   State the coordinates of a point in its solution.
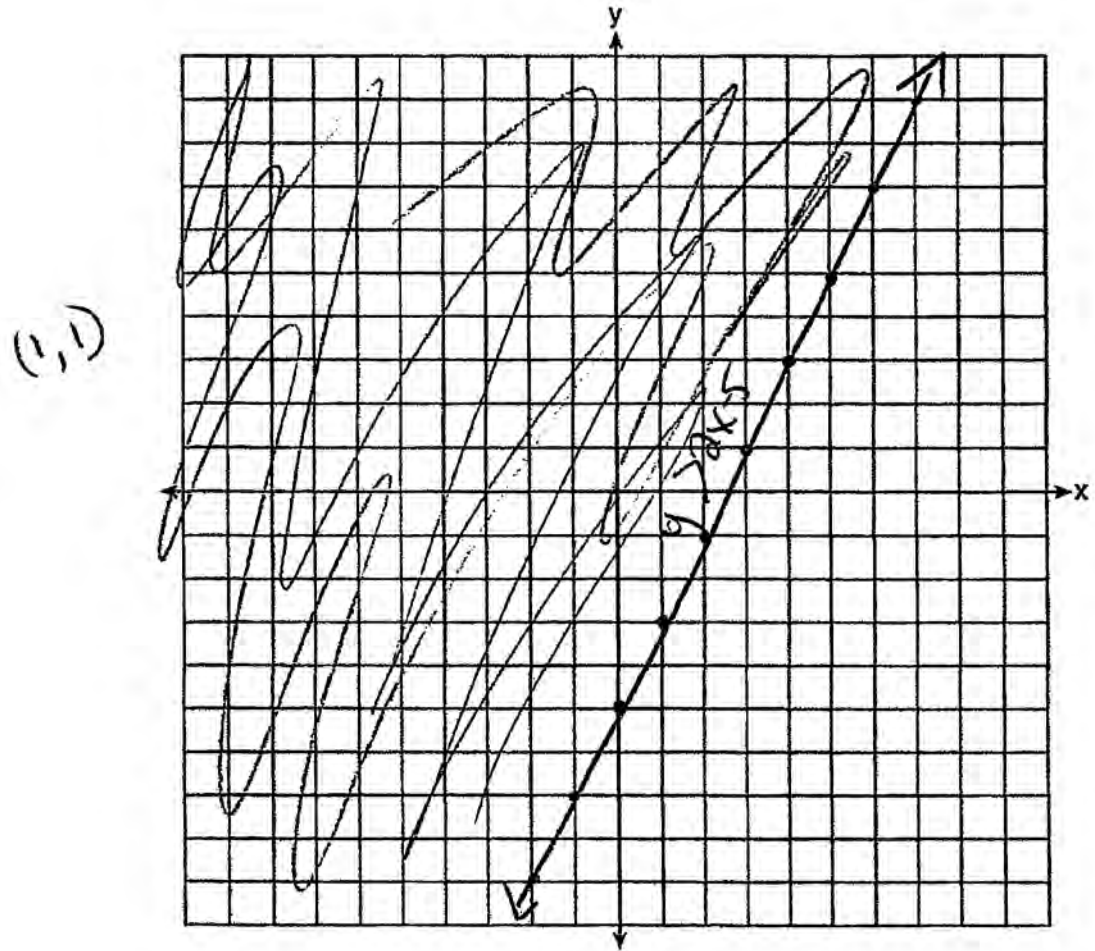
Score 1:   The student graphed a solid line, but stated an appropriate point in the solution.

29 Graph the inequality $y > 2x - 5$ on the set of axes below.
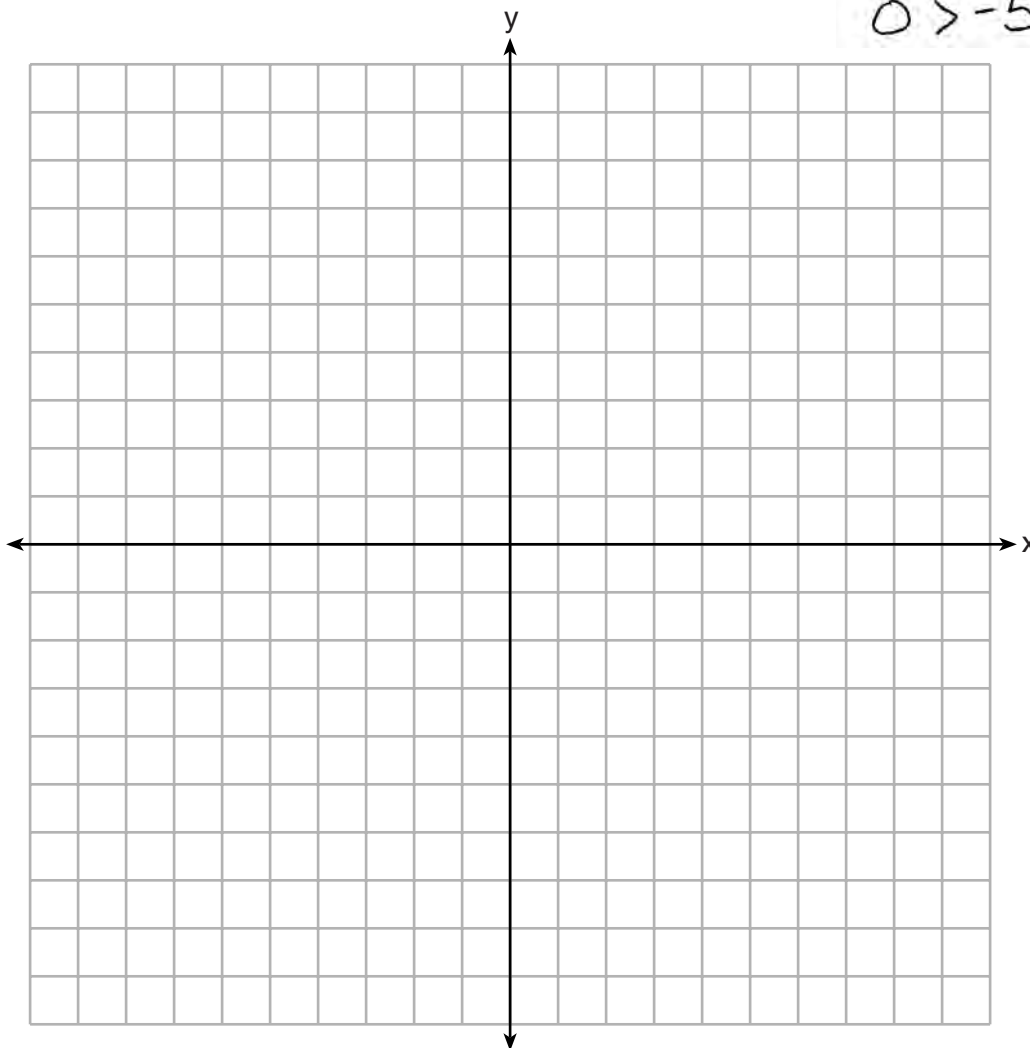   State the coordinates of a point in its solution.

$(6, -2)$

Score 1:   The student shaded the wrong side, but stated an appropriate point in the solution.

