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

ALGEBRA I
(Common Core)

Tuesday, June 13, 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.

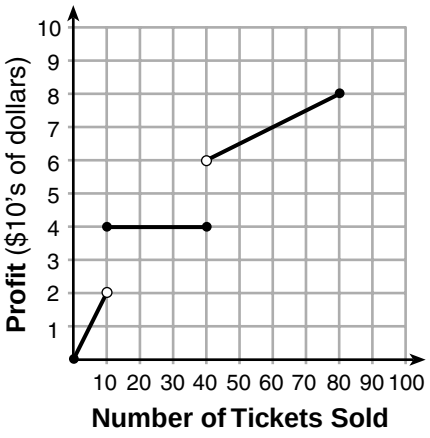
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

Part I

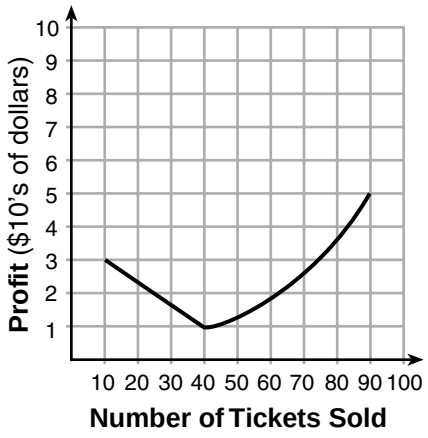
Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression 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 To keep track of his profits, the owner of a carnival booth decided to model his ticket sales on a graph. He found that his profits only declined when he sold between 10 and 40 tickets. Which graph could represent his profits?



(1)



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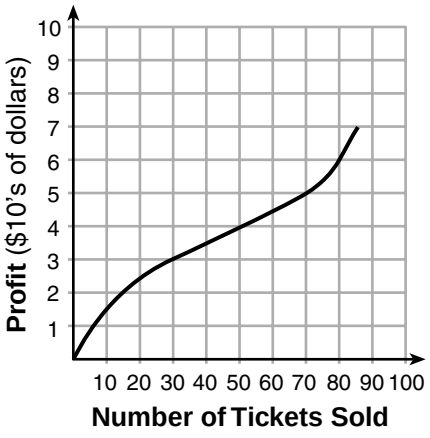

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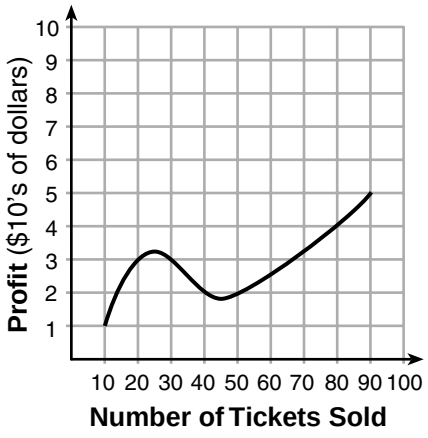


(4)

Use this space for computations.

2 The formula for the surface area of a right rectangular prism is $A = 2lw + 2hw + 2lh$, where l, w, and h represent the length, width, and height, respectively. Which term of this formula is *not* dependent on the height?

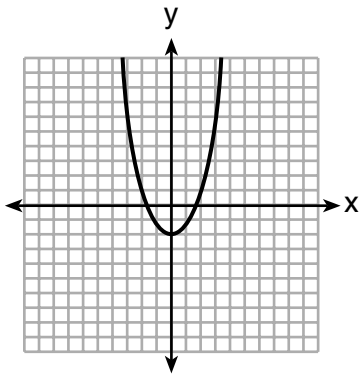
(1) A

(2) $2lw$

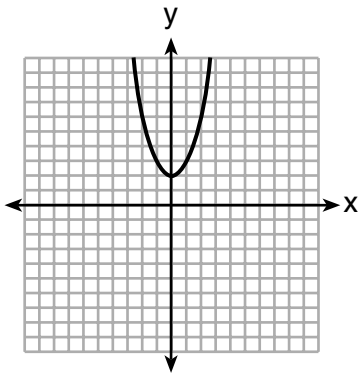
(3) $2hw$

(4) $2lh$

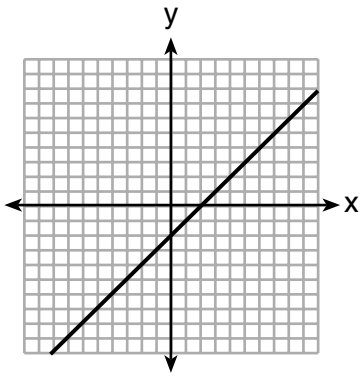
3 Which graph represents $y = \sqrt{x - 2}$?



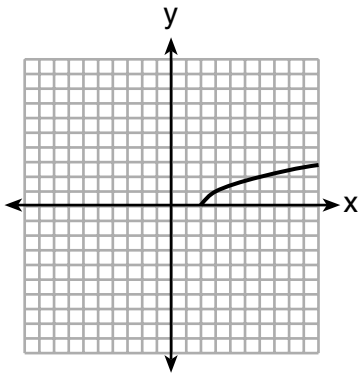
(1)



(3)



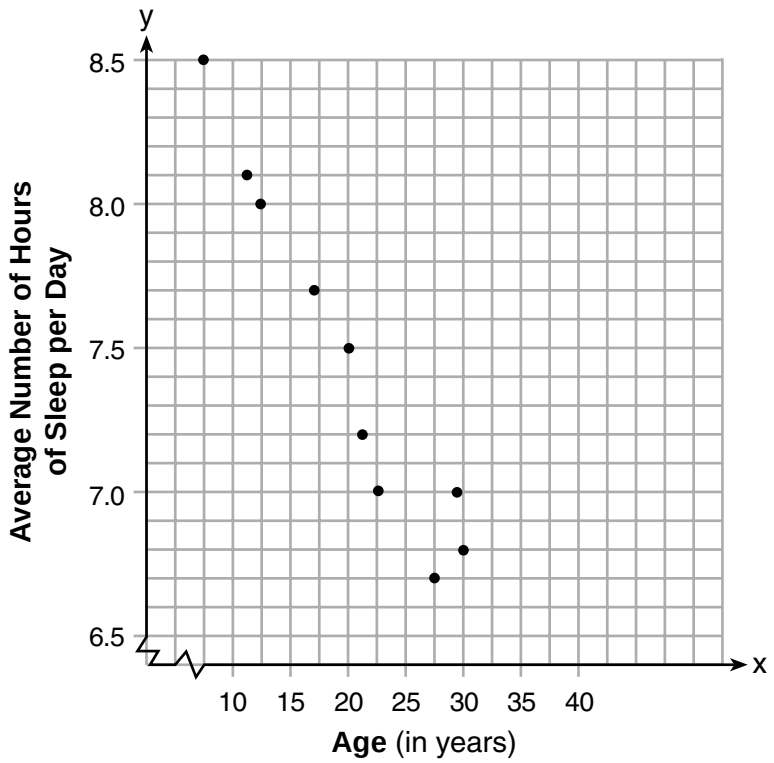
(2)



(4)

Use this space for computations.

4 A student plotted the data from a sleep study as shown in the graph below.



The student used the equation of the line $y = -0.09x + 9.24$ to model the data. What does the rate of change represent in terms of these data?

(1) The average number of hours of sleep per day increases 0.09 hour per year of age.

(2) The average number of hours of sleep per day decreases 0.09 hour per year of age.

(3) The average number of hours of sleep per day increases 9.24 hours per year of age.

(4) The average number of hours of sleep per day decreases 9.24 hours per year of age.

Use this space for computations.

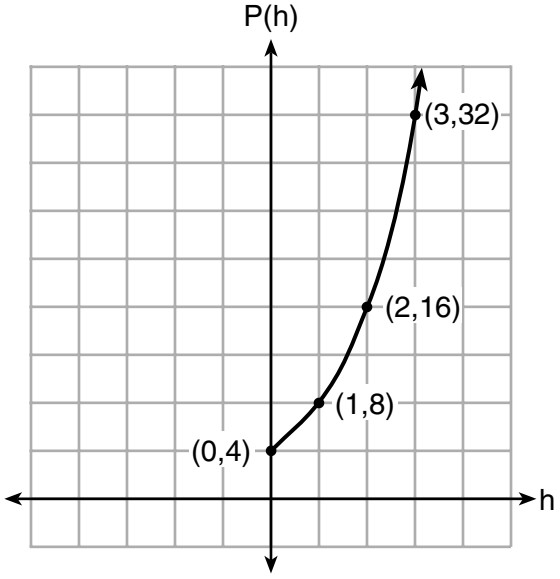
5 Lynn, Jude, and Anne were given the function $f(x) = -2x^2 + 32$, and they were asked to find $f(3)$. Lynn's answer was 14, Jude's answer was 4, and Anne's answer was ± 4. Who is correct?

(1) Lynn, only
(2) Jude, only
(3) Anne, only
(4) Both Lynn and Jude

6 Which expression is equivalent to $16x^4 - 64$?

(1) $(4x^2 - 8)^2$
(2) $(8x^2 - 32)^2$
(3) $(4x^2 + 8)(4x^2 - 8)$
(4) $(8x^2 + 32)(8x^2 - 32)$

7 Vinny collects population data, $P(h)$, about a specific strain of bacteria over time in hours, h, as shown in the graph below.



Which equation represents the graph of $P(h)$?

(1) $P(h) = 4(2)^h$
(2) $P(h) = \frac{46}{5}h + \frac{6}{5}$
(3) $P(h) = 3h^2 + 0.2h + 4.2$
(4) $P(h) = \frac{2}{3}h^3 - h^2 + 3h + 4$

Use this space for computations.

8 What is the solution to the system of equations below?

$$y = 2x + 8$$
$$3(-2x + y) = 12$$

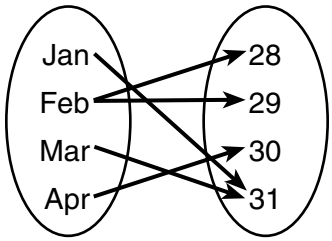
(1) no solution

(2) infinite solutions

(3) $(-1,6)$

(4) $\left(\frac{1}{2},9\right)$

9 A mapping is shown in the diagram below.



This mapping is

(1) a function, because Feb has two outputs, 28 and 29

(2) a function, because two inputs, Jan and Mar, result in the output 31

(3) not a function, because Feb has two outputs, 28 and 29

(4) not a function, because two inputs, Jan and Mar, result in the output 31

10 Which polynomial function has zeros at -3, 0, and 4?

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

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

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

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

Use this space for computations.