29 Graph the inequality $y > 2x - 5$ on the set of axes below. State the coordinates of a point in its solution.
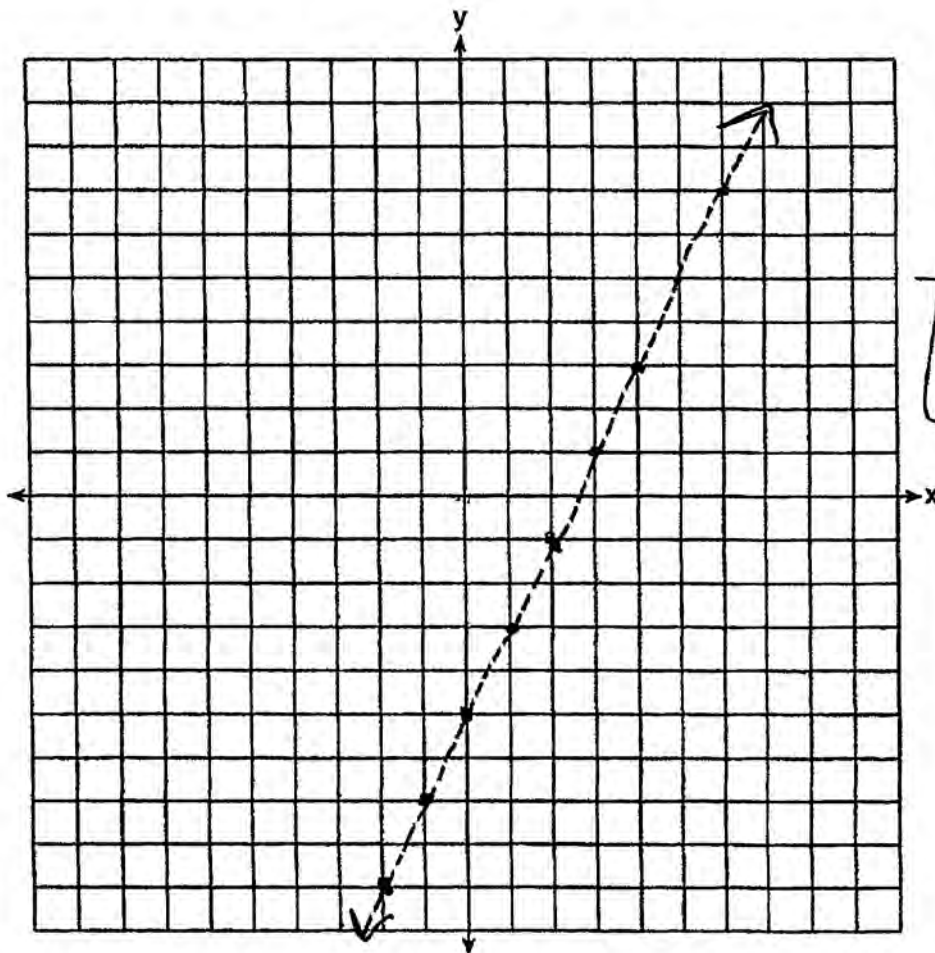
$(0,0)$

$0 > 2 \cdot 0 - 5$

$0 > -5 \checkmark$

Score 1: The student stated a point in the solution set and checked it in the inequality.

29 Graph the inequality $y > 2x - 5$ on the set of axes below.
   State the coordinates of a point in its solution.

(0,-5)

Score 0: The student graphed the inequality incorrectly and the point is not in the solution set.

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

$$C = 1.29 + .99(s-1)$$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

$$C = 1.29 + .99(52-1)$$
$$C = 1.29 + .99(51)$$
$$C = 1.29 + 50.49$$
$$C = 51.78 \quad \text{No}$$

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

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

$$y = 1.29 + .99(x-1)$$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

$$y = 1.29 + .99(x-1)$$
$$y = 1.29 + .99(52-1)$$
$$y = 1.29 + .99(51)$$
$$y = 1.29 + 50.49$$
$$y = 51.78 \quad \boxed{No}$$

Score 2:   The student redefined the variables and completed the response correctly.

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

$$C = S - .01(S-30)$$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

$$C = 52 - .01(52-30)$$
$$C = 52 - .22$$
$$C = \$51.78$$

No She would pay $51.78 for 52 songs

Score 2: The student used an alternate appropriate equation.

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

$$C = 1.29 + s \cdot .99$$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

This is. not correct because the first song is
$1.29 then the rest are 99¢ so 1.29 + 51·.99 =
$51.79 not $52.77.

Score 1: The student only wrote a correct justification indicating that Sandy was incorrect.

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

$$C(s) = 129 + 99(s-1)$$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

$$C(52) = 129 + 99(52-1)$$
$$= 129 + 99(51)$$
$$= 129 + 5049$$
$$= 5178$$

Score 1: The student wrote an appropriate function but did not state whether or not the amount is correct.

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

$$C(s) \begin{cases} 1.29 & \text{if } s = 1 \\ .99s + .30 & \text{if } s > 1 \end{cases}$$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

$$.99 \cdot 52 + .30 = \boxed{51.78}$$

Score 1: The student wrote a correct piecewise function but did not state whether or not the amount is correct.

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

$$C = 1.29s + .99$$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

$$C \quad 1.29(52) + .99$$
$$C = 67.08 + .99$$
$$C = 68.07$$

Score 0: The student wrote an incorrect equation and did not answer the question.

31 A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

Time (hrs)	0	2	5	7
Distance (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

$\dfrac{y_2 - y_1}{x_2 - x_1}$ = average rate of change

$\dfrac{480 - 140}{7 - 2}$ = $\dfrac{340}{5}$

$\downarrow$

$= 68$

Average Rate of
Change : 68 miles per hour

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

31 A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

Time (hrs)	0	2	5	7
Distance (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

$$\frac{340}{5} = 68 \text{ mph}$$

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

31 A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

Time (hrs)	0	2	5	7
Distance (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

$$\frac{7-2}{480-140} = \frac{5}{340} = \frac{1}{68} \quad \frac{hr}{mile}$$

Score 1: The student calculated hours per mile.

31 A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

Time (hrs)	0	2	5	7
Distance (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

$$\frac{7hrs - 2hrs}{480mi - 140mi} = \frac{5hrs}{340mi} = 0.015$$

Score 0: The student made more than one error.

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of *x* map to the same *y*-value.

Determine if either one is correct, and justify your answer completely.

Both are incorrect, though the circle is not a function because it fails the vertical line test. Just-because a line is continuous doesn't mean it is a function. Multiple x-values can match up to one y-value, but not vice-versa.

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

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value.

Determine if either one is correct, and justify your answer completely.

Nora is incorrect because even though she can draw a circle without picking up her pencil it fails the vertical line test.

Mia is correct that it isn't a function but the x and y's are switched in her explanation

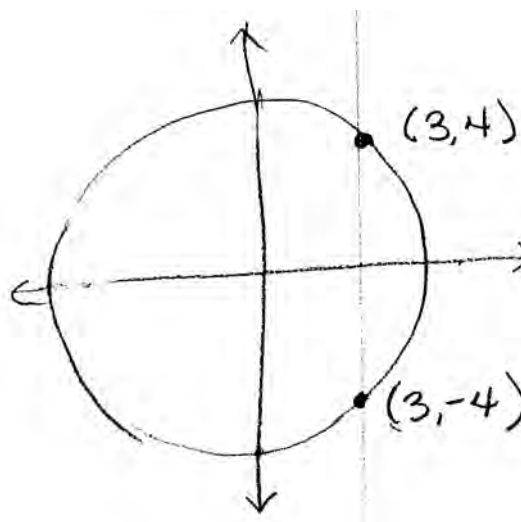**Score 2:** The student gave a complete and correct response.

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of *x* map to the same *y*-value.

Determine if either one is correct, and justify your answer completely.

Neither are correct
you cannot have two same x values equal
different y values

Score 1: The student did not justify why Nora was not correct.

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value.

Determine if either one is correct, and justify your answer completely.

Neither is correct.

It is not a function because it fails the verticle line test

(3,4)

(3,-4)

Score 1: The student wrote an incomplete justification.

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of *x* map to the same *y*-value.

Determine if either one is correct, and justify your answer completely.

Nora is incorrect because tracing a graph without picking up a pencil is not a function test

Score 1: The student only justified Nora's error in reasoning.

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of *x* map to the same *y*-value.

Determine if either one is correct, and justify your answer completely.

IF the circle was half
on the Y or X axis
It would not be a function,
both girls are partially correct
because a circle graph is
a function when they
went in the axis so
they don't reflect back
toward eachother, and
if it is an the axis,
the points will reflect on eachother
making it not a function.
a function can only go
to a point one time

Score 0: The student gave an incorrect response.

33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
   Does $f(-2) = g(-2)$? Use your graph to explain why or why not.
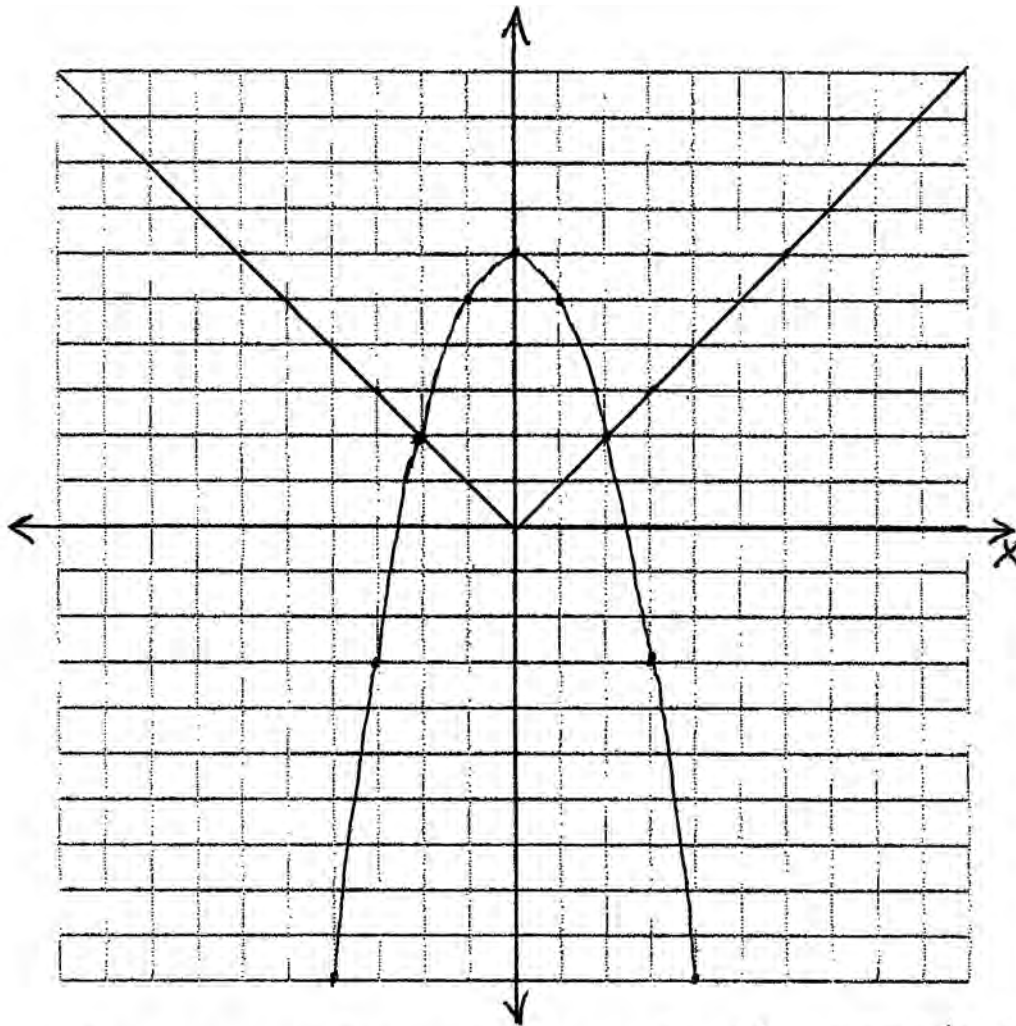
The graph of f(x) intersects the graph of
g(x) at x = -2, so f(-2) = g(-2).

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

33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
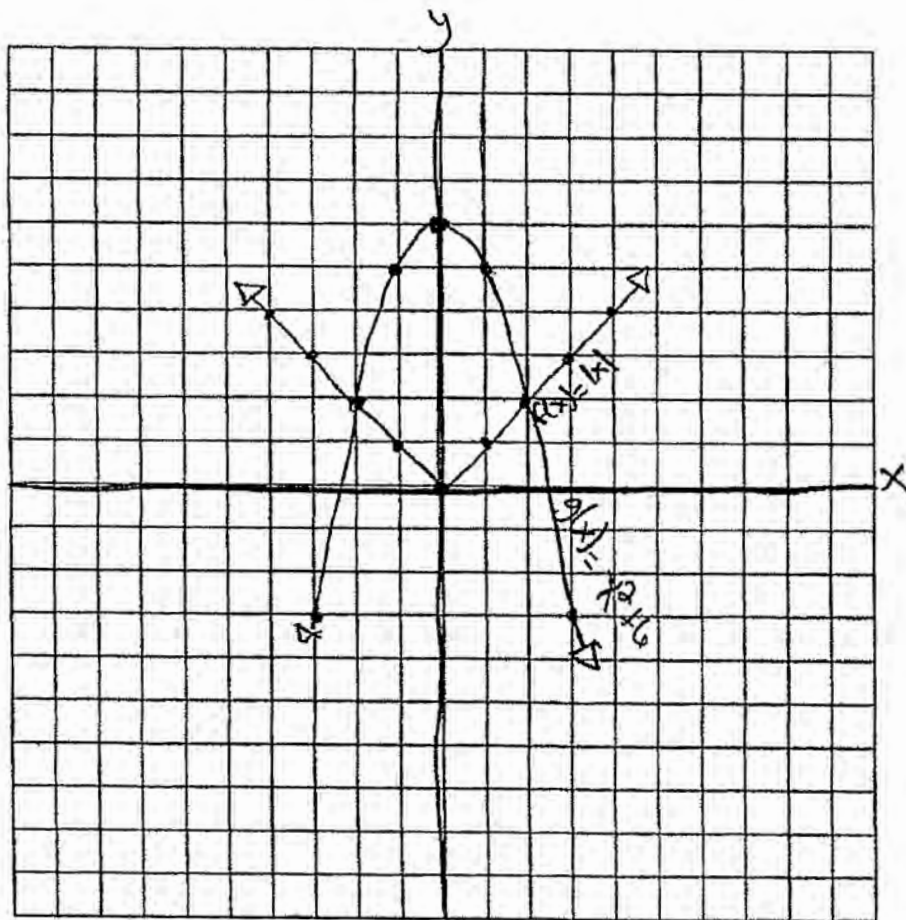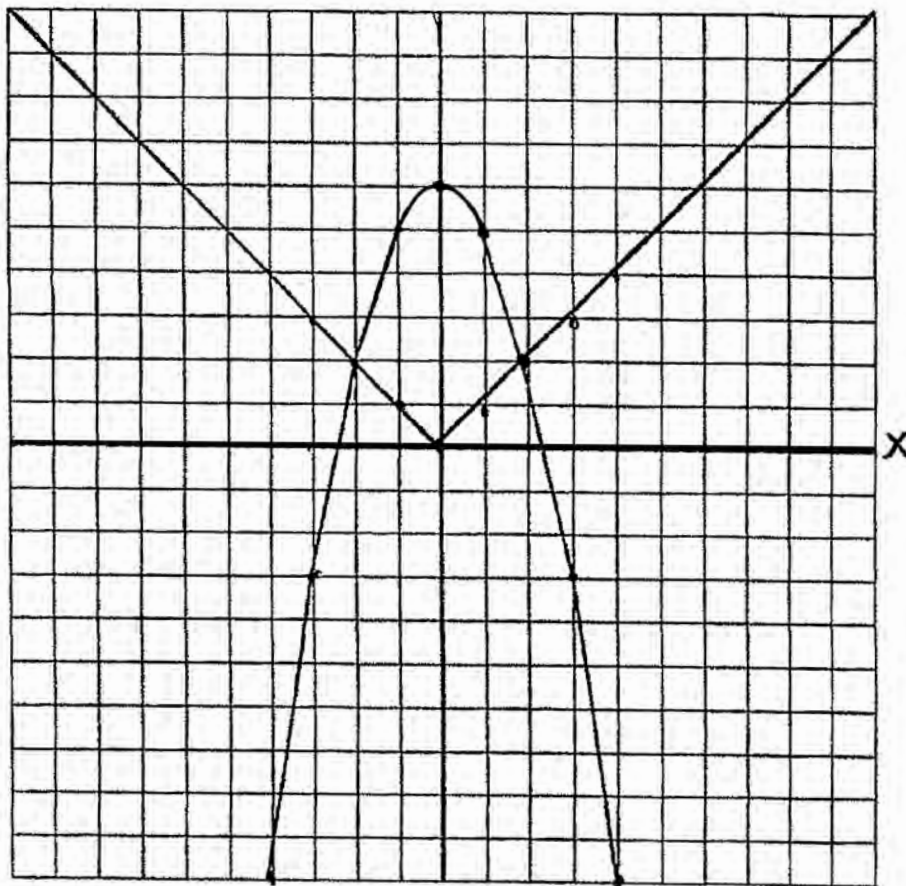 Does $f(-2) = g(-2)$? Use your graph to explain why or why not.