11 Jordan works for a landscape company during his summer vacation. He is paid \$12 per hour for mowing lawns and \$14 per hour for planting gardens. He can work a maximum of 40 hours per week, and would like to earn at least \$250 this week. If m represents the number of hours mowing lawns and g represents the number of hours planting gardens, which system of inequalities could be used to represent the given conditions?

(1) $m + g \leq 40$
$12m + 14g \geq 250$

(2) $m + g \geq 40$
$12m + 14g \leq 250$

(3) $m + g \leq 40$
$12m + 14g \leq 250$

(4) $m + g \geq 40$
$12m + 14g \geq 250$

12 Anne invested \$1000 in an account with a 1.3% annual interest rate. She made no deposits or withdrawals on the account for 2 years. If interest was compounded annually, which equation represents the balance in the account after the 2 years?

(1) $A = 1000(1 - 0.013)^2$

(2) $A = 1000(1 + 0.013)^2$

(3) $A = 1000(1 - 1.3)^2$

(4) $A = 1000(1 + 1.3)^2$

13 Which value would be a solution for x in the inequality $47 - 4x < 7$?

(1) -13

(2) -10

(3) 10

(4) 11

14 Bella recorded data and used her graphing calculator to find the equation for the line of best fit. She then used the correlation coefficient to determine the strength of the linear fit.

Which correlation coefficient represents the strongest linear relationship?

(1) 0.9

(2) 0.5

(3) -0.3

(4) -0.8

Use this space for computations.

15 The heights, in inches, of 12 students are listed below.

61, 67, 72, 62, 65, 59, 60, 79, 60, 61, 64, 63

Which statement best describes the spread of these data?

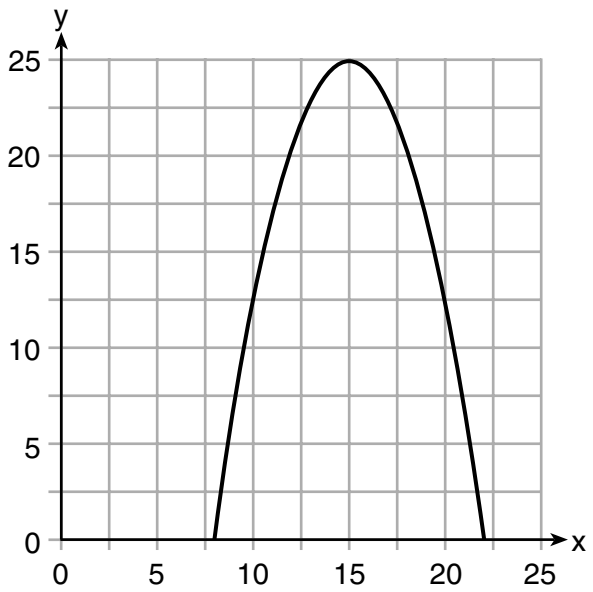
(1) The set of data is evenly spread.

(2) The median of the data is 59.5.

(3) The set of data is skewed because 59 is the only value below 60.

(4) 79 is an outlier, which would affect the standard deviation of these data.

16 The graph of a quadratic function is shown below.



An equation that represents the function could be

(1) $q(x) = \frac{1}{2}(x + 15)^2 - 25$

(2) $q(x) = -\frac{1}{2}(x + 15)^2 - 25$

(3) $q(x) = \frac{1}{2}(x - 15)^2 + 25$

(4) $q(x) = -\frac{1}{2}(x - 15)^2 + 25$

Use this space for computations.

17 Which statement is true about the quadratic functions $g(x)$, shown in the table below, and $f(x) = (x - 3)^2 + 2$?

x	g(x)
0	4
1	–1
2	–4
3	–5
4	–4
5	–1
6	4

(1) They have the same vertex.

(2) They have the same zeros.

(3) They have the same axis of symmetry.

(4) They intersect at two points.

18 Given the function $f(n)$ defined by the following:

$$f(1) = 2$$
$$f(n) = -5f(n - 1) + 2$$

Which set could represent the range of the function?

(1) $\{2, 4, 6, 8,\ldots\}$

(2) $\{2, -8, 42, -208,\ldots\}$

(3) $\{-8, -42, -208, 1042,\ldots\}$

(4) $\{-10, 50, -250, 1250,\ldots\}$

19 An equation is given below.

$$4(x - 7) = 0.3(x + 2) + 2.11$$

The solution to the equation is

(1) 8.3

(2) 8.7

(3) 3

(4) -3

Use this space for computations.

20 A construction worker needs to move 120 ft^3 of dirt by using a wheelbarrow. One wheelbarrow load holds 8 ft^3 of dirt and each load takes him 10 minutes to complete. One correct way to figure out the number of hours he would need to complete this job is

(1) $\frac{120\ ft^3}{1} \bullet \frac{10\ min}{1\ load} \bullet \frac{60\ min}{1\ hr} \bullet \frac{1\ load}{8\ ft^3}$

(2) $\frac{120\ ft^3}{1} \bullet \frac{60\ min}{1\ hr} \bullet \frac{8\ ft^3}{10\ min} \bullet \frac{1}{1\ load}$

(3) $\frac{120\ ft^3}{1} \bullet \frac{1\ load}{10\ min} \bullet \frac{8\ ft^3}{1\ load} \bullet \frac{1\ hr}{60\ min}$

(4) $\frac{120\ ft^3}{1} \bullet \frac{1\ load}{8\ ft^3} \bullet \frac{10\ min}{1\ load} \bullet \frac{1\ hr}{60\ min}$

21 One characteristic of all linear functions is that they change by

(1) equal factors over equal intervals

(2) unequal factors over equal intervals

(3) equal differences over equal intervals

(4) unequal differences over equal intervals

22 What are the solutions to the equation $x^2 - 8x = 10$?

(1) $4 \pm \sqrt{10}$

(2) $4 \pm \sqrt{26}$

(3) $-4 \pm \sqrt{10}$

(4) $-4 \pm \sqrt{26}$

Use this space for computations.

23 The formula for blood flow rate is given by $F = \frac{p_1 - p_2}{r}$, where F is the flow rate, p_1 the initial pressure, p_2 the final pressure, and r the resistance created by blood vessel size. Which formula can *not* be derived from the given formula?

(1) $p_1 = Fr + p_2$

(2) $p_2 = p_1 - Fr$

(3) $r = F(p_2 - p_1)$

(4) $r = \frac{p_1 - p_2}{F}$

24 Morgan throws a ball up into the air. The height of the ball above the ground, in feet, is modeled by the function $h(t) = -16t^2 + 24t$, where t represents the time, in seconds, since the ball was thrown. What is the appropriate domain for this situation?

(1) $0 \le t \le 1.5$

(2) $0 \le t \le 9$

(3) $0 \le h(t) \le 1.5$

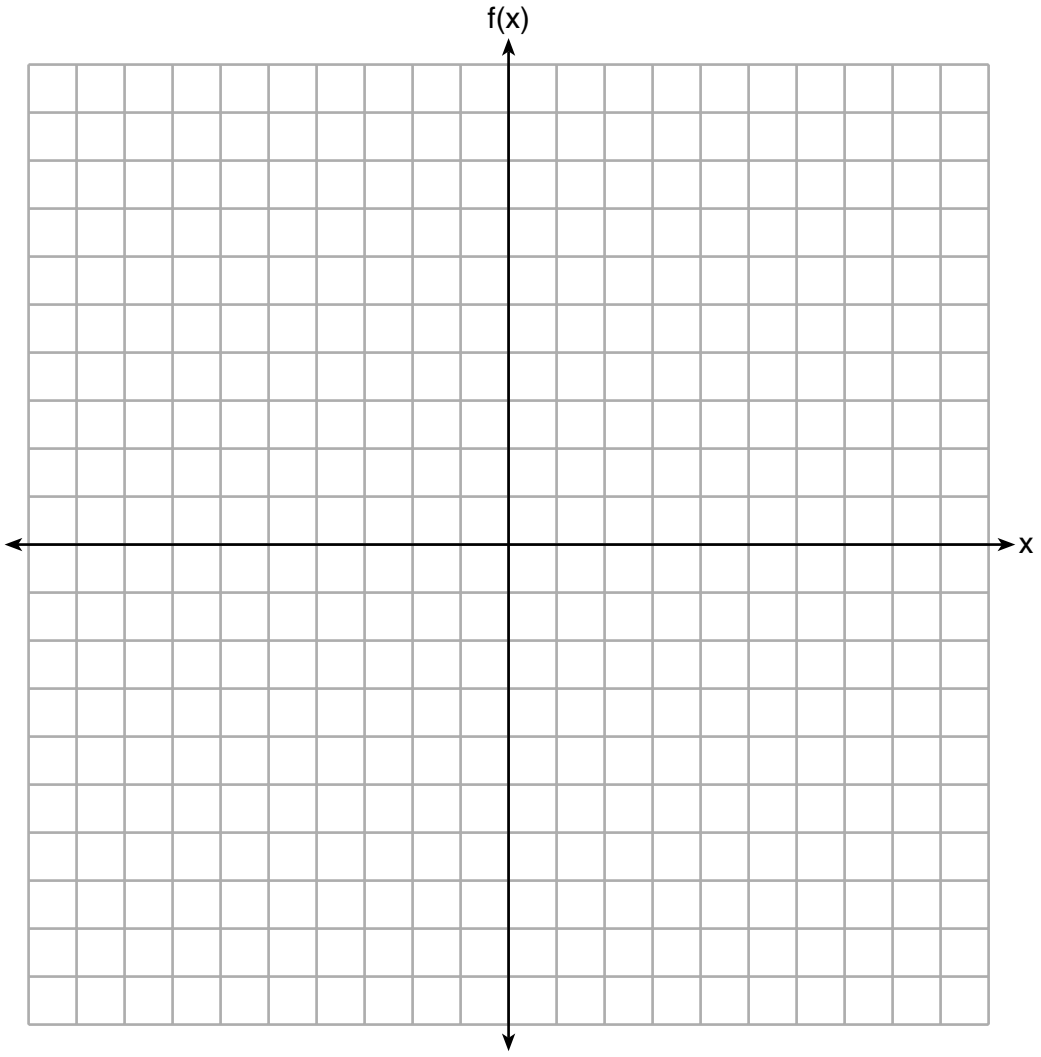
(4) $0 \le h(t) \le 9$

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 Express in simplest form: $(3x^2 + 4x - 8) - (-2x^2 + 4x + 2)$

26 Graph the function $f(x) = -x^2 - 6x$ on the set of axes below.



State the coordinates of the vertex of the graph.