$f(-2) = |-2| = 2$

$g(-2) = -x^2 + 6 = 2$

yes because when you plug in -2 for X, they both come out the same answer.

Score 3: The student justified $f(-2) = g(-2)$ algebraically.

33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
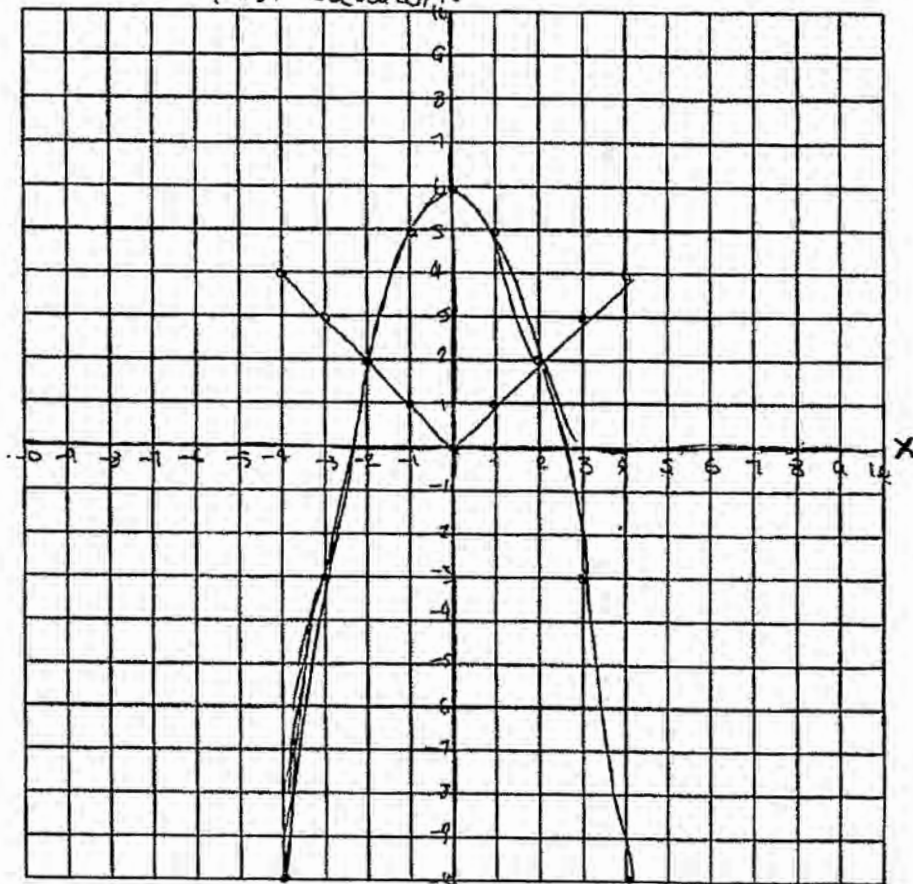Does $f(-2) = g(-2)$? Use your graph to explain why or why not.

Yes because the
two numbers intersect.

Score 3:   Both graphs are drawn correctly.

33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
Does $f(-2) = g(-2)$? Use your graph to explain why or why not.

no because the 2nd eavation doesn't have Points (cordinates) on the first eavation.
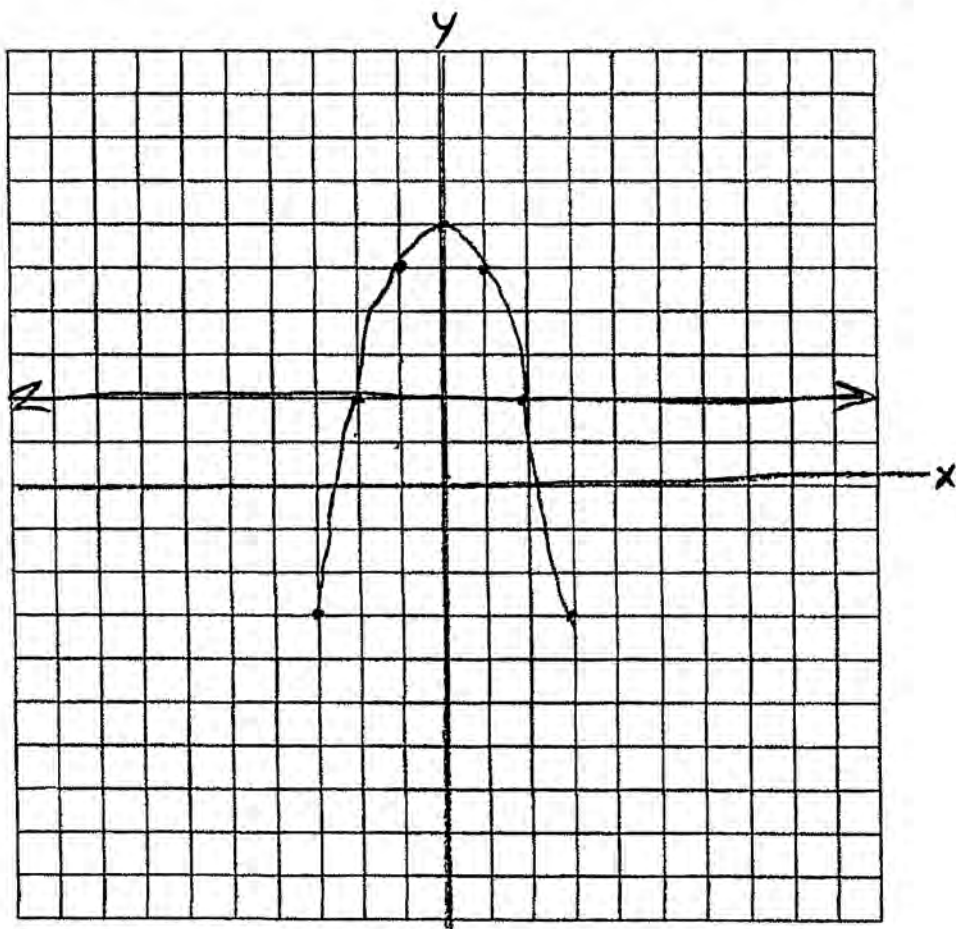

Score 2: The student graphed the parabola correctly. The arrows were missing on the graph of the absolute value.

33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.

Does $f(-2) = g(-2)$? Use your graph to explain why or why not.

no f hits at $(-2, 2)$

Score 1: The student did not put arrows on the graph of the parabola.

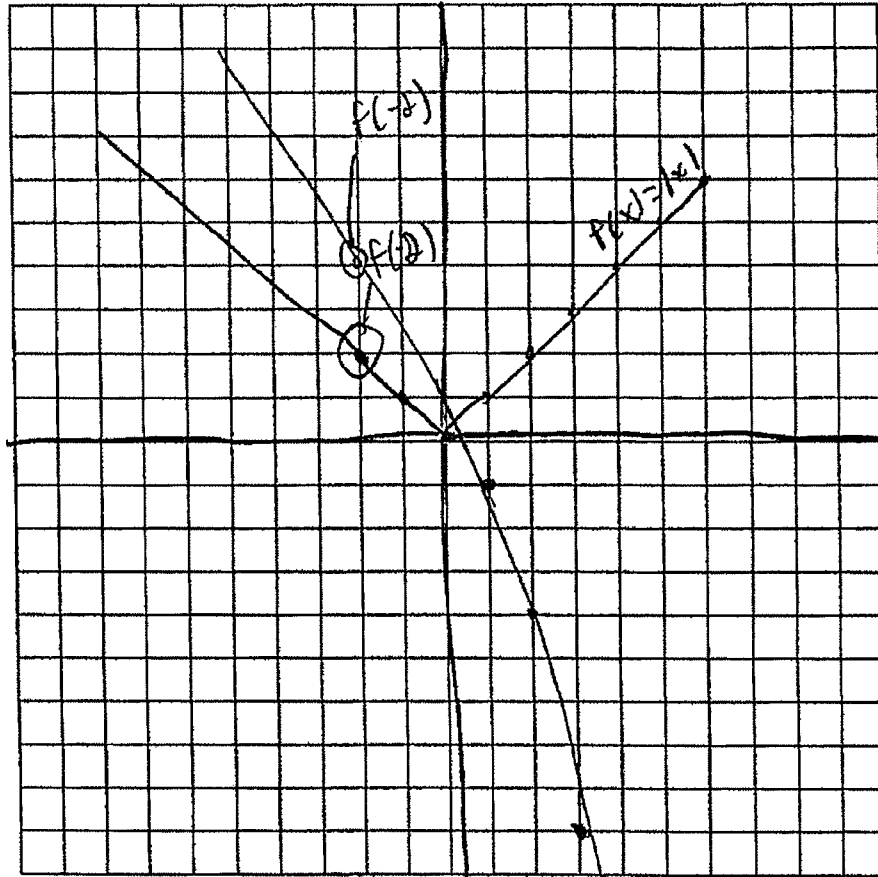**33** Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
Does $f(-2) = g(-2)$? Use your graph to explain why or why not.

NO

$g(x) = -x^2$

$f(x) = |x|$

Score 0: The student did not put arrows on the graph of the absolute value, did not explain their "no" response, and graphed $g(x)$ incorrectly.

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

$$3\;\;1P + 2S = 15.95$$
$$ \;\;3P + 5S = 45.90$$
$$5P + 10S = 79.75$$
$$6P + 10S = 91.8$$
$$\frac{-1P = -12.05}{-1}$$
$$1\;Pizza = 12.05$$

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

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

5 sodas

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

let x = soda = 1.95
y = pizza = 12.05

$y + 2x = 15.95$
$-2x \quad -2(1.95)$
$y = 15.95 - 2x$
$\times 3$
$3y = 47.85 - 6x$

$3y + 5x = 45.90$
$-5x \quad -5x$
$3y = 45.90 - 5x$

$y + 2(1.95) = 15.95$

$y + 3.90 = 15.95$
$-3.90 \quad -3.90$

$y = 12.05$

$47.85 - 6x = 45.90 - 5x$
$+6x \qquad +6x$
$47.85 = 45.90 + x$
$-45.90 \quad -45.90$

$1.95 = x$

$3(12.05) + 5(1.95) = 45.90$
$36.15 + 9.75 = 45.90$
$45.90 = 45.90$ ✓

One pizza = 12.05

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

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

Let $x = $ $ of pizza

$y = $ $ of sodas

$45.90 = 3x + 5y$ (2)

$\Rightarrow$ $10.90 = 5x + 2y$ (5)

_____

$91.80 = 6x + 10y$

$-79.50 = 5x + 10y$

_____

$12.30 = x$

$\boxed{$12.30}$

Score 3: The student made a transcription error when writing their second equation, but found an appropriate answer.

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

$$\text{Check}$$
$$1x + 2x = 15.95$$
$$1(15.17) + 2(.39) = 15.95$$
$$15.17 + .78 = 15.95$$
$$.95.95 = 15.95 \checkmark$$

Let $X = $ pizza 15.17
$Y = $ soda .39

$\boxed{\text{pizza} = 15.17}$

$$\overset{-3}{(1x} + \overset{-3}{2y)} = \overset{-3}{(15.95)}$$
$$(3x)(+ 1y) = 45.90$$

$$\overset{-3}{} \qquad -3\cancel{x} - 6y = -47.185$$
$$\cancel{3x} + 1y = 45.90$$

$$1(x) + 2(.39) = 15.95$$

$$1x + .78 = 15.95$$
$$- .78 \quad - .78$$
$$15.17$$

$$\frac{-5y}{-5} = \frac{-1.95}{-5}$$
$$Y = .39$$

Score 3: The student wrote an incorrect second equation, but found an appropriate answer.

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

$$\begin{cases} x + 2a = 15.95 \\ 3x + 5a = 45.90 \end{cases}$$

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

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

Let x = # of pizza's ordered
Let y = # of soda's ordered

$3(x + 2y = ^\$15.95) \rightarrow 3x + 6y = 47.85$
$3x + 3y = \$45.90 \rightarrow 3x + 3y = 45.90$

$$\frac{9y}{9} = \frac{94.75}{9}$$

$$y = \$10.55$$

Score 1: The student only wrote one correct equation.

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

$$P = pizza$$

$$S = sodas$$

$$(p)(s^2) = \$15.95$$

$$(p^3)(s^5) = \$45.90$$

Score 0: The student showed no correct work.

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

$$f(x) = \tfrac{3}{4}x + 4.5$$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

The slope means that she spends
$0.75 on each card, but the y-intercept
says that she spent $4.50 initially
to start making the cards.

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

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

$$y = 0.75x + 4.5$$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

the slope means how much
each card costs

the yintercept mean how much cost
She started with

Score 3: The student did not write an equation in terms of $f(x)$.

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

$+2\ \{$
$+3\ \{$
$+1\ \{$

$\}+1.5$
$\}+2.25$
$\}+.75$

$Y = $
$94 = 6s$

Write a linear function, $f(x)$, that represents the data.