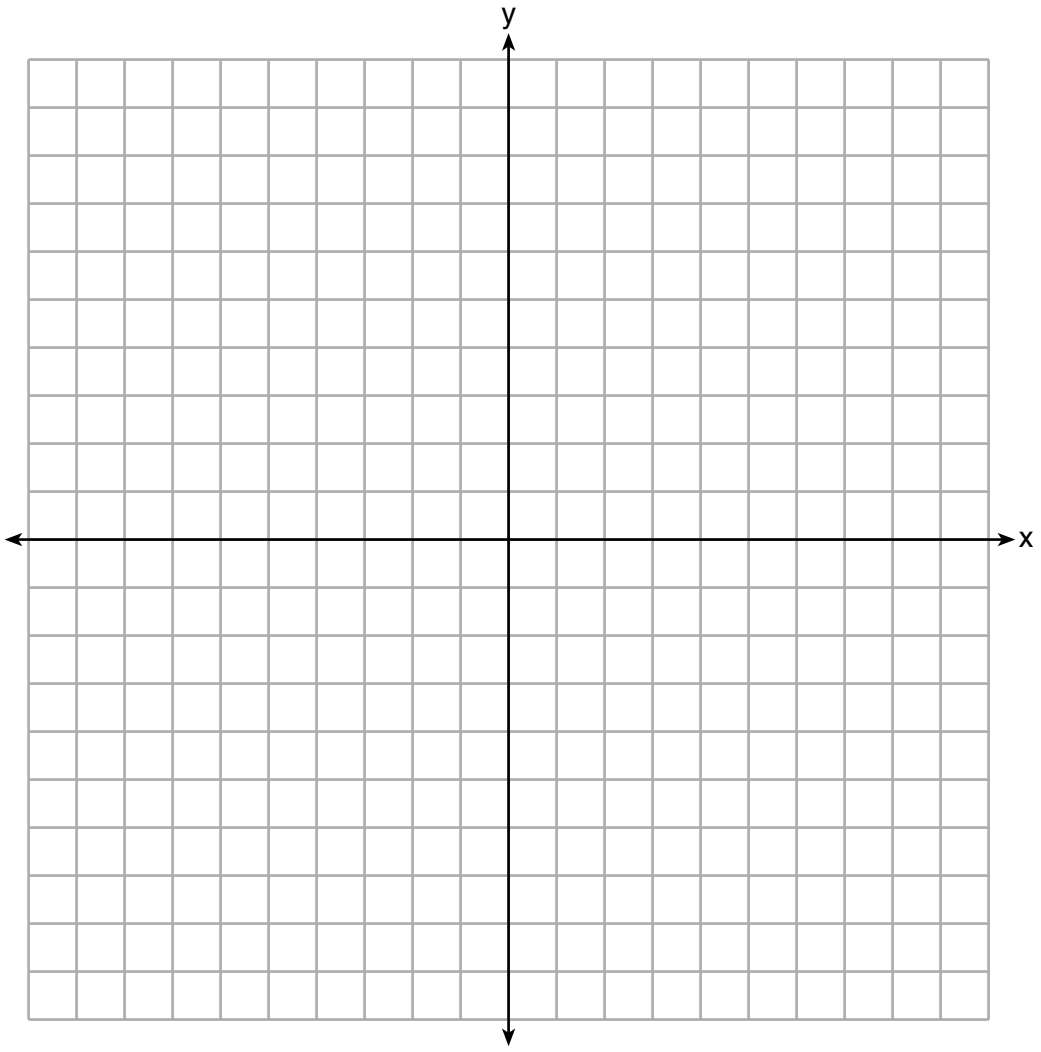
27 State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

28 The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.

29 A survey of 100 students was taken. It was found that 60 students watched sports, and 34 of these students did not like pop music. Of the students who did *not* watch sports, 70% liked pop music. Complete the two-way frequency table.

	Watch Sports	Don't Watch Sports	Total
Like Pop			
Don't Like Pop			
Total			

30 Graph the inequality $y + 4 < -2(x - 4)$ on the set of axes below.



31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

32 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

$h(x) = |x| - a$

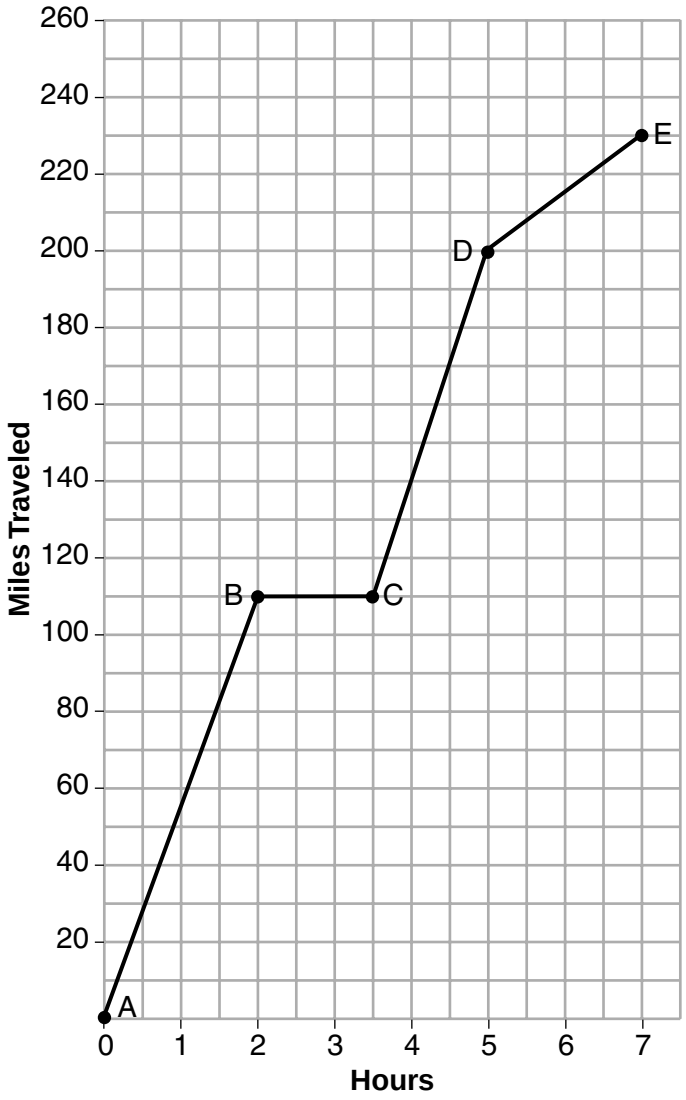
Part III

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 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

Explain what the zeros represent on the graph of $r(x)$.

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between B and C.

Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

Explain why you chose the method you used to solve this quadratic equation.

36 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

Part IV

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

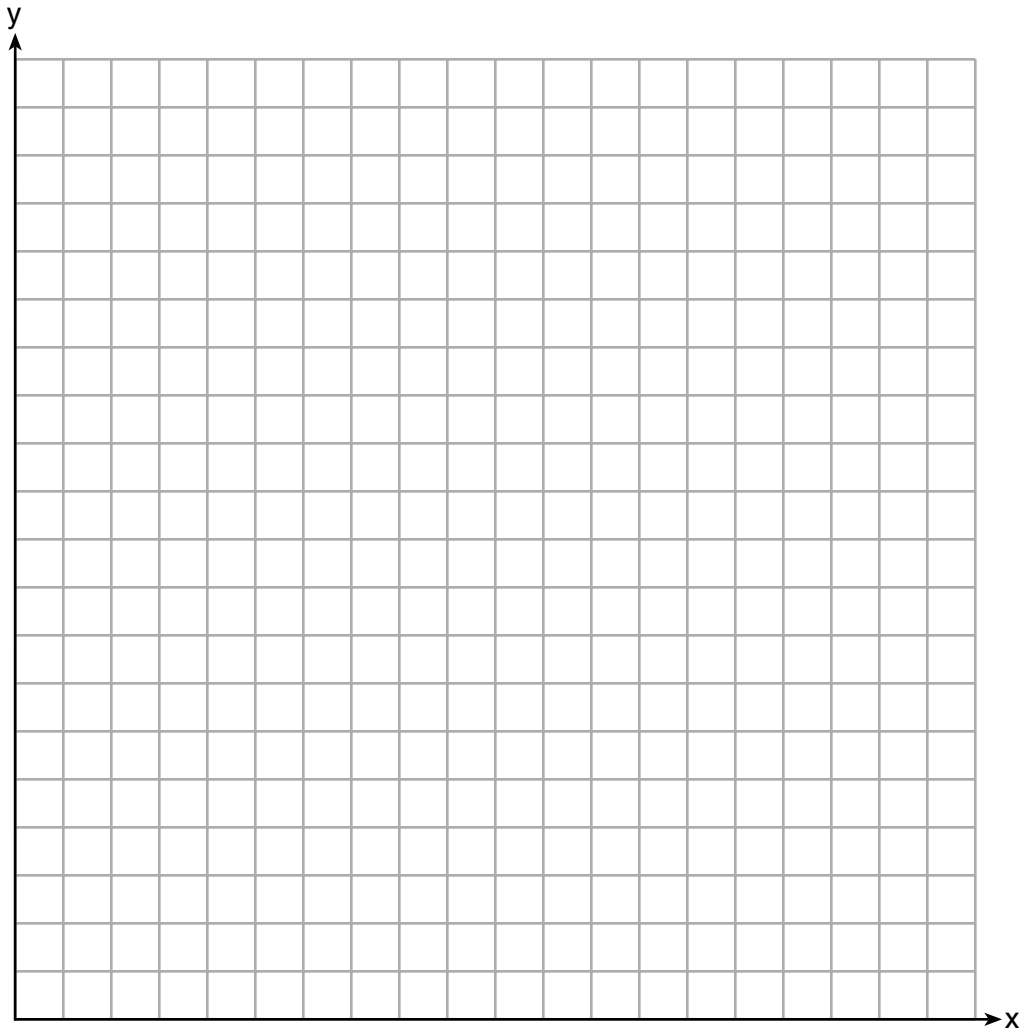
37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

Question 37 is continued on the next page.

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

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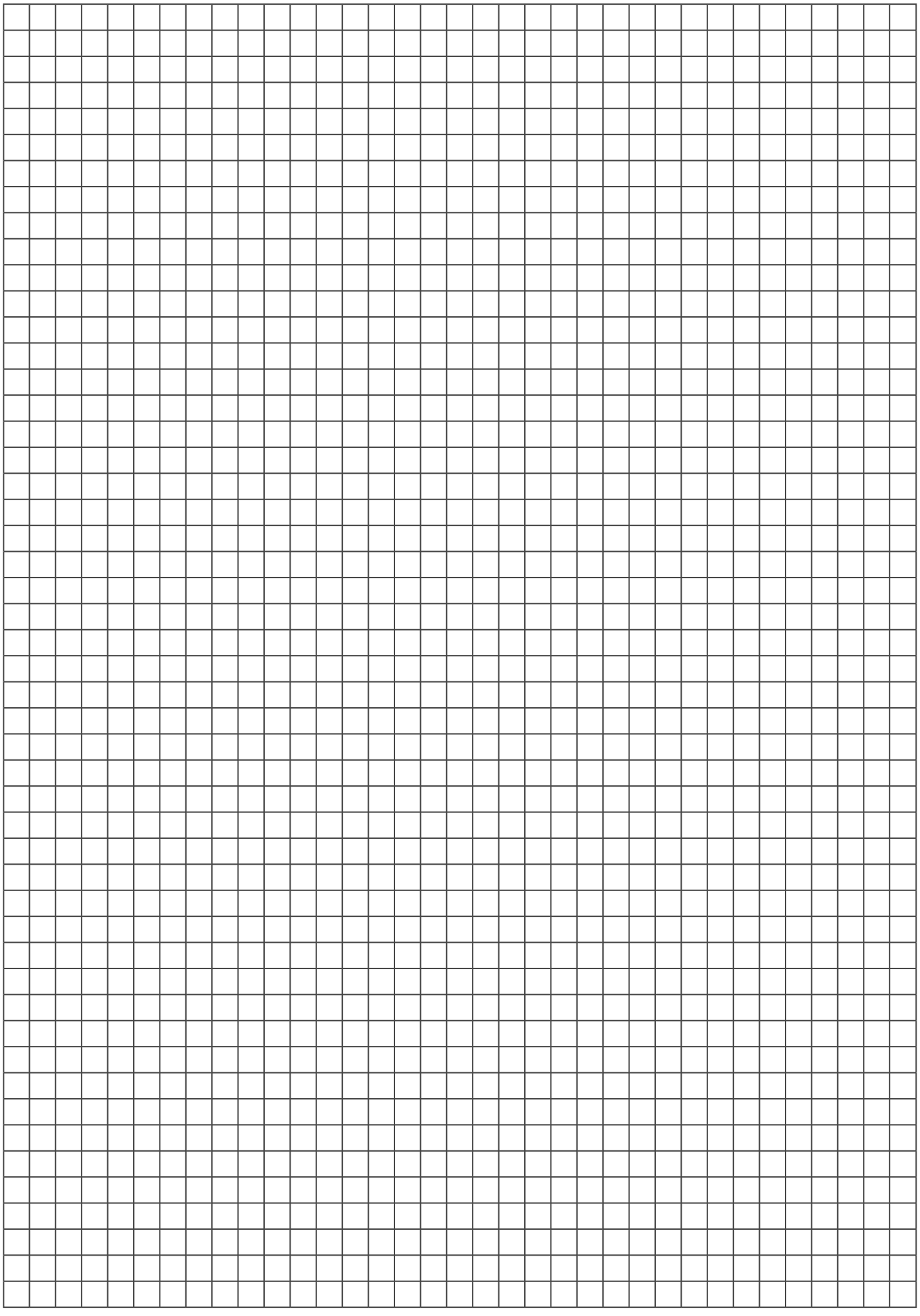

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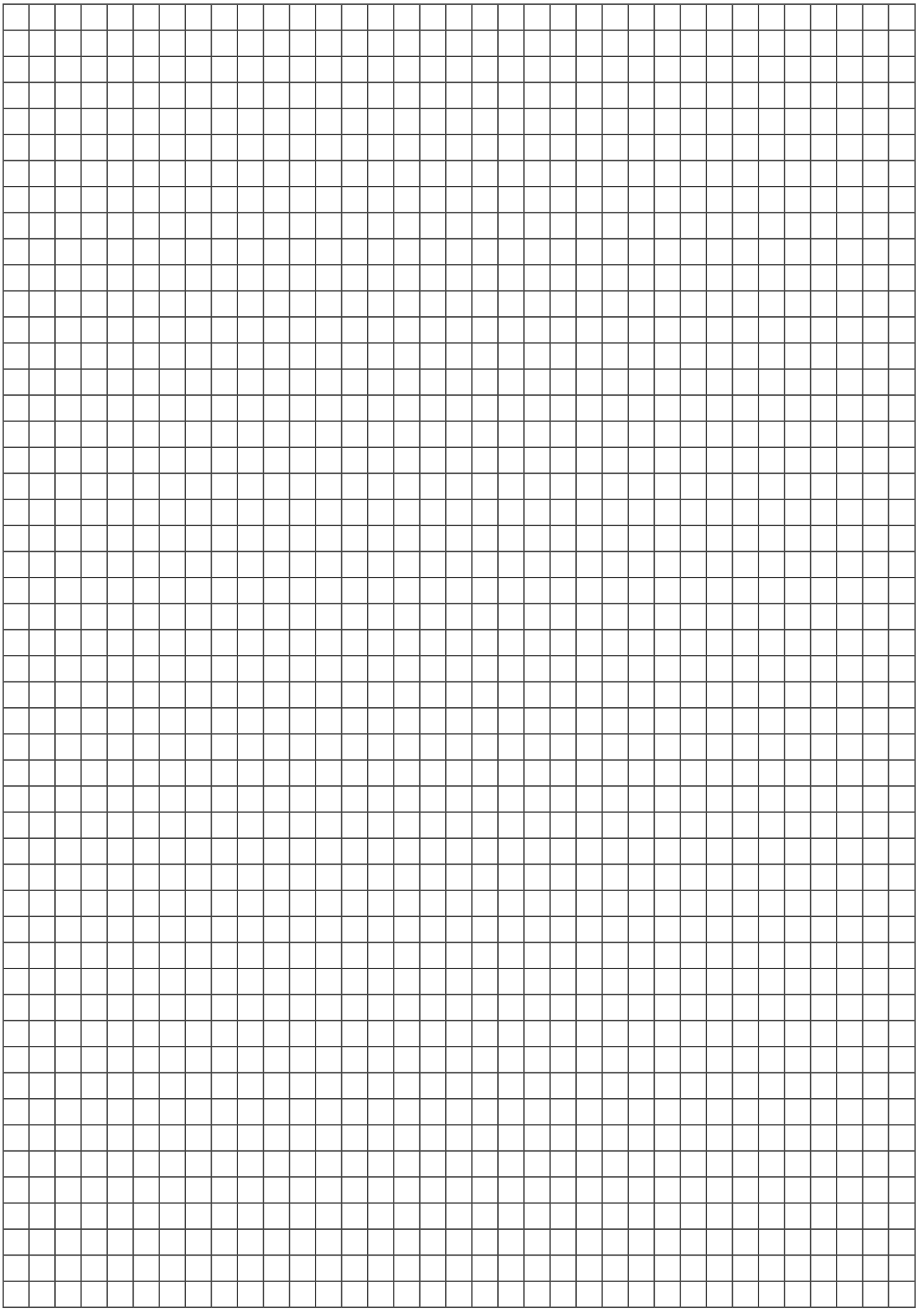

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High School Math Reference Sheet

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

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

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

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

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

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ALGEBRA I (COMMON CORE)

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Printed on Recycled Paper

ALGEBRA I (COMMON CORE)

FOR TEACHERS ONLY

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

ALGEBRA I (Common Core)

Tuesday, June 13, 2017 — 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 Tuesday, June 13, 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) 3	(9) 3	(17) . . . . . 3 . . . . .
(2) 2	(10) 3	(18) . . . . . 2 . . . . .
(3) 4	(11) 1	(19) . . . . . 1 . . . . .
(4) 2	(12) 2	(20) . . . . . 4 . . . . .
(5) 1	(13) 4	(21) . . . . . 3 . . . . .
(6) 3	(14) 1	(22) . . . . . 2 . . . . .
(7) 1	(15) 4	(23) . . . . . 3 . . . . .
(8) 1	(16) 4	(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 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]** $5x^2 - 10$ or $5(x^2 - 2)$, and appropriate 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] $5x^2 - 10$, 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.

(26) **[2]** A correct graph is drawn and $(-3,9)$ is stated.

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

or

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

or

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

or

[1] $(-3,9)$, 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.

(27) **[2]** Irrational, and a correct explanation is written.

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

or

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

or

[1] 5.585786438 and irrational are written, but the explanation is missing or incorrect.

[0] Irrational is written, but no explanation is written.

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]** 15, and a correct justification 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] 15, but the justification is missing or incorrect.

[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 frequency table is completed correctly.

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

or

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

[0] Only the given information of 100, 60, and 34 is written in the table.

or

[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]** The inequality is graphed and shaded correctly.

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

or

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

[0] $y + 4 = -2(x - 4)$ is graphed correctly, 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]** 0 and 1, and correct work is shown.

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

or

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

or

[1] Appropriate work is shown to find $x(x - 1) = 0$, but no further correct work is shown.

or

[1] Appropriate work is shown, but only one solution is found.

or

[1] Appropriate work is shown, but the solutions are written as (0,0) and (1,1).

or

[1] 0 and 1, 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]** $f(x)$ is shifted right by a and $f(x)$ is shifted down by a are stated.

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

or

[1] Only one shift is stated correctly.

[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]** -6 and 3, and correct work is shown, and a correct explanation is written.

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

or

[3] Appropriate work is shown, but an incomplete explanation is written.

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

or

[2] Correct work is shown to find -6 and 3, but no explanation is written.

or

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

[1] -6 and 3, but a method other than factoring is used and no further correct work is shown.

or

[1] -6 and 3, 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.

(34) **[4]** D to E with a correct explanation is written, a correct explanation for interval B to C is written, and 32.9.

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

[2] D to E and 32.9 are stated, but no further correct work is shown.

[1] D to E or 32.9 is stated, 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]** 3.6 and −3.1, and correct algebraic work is shown, and a correct explanation is written.

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

or

[3] Correct work is shown to find 3.6 and −3.1, but the explanation is missing or incorrect.

or

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

or

[3] Appropriate work is shown, but the roots are not expressed in decimal form.

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

or

[2] Appropriate work is shown to find 3.6 or −3.1, but the explanation is missing or incorrect.

or

[2] 3.6 and −3.1 are found using a method other than algebraic, but an appropriate explanation is written.

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

or

[1] 3.6 and −3.1, 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.

(36) **[4]** $f(x) = 10 + 100x$ and $g(x) = 10(2)^x$ or equivalent functions, "both" is stated, and a correct justification is given.

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

or

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

or

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

or

[3] Appropriate work is shown, but two expressions are written instead of equations.

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

or

[2] Correct functions are stated, but no further correct work is shown.

or

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

[1] "Both" is stated, but no work is shown.

or

[1] One correct function 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]** $y = 10x + 5$ and $y = 5x + 35$ are written and graphed correctly, and at least one is labeled, and a correct explanation is written.

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

or

[5] Appropriate work is shown, but the explanation for one of the coordinates is missing or incorrect.

or

[5] Appropriate work is shown, but expressions are written instead of equations.