$\dfrac{Y_2 - Y_1}{X_2 - X_1}$ $\dfrac{12 - 11.25}{10 - 9}$

$Y = X_1 (b + Y_1)$
$Y = 6(6 + 9)$
$Y = 66 + 54$

$Y = mx + b$

$\boxed{Y = .75x + 9}$

$\dfrac{.75}{1}$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

The slope is the amount of money she is spending per card. The y-int is the amount of money she is spending to start

Score 2: The student wrote two correct explanations.

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

$$f(x) = .75X + 4.5$$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

Slope is the rate at which the line increases y-intercept is where the line begins on the y-axis.

Score 2:   The student wrote explanations that were not in context.

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

$$\frac{\Delta y}{\Delta x} \quad \frac{9 \cdot 5 - 9}{4 - 6} = \frac{-2 \cdot 5}{-2} = 1.25$$

$$\frac{\Delta y}{\Delta x} = \frac{12 - 11.25}{10 - 9} = \frac{.75}{9} = \frac{3}{4}$$

Write a linear function, $f(x)$, that represents the data.

$$y = \frac{3}{4}x$$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

The slope is how much money each card costs and the y intercept is showing the starting point.

Score 1: The student wrote one correct explanation.

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

$$y = ax + b \qquad a = .75$$
$$b = 4.5$$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

The slope means rise over run. In this case it is .75.
The y-intercept is 4.5, which is where the graph starts on the y-axis.

Score 1: The student did not write an equation in terms of $f(x)$.

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

$$y = \$1.50\,(x)$$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

X is equal to the number of cards she makes

Y is equal to the money she spent on the cards.

Score 0: The student showed no correct work.

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.
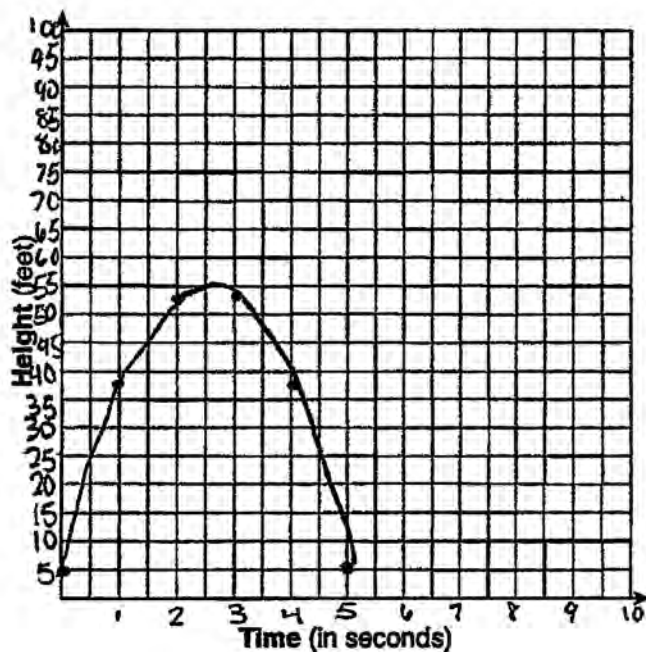
State the coordinates of the vertex and explain its meaning in the context of the problem.

The vertex is (2.5, 55) which means the ball started to fall after 2.5 seconds at a height of 55.

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

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.

State the coordinates of the vertex and explain its meaning in the context of the problem.

$X = 2\frac{1}{2}$

$Y = 55$

this meas that is where the ball is falling back down, it has reached its highest point

Score 3: The student wrote an incomplete explanation.

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.
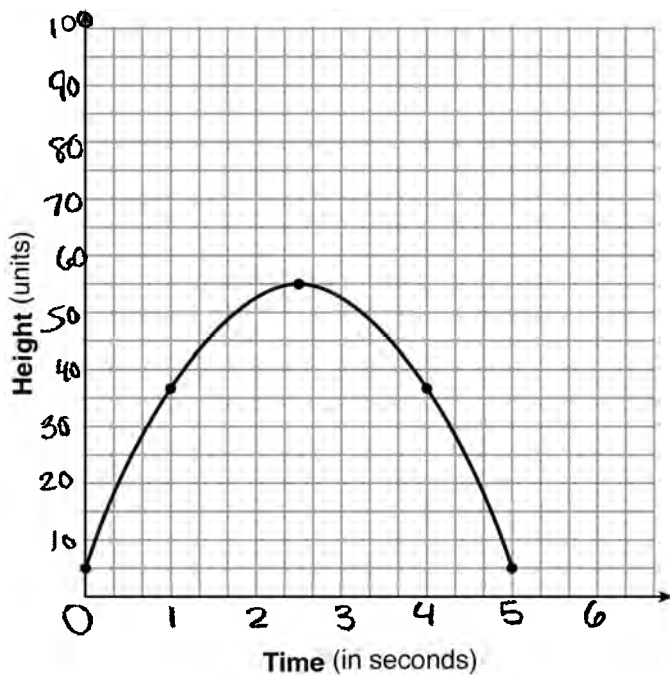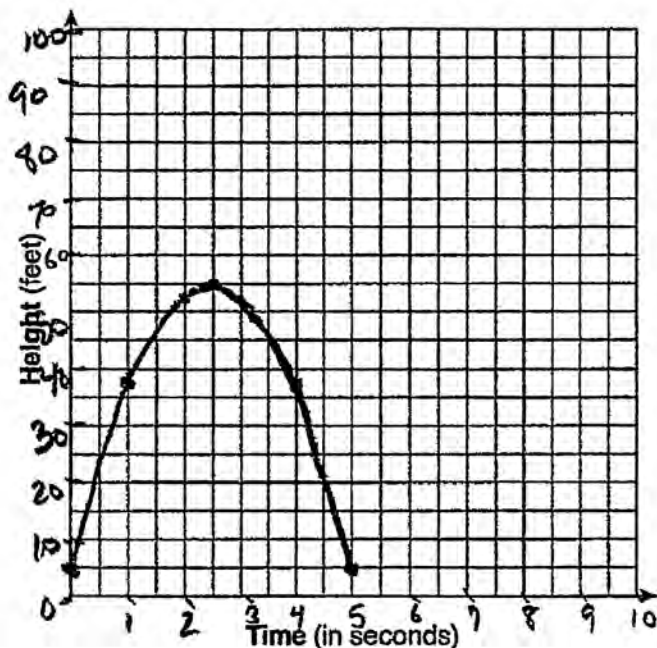

State the coordinates of the vertex and explain its meaning in the context of the problem.

At 2.5 seconds the height was 55 this means that the highest the ball got was 55 units and it was 2.5 seconds this occured.

Score 3: The student did not state the coordinates of the vertex.

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.

State the coordinates of the vertex and explain its meaning in the context of the problem.

$$\text{Vertex} = (2.5, 55)$$

Score 2: The student did not connect the points to form the parabola and did not explain the meaning of the coordinates of the vertex.

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.

State the coordinates of the vertex and explain its meaning in the context of the problem.

$$x = \frac{-b}{2a} = \frac{-40}{-16} = 2.5 - \text{turning point} \quad (2.5, 55)$$

$$h = -8(2.5)^2 + 40(2.5) + 5$$
$$= -50 + 100 + 5$$
$$= -50 + 105$$
$$= 55$$

Score 1: The student did not use a consistent scale of the x-axis, extended the graph beyond $t = 0$ and $t = 5$, and did not explain the meaning of the coordinates of the vertex.