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

[3] Appropriate work is shown, but one graphing or labeling error is made and the explanation is missing or incorrect.

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

or

[2] A correct explanation for both coordinates is written, but no further correct work is shown.

or

[2] One equation is written and graphed correctly, but no further correct work is shown.

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

or

[1] (6,65) is stated, 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)
June 2017

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

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

Regents Examination in Algebra I (Common Core)

June 2017

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

The *Chart for Determining the Final Examination Score for the June 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 Tuesday, June 13, 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.

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I (Common Core)

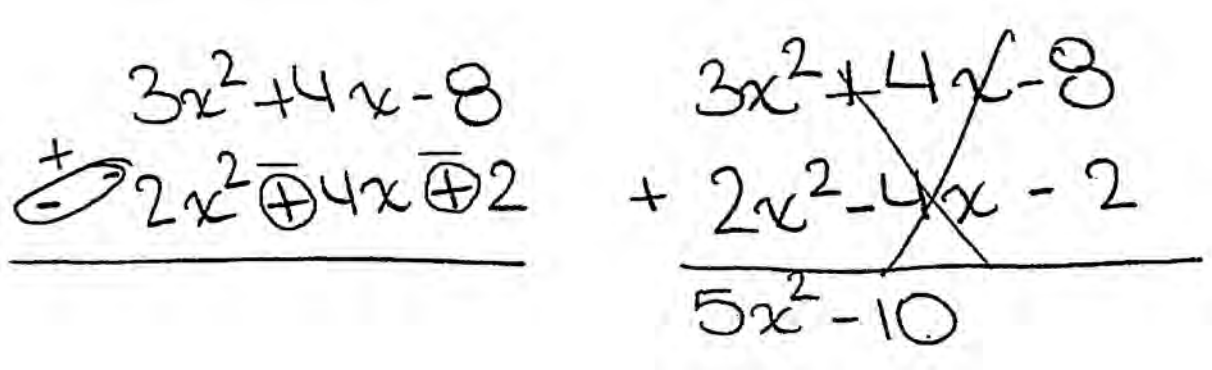
Tuesday, June 13, 2017 — 1:15 to 4:15 p.m.

MODEL RESPONSE SET

Table of Contents

Question 25

25 Express in simplest form: $(3x^2 + 4x - 8) - (-2x^2 + 4x + 2)$



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

Question 25

25 Express in simplest form: $(3x^2 + 4x - 8) - (-2x^2 + 4x + 2)$

$$\begin{array}{r} 3x^2+4x-8 \\ +\ 2x^2-4x-2 \\ \hline x^2-10 \end{array}$$

Score 1: The student did not add $3x^2$ and $2x^2$.

Question 25

25 Express in simplest form: $(3x^2 + 4x - 8) - (-2x^2 + 4x + 2)$

$(3x^2+4x-8)+(-2x^2+4x+2)$

$1x^2+8x+6$

Score 0: The student wrote the problem as addition and combined the constant terms incorrectly.

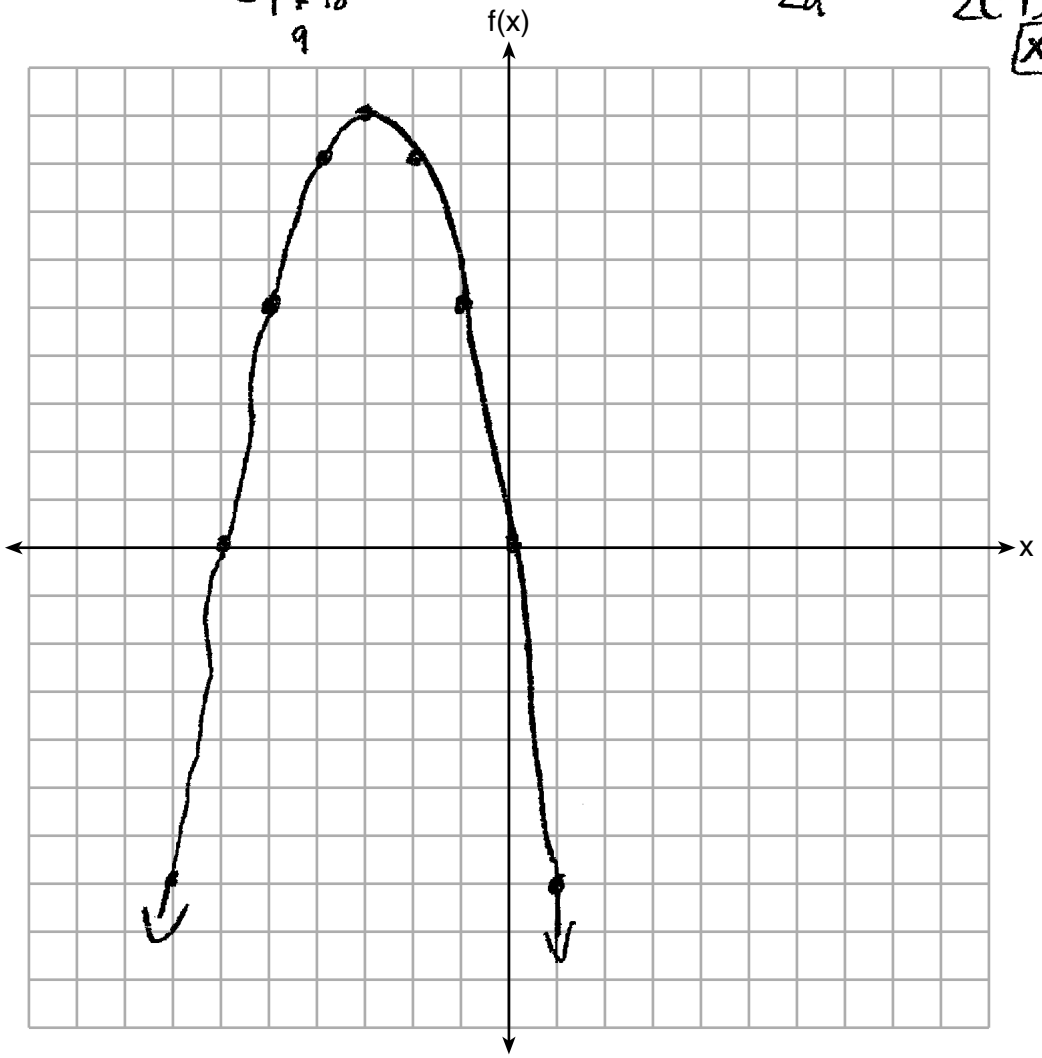
Question 26

26 Graph the function $f(x) = -x^2 - 6x$ on the set of axes below.

$-(-3)^2 - 6(-3)$
$-9 + 18$
9

$\frac{-b}{2a}$ $\frac{-(-6)}{2(-1)}$ $\frac{6}{-2}$

$x = -3$



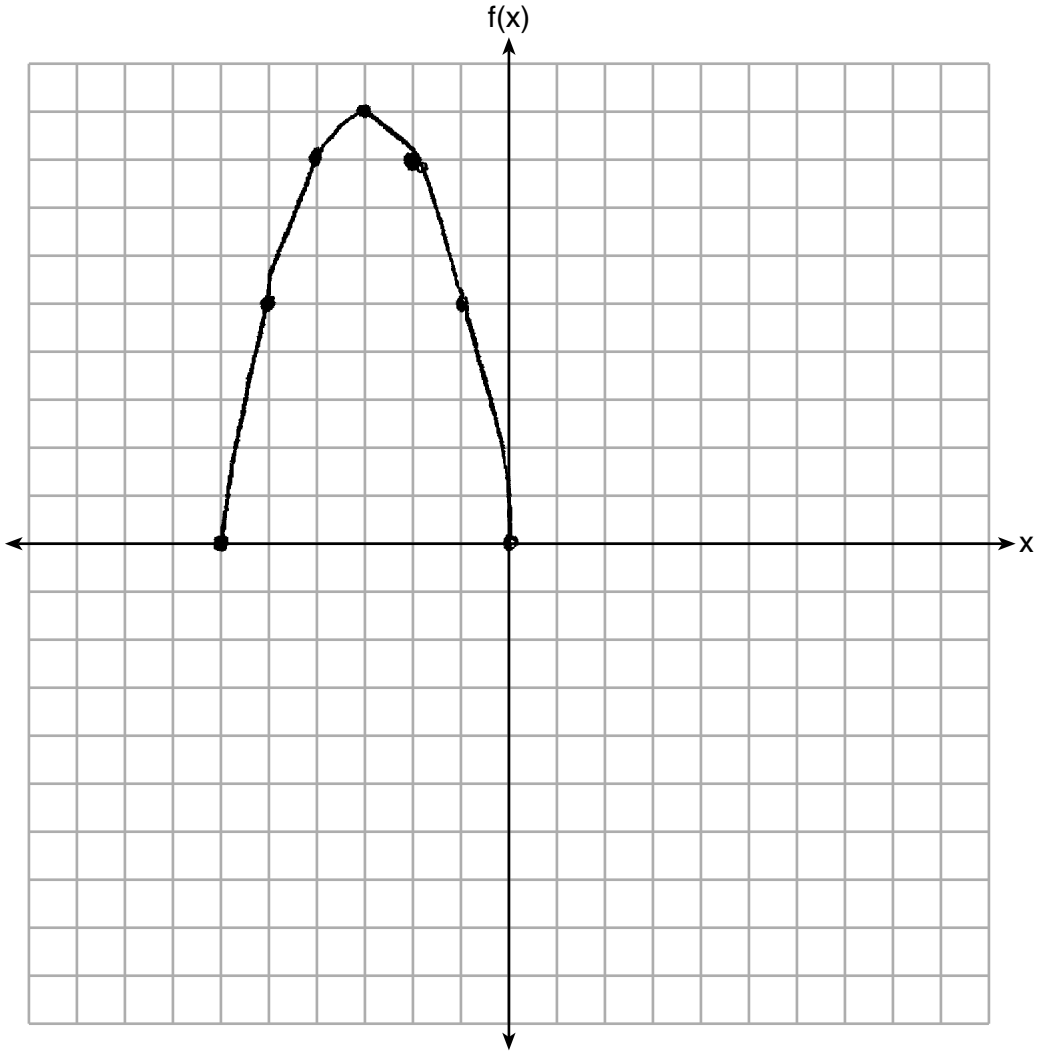
State the coordinates of the vertex of the graph.

$(-3, 9)$

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

Question 26

26 Graph the function $f(x) = -x^2 - 6x$ on the set of axes below.



State the coordinates of the vertex of the graph.

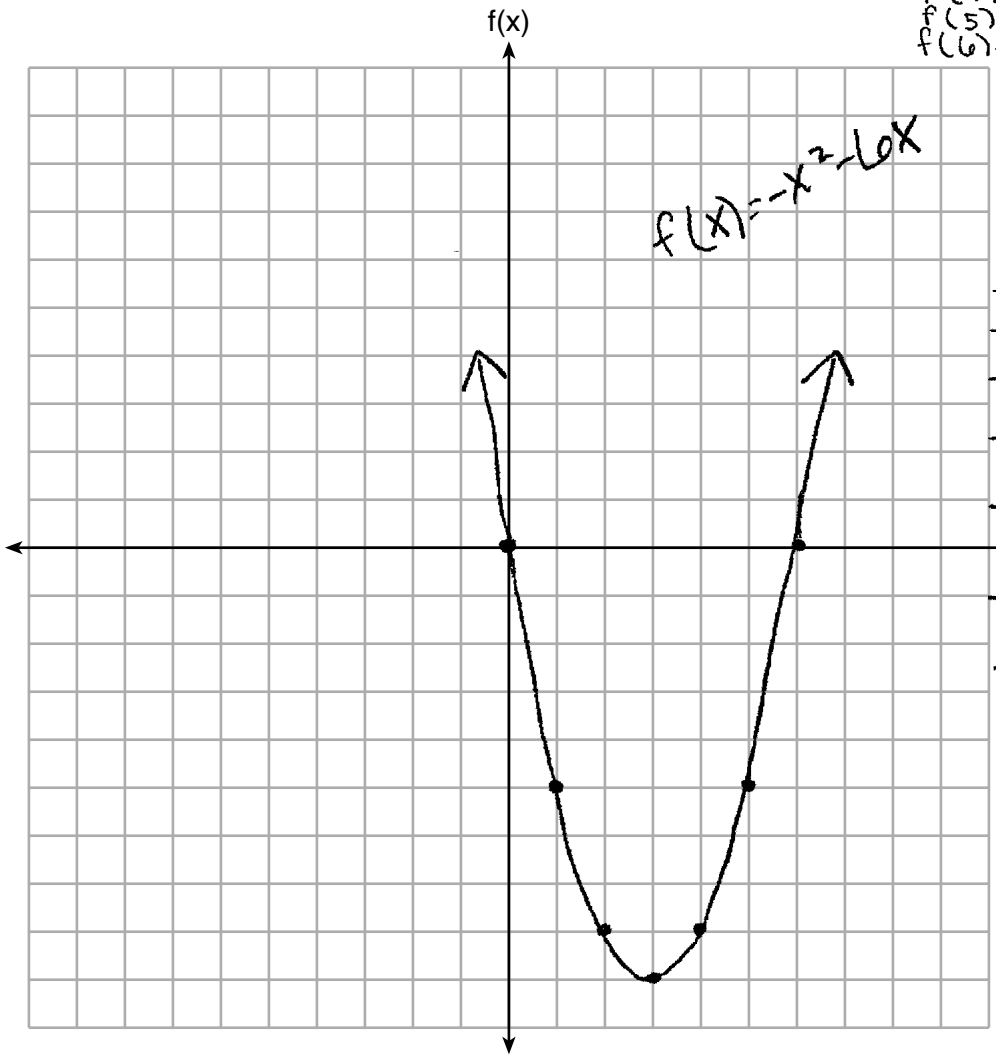
(-3, 9)

Score 1: The student only graphed $f(x)$ over the interval -6 to 0.

Question 26

26 Graph the function $f(x) = -x^2 - 6x$ on the set of axes below.

f(1) = -5 f(7) =
f(2) = -8
f(3) = -9
f(4) = -8
f(5) = -5
f(6) = 0



X	Y
0	0
1	-5
2	-8
3	-9
4	-8
5	-5
6	0

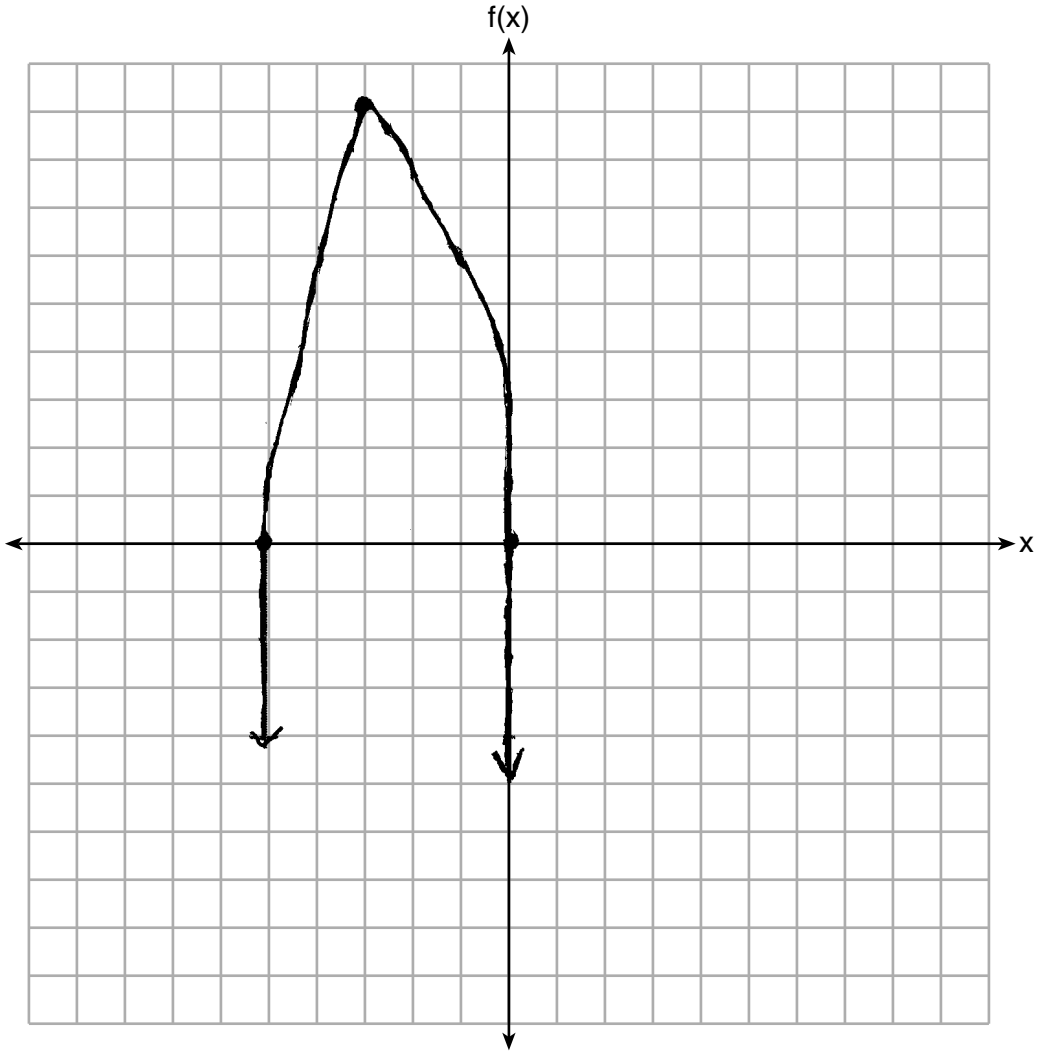
State the coordinates of the vertex of the graph.

(3, -9)

Score 1: The student graphed $f(x)$ incorrectly, but stated an appropriate vertex.

Question 26

26 Graph the function $f(x) = -x^2 - 6x$ on the set of axes below.



State the coordinates of the vertex of the graph.

Score 0: The student drew an incorrect graph and did not state a vertex.

Question 27

27 State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

irrationall

The difference of a rational and irrational number is always irrational

7 is rationall
but the $\sqrt{2}$ is irrational
therefore $7 - \sqrt{2}$ = irrational

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

Question 27

27 State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

The difference of a rational number and an irrational number is irrational.

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

Question 27

27 State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

$7 - \sqrt{2} = 5.5857...$

$7 - \sqrt{2}$ is irrational because $\sqrt{2}$ is irrational. There is no ~~two~~ same numbers that will multiply to a product of 2, thus making $\sqrt{2}$ radical or a decimal that cannot be converted into a fraction or a terminating decimal. By subtracting ~~radical 2~~ $\sqrt{2}$ from 7 you are decreasing 7 by a radical number, therefore ~~resett~~ resulting in an irrational answer.

Score 1: The student made an error in describing an irrational number.

Question 27

27 State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

Irrational; because 2 is not a perfect square so is irrational

Score 1: The student only explained why $\sqrt{2}$ is irrational. The student did not address the difference.

Question 27

27 State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

$7 - \sqrt{2}$

5.585

Irrational, It isn't a whole number

Score 0: The student did not write the full display of the calculator and wrote an incorrect explanation.

Question 28

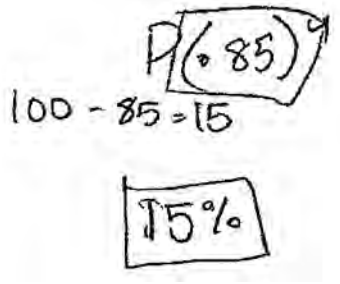
28 The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.

The car's value decreases by 15% every year. A 10000 dollar car would be 8500 dollars the next year because $10,000(.85)^1 = 8500$. It's the same as multiplying 10,000 by .15 then subtracting your answer from 10,000, because of its annual 15% value decrease.

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

Question 28

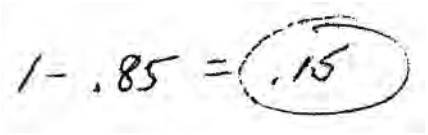
28 The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.



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

Question 28

28 The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.



Score 1: The student wrote an appropriate justification, but did not state the percent of decrease.

Question 28

28 The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.

V = 25,000(.85)^5 P = 25,000 Y = 5

V = 21250^5 = 4.3306E21

V = 4.3306E21

By 4.33% each year the car will go down

Score 0: The student wrote a completely incorrect response.

Question 29

29 A survey of 100 students was taken. It was found that 60 students watched sports, and 34 of these students did not like pop music. Of the students who did *not* watch sports, 70% liked pop music. Complete the two-way frequency table.

	Watch Sports	Don't Watch Sports	Total
Like Pop	26	28	54
Don't Like Pop	34	12	46
Total	60	40	100

100
60 students
40 students
34 dont like pop
40 x .70
28 like pop

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

Question 29

29 A survey of 100 students was taken. It was found that 60 students watched sports, and 34 of these students did not like pop music. Of the students who did *not* watch sports, 70% liked pop music. Complete the two-way frequency table.