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.
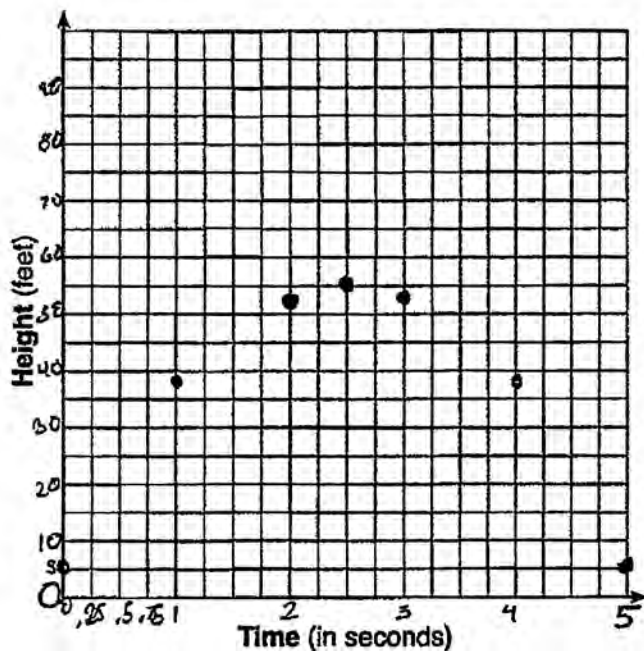

State the coordinates of the vertex and explain its meaning in the context of the problem.

The vertex is (2,53) and that is the maximum height the ball reaches.

Score 1: The student made an error when graphing the parabola and only explained the meaning of the y-coordinate.

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.
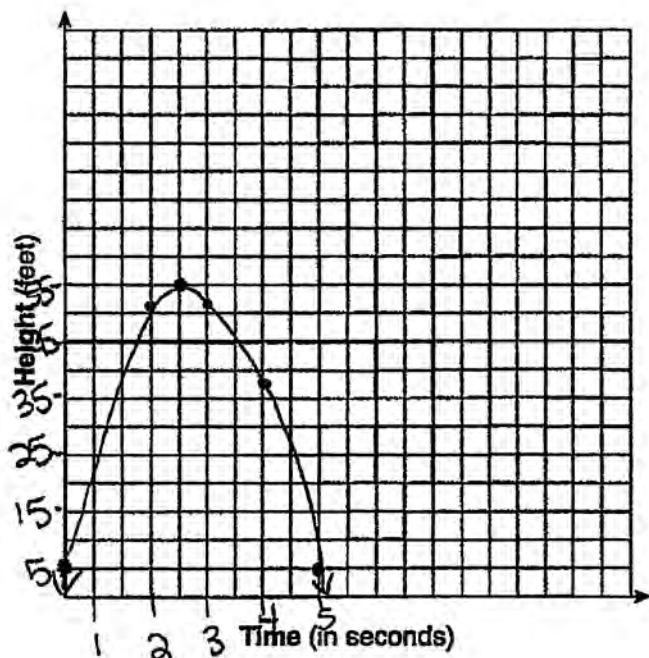
Height (units)

Time (in seconds)

State the coordinates of the vertex and explain its meaning in the context of the problem.

The vertex is the time when the ball will be at its highest point.

Score 1: A correct explanation for the vertex is provided, but no further correct work is shown.

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.
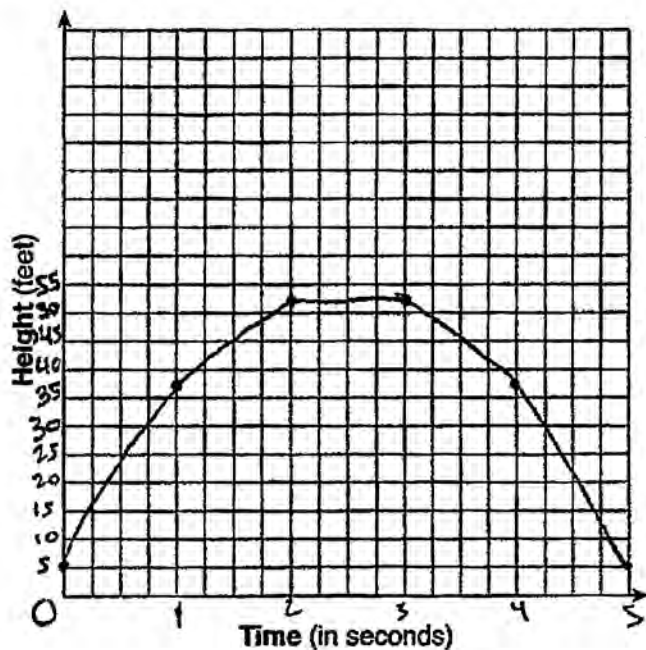
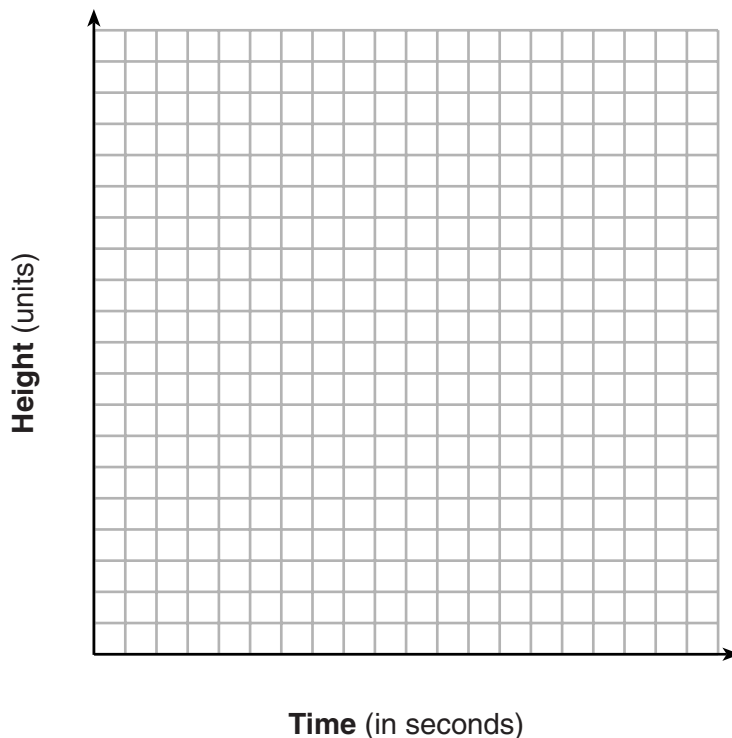| x	y
0	5
1	37
2	53
2.5	55
3	53
4	37
5	5

Height (feet)

Time (in seconds)
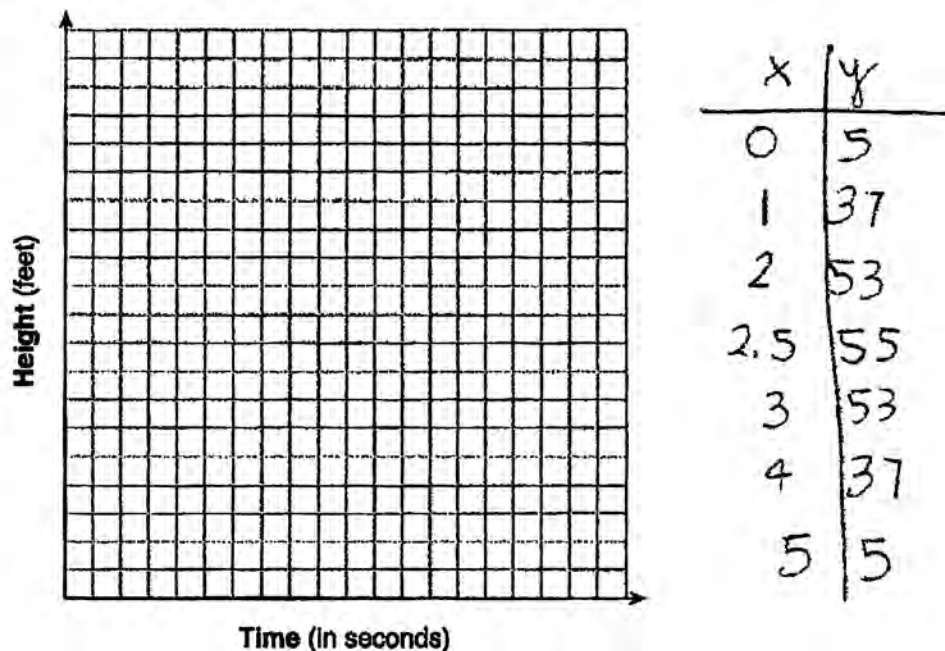
State the coordinates of the vertex and explain its meaning in the context of the problem.