	Watch Sports	Don't Watch Sports	Total
Like Pop	26	25	51
Don't Like Pop	34	15	49
Total	60	40	100

Score 1: The student made an error when calculating 70% of 40, but then completed the table appropriately.

Question 29

29 A survey of 100 students was taken. It was found that 60 students watched sports, and 34 of these students did not like pop music. Of the students who did *not* watch sports, 70% liked pop music. Complete the two-way frequency table.

	Watch Sports	Don't Watch Sports	Total
Like Pop	18	12	30
Don't Like Pop	34	28	62
Total	60	40	100

$60 - 34 = 26$

$26 \times .7 = 18.2 \approx 18$

$100 - 60 = 40$

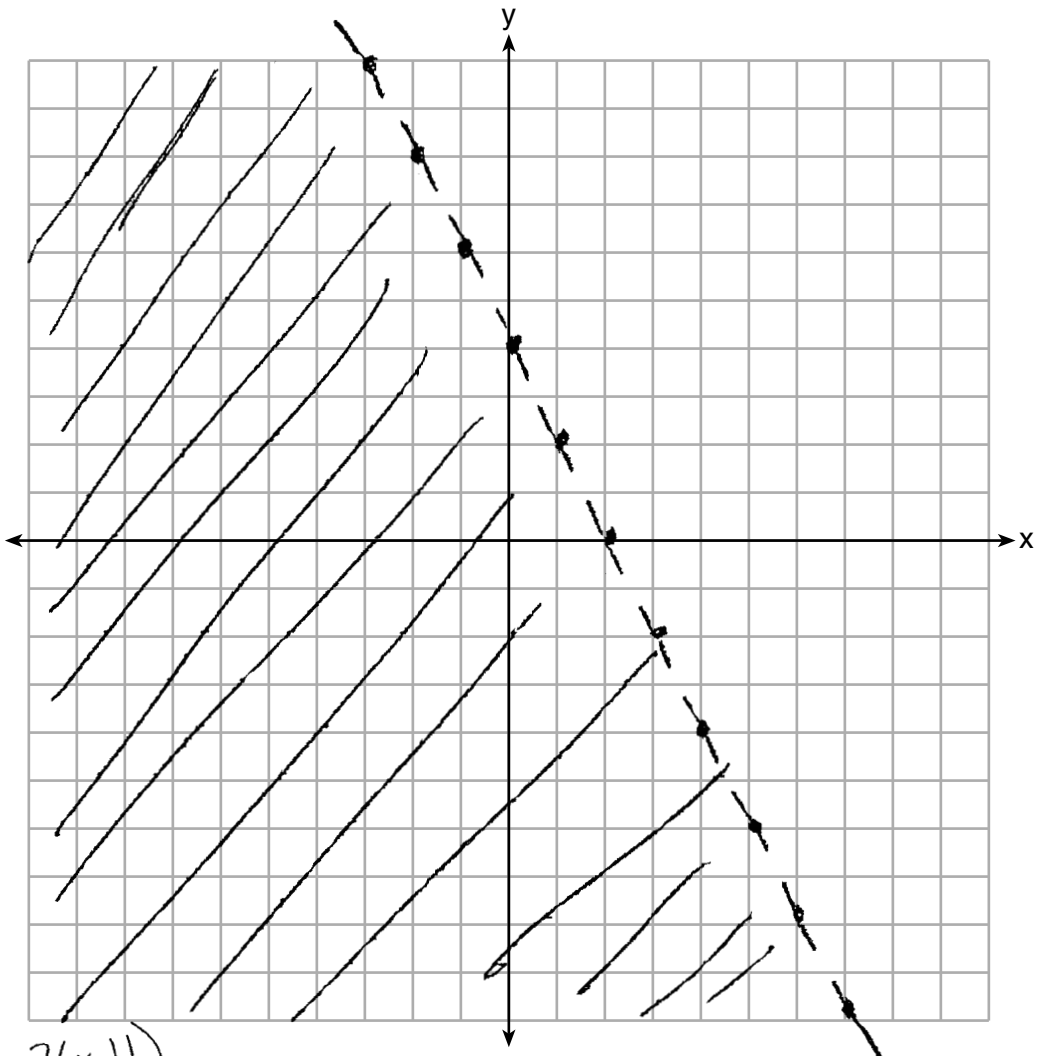
$40 \times .7 = 28$

$40 - 28 = 12$

Score 0: The student made multiple errors.

Question 30

30 Graph the inequality $y + 4 < -2(x - 4)$ on the set of axes below.

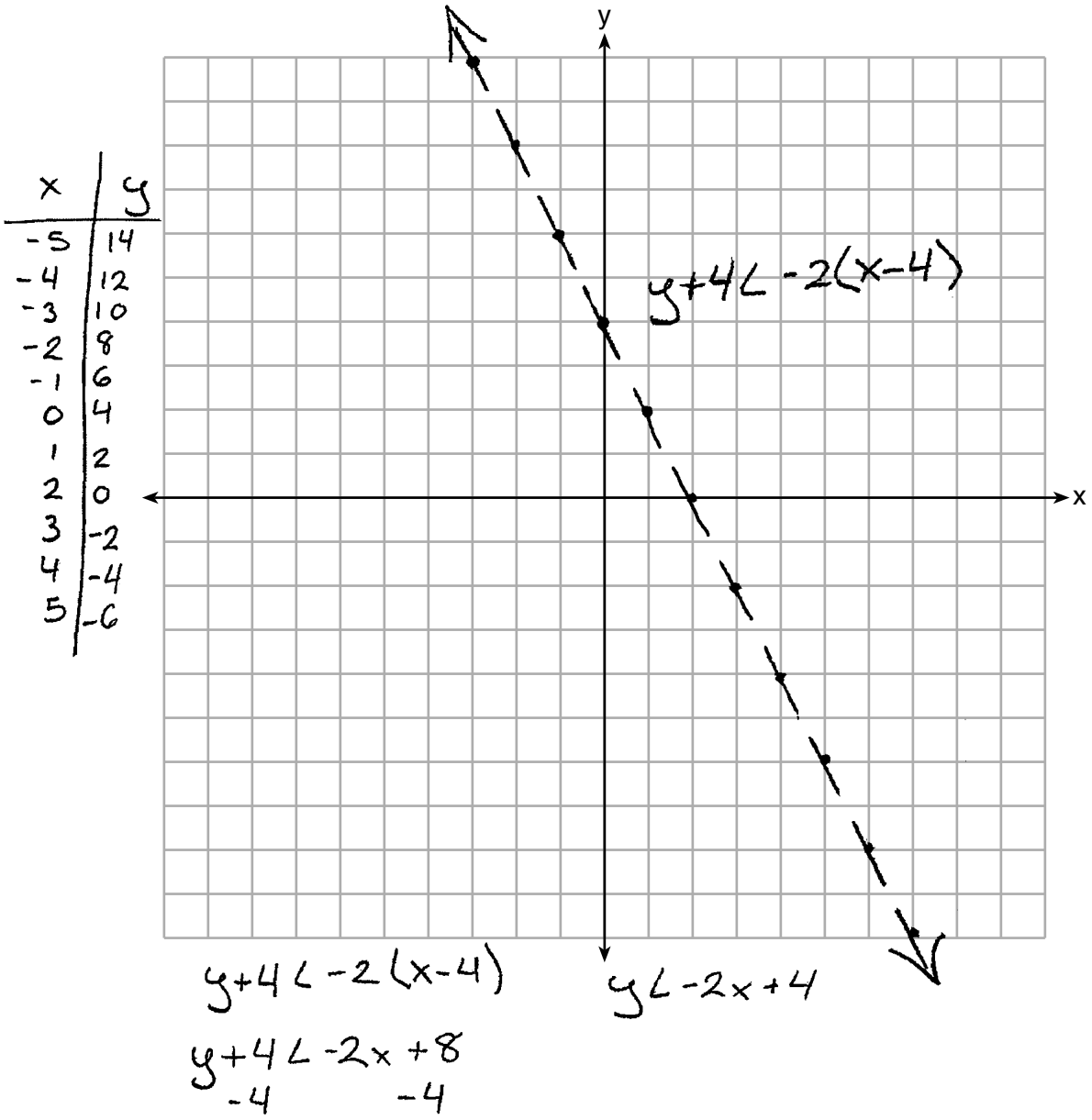


$y+4 < -2(x-4)$
$-4 \quad -4$
$y \quad < -2(x-4)-4$

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

Question 30

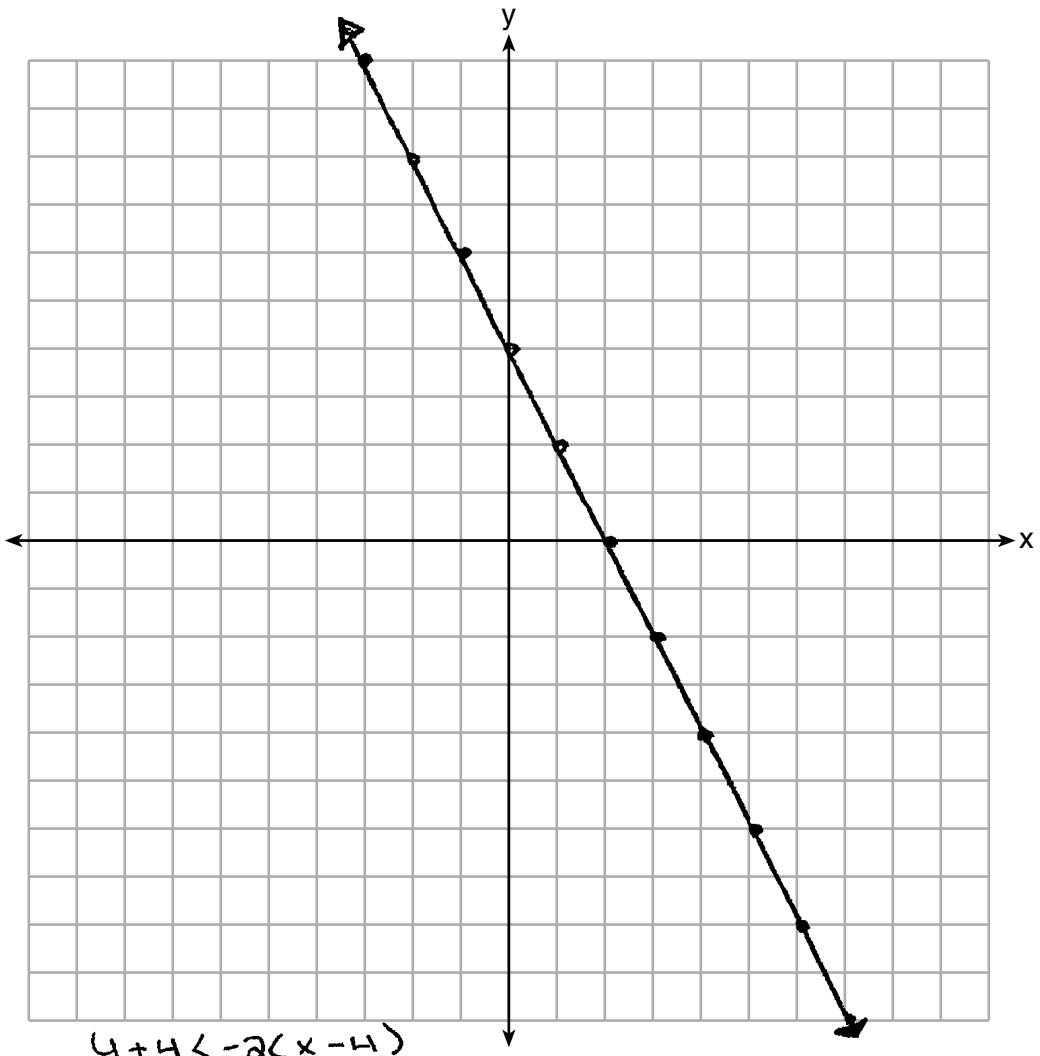
30 Graph the inequality $y + 4 < -2(x - 4)$ on the set of axes below.