Vertex is the maximum point on the graph

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

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

$$1000 - 60x = 600 - 20x \quad \text{— equation}$$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

$$1000 - 60x = 600 - 20x$$
$$+60x \qquad +60x$$

$$1000 = 600 + 40x$$
$$-600 \quad -600$$

$$\frac{400}{40} = \frac{40x}{40}$$

$$10 = x$$

10 months
$400

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

Ian is incorrect because 6 months after he and Ken owe the same amount, he still owes his parents $40. x= months. Ian and Ken will owe the same amount in 10 months. 1000 - 60(16) = y. y=total $ owe. y= $40.

10 months + 6 months = 16 months

$$1000 - 60(16) = y$$
$$1000 - 960 = y$$
$$\boxed{\$40 = y}$$

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

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

$$\begin{pmatrix} 1000 = 60x \\ 600 = 20x \end{pmatrix} \qquad \frac{400 = 40x}{40 \quad 40}$$

$$\boxed{400 = 40x}$$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

$$\frac{400 = 40x}{40 \quad 40} \quad = \quad \begin{array}{l} 600 = 20x \\ 600 = 20(10) \\ 600 = 200 \\ 400 \end{array} \boxed{\begin{array}{l} x = 10 \\ \text{months} \end{array}}$$

$$\boxed{\$400}$$

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

No. He will have $40
to pay after 6 months.

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

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

$$Ian \rightarrow \quad 60x = 1000$$
$$Ken \rightarrow \quad 20x = 600$$
$$\overline{\qquad\qquad}$$
$$40x = 400$$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

$$60(10) = 600$$
$$20(10) = 200$$

IAN	KEN
1000	600
- 600	-200
400 $	400 $

in 10 months the two boys will owe the same amount

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

At 10 months Ian only owes 400$

$$60(6) = 360 \qquad \begin{array}{r} 360 \\ -400 \\ \hline -40 \ \$ \end{array}$$

Ian is not correct, he still owes 40$ because after 6 months he only made 360$ when he needed 400$

Score 5: The student did not show an algebraic solution to determine the number of months.

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

Ian $y = -60x + 1000$

Ken $y = -20x + 600$

$-60x + 1000 = -20x + 600$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

$-60x + 1000 = -20x + 600$ Ian: $y = -60(10) + 1000$
$+60x \qquad\qquad\quad +60x$ $= 400$

$1000 = 40x + 600$ Ken: $y = -20(10) + 600$
$-600 \qquad\quad -600$ $y = 400$

$\dfrac{400}{40} = \dfrac{40x}{40}$ $\boxed{x = 10}$ both owe $400

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

Ian is not correct!

Score 4: The student did not write an explanation.

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

$$1000 - 60x = 600 - 20x$$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

Ian x	y
2	880
4	760
6	640
8	520
10	400
12	280

After 10 months they will both owe $400

x	y
2	560
4	520
6	480
8	440
10	400
12	360

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

$$y = 1000 - 60x$$
$$y = 1000 - 60(6)$$
$$y = 1000 - 360$$
$$y = 640$$

NO, Ian is incorrect. He will still owe $640

Score 4: The student used a method other than algebraic to determine the number of months and amount owed. The student also made an error in the explanation by not taking into consideration the ten months that had been paid.

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

$I = Ian$

$K = ken$

$X = months$

$f(I) = 60x = 1000$

$f(K) = 20X = 600$

$60x + 20x = 1600$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

No Ian is wrong, It will take Ian about 17 months to pay off his loan at a constant rate of $60 a month. The boys will both owe $400 at month 10 and ken will be paid off In 30 months with a rate of $20

Score 3: The student did not write a correct equation and used a nonalgebraic method to determine the number of months.

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

$$Y = -60X + 1000$$
$$\text{Ian}$$

$$Y = -20X + 600$$
$$\text{Ken}$$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

Ian

1	940
2	880
3	820
4	760
5	700
6	640
7	580
8	520
9	460
10	400

Ken

1	580
2	560
3	540
4	520
5	500
6	480
7	460
8	440

9	420
10	400

BY mout 10 they will owe the some amount.

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

It is correct becouse they both paid there debt.

Score 2: The student wrote an appropriate system of equations and used a nonalgebraic method to determine the number of months.

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

Ian
$60x = 1000$

Ken:
$20x = 600$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

Ian:

$60x = 1000$
$60(2) = 120$
$60(3) = 180$
$60(4) = 240$
$60(5) = 300$
$60(6) = 360$
$60(7) = 420$
$60(8) = 480$
$60(9) = 540$

$60(10) = 600$
$60(11) = 660$
$60(12) = 720$

After 10 months, Ian will have paid $600 which is the total amount Ken has to pay.

Ken:

$20x = 600$
$20(2) = 40$
$20(3) = 60$
$20(4) = 80$
$20(5) = 100$
$20(6) = 120$
$20(7) = 140$
$20(8) = 160$
$20(9) = 180$

$20(10) = 200$
$20(11) = 220$
$20(12) = 240$

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

No he is not correct because he has to pay a total of $1000 and he has only paid $360.

Score 1: The student wrote individual equations for Ian and Ken.

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

$$Y = 1000x + 60 \quad \text{Iian}$$
$$Y = 600x + 20 \quad \text{Ken}$$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

$$40\sqrt{400}$$

$$NOW = 60, 20$$

same amount = | 10 months |

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

He is wrong because it took 10 months for them to owe the same amount

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

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

Regents Examination in Algebra I (Common Core) – January 2017

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

(Use for the January 2017 exam only.)

Raw Score	Scale Score	Performance Level	Raw Score	Scale Score	Performance Level	Raw Score	Scale Score	Performance Level
86	100	5	57	81	4	28	66	3
85	99	5	56	81	4	27	65	3
84	98	5	55	80	4	26	64	2
83	97	5	54	80	4	25	63	2
82	95	5	53	80	4	24	62	2
81	94	5	52	80	4	23	60	2
80	93	5	51	79	3	22	59	2
79	92	5	50	79	3	21	58	2
78	92	5	49	79	3	20	56	2
77	91	5	48	78	3	19	55	2
76	90	5	47	78	3	18	53	1
75	89	5	46	78	3	17	51	1
74	88	5	45	77	3	16	49	1
73	88	5	44	77	3	15	47	1
72	87	5	43	76	3	14	45	1
71	86	5	42	76	3	13	43	1
70	86	5	41	75	3	12	41	1
69	86	5	40	75	3	11	38	1
68	85	5	39	74	3	10	36	1
67	84	4	38	74	3	9	33	1
66	84	4	37	73	3	8	30	1
65	83	4	36	73	3	7	27	1
64	83	4	35	72	3	6	24	1
63	83	4	34	71	3	5	20	1
62	82	4	33	70	3	4	17	1
61	82	4	32	70	3	3	13	1
60	82	4	31	69	3	2	9	1
59	81	4	30	68	3	1	5	1
58	81	4	29	67	3	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).