Score 1: The student graphed the dotted line correctly, but did not shade the inequality.

Question 30

30 Graph the inequality $y + 4 < -2(x - 4)$ on the set of axes below.



$y+4<-2(x-4)$

$y+4<-2x+8$

$-4 \quad -4$

$y<-2x+4$

Score 0: The student made two graphing errors by drawing a solid line and not shading.

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

$x^2 = x$

$x^2 - x = 0$

$x(x-1) = 0$

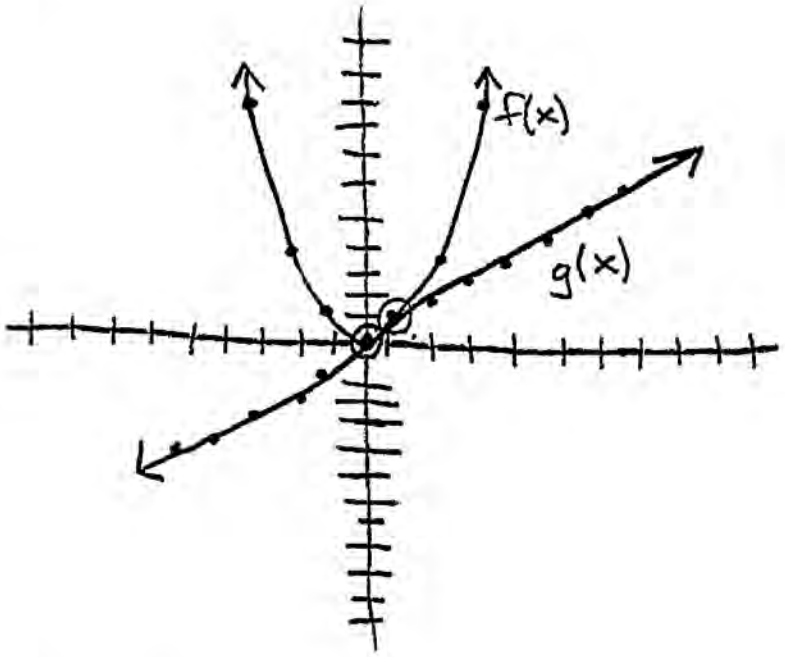
$x = 0 \quad x = 1$

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

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

$y = x^2$ $y = x$

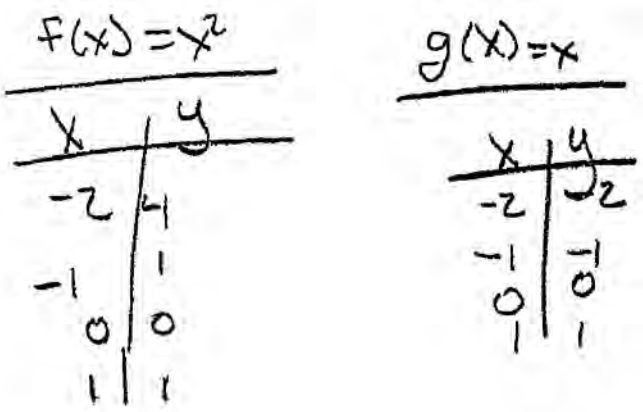


The values of x are 0 and 1.

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

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

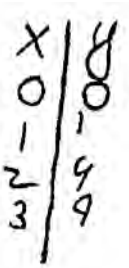


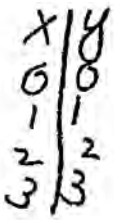
X=0 x=1

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

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.



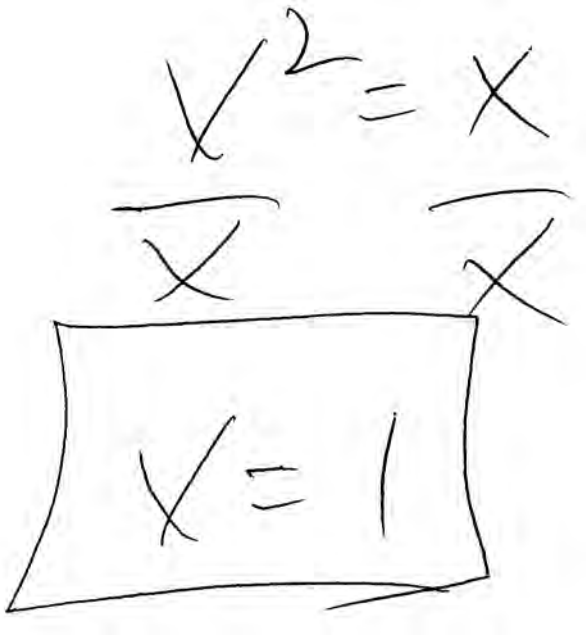


(0, 0) (1, 1)

Score 1: The student wrote the solutions to $f(x) = g(x)$ as coordinates.

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.



Score 1: The student found one correct solution.

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

I graphed it & got this as a table.

X	y_1	y_2
-4	16	-4
-3	9	-3
-2	4	-2
-1	1	-1
0	0	0
1	1	1
2	4	2

Score 0: The student showed appropriate work, but did not state either solution.

Question 32

32 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

it will go to the right by however many (a) equals

$h(x) = |x| - a$

will go down based on however many (a) equals.

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

Question 32

32 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

Right a

$h(x) = |x| - a$

down a

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

Question 32

32 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

moved down a units

$h(x) = |x| - a$

moved right a units

Score 1: The student reversed the horizontal and vertical shifts.

Question 32

32 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

The function moves left a units.

$h(x) = |x| - a$

The function moves down a units.

Score 1: The student only stated one shift correctly.

Question 32

32 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

The function would be translated down a units.

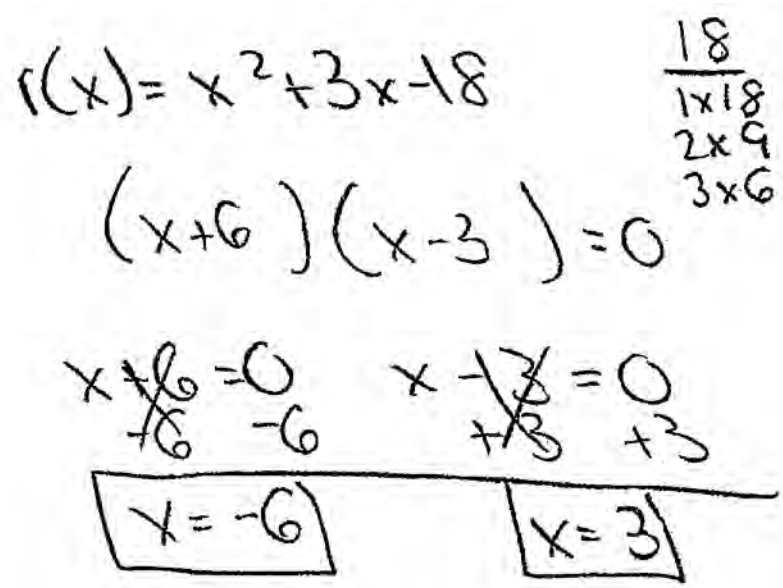
$h(x) = |x| - a$

The function would be translated to the left a units.

Score 0: The student wrote two incorrect responses.

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.



Explain what the zeros represent on the graph of $r(x)$.

The zeros represent that when the graph crosses the x axis, "x" is (-6) and (3).

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

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

$r(x) = x^2 + 3x - 18$

$0 = x^2 + 3x - 18$

$0 = x^2 + 6x - 3x - 18$

$0 = x(x+6) - 3(x+6)$

$0 = (x-3)(x+6)$

$x = 3$ or $x = -6$

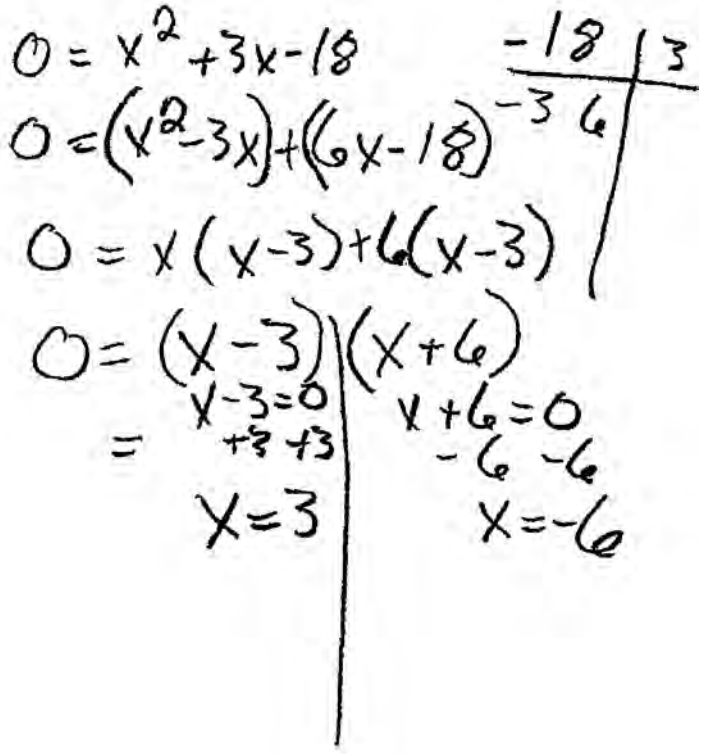
Explain what the zeros represent on the graph of $r(x)$.

The zeros represent the x intercepts.

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

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.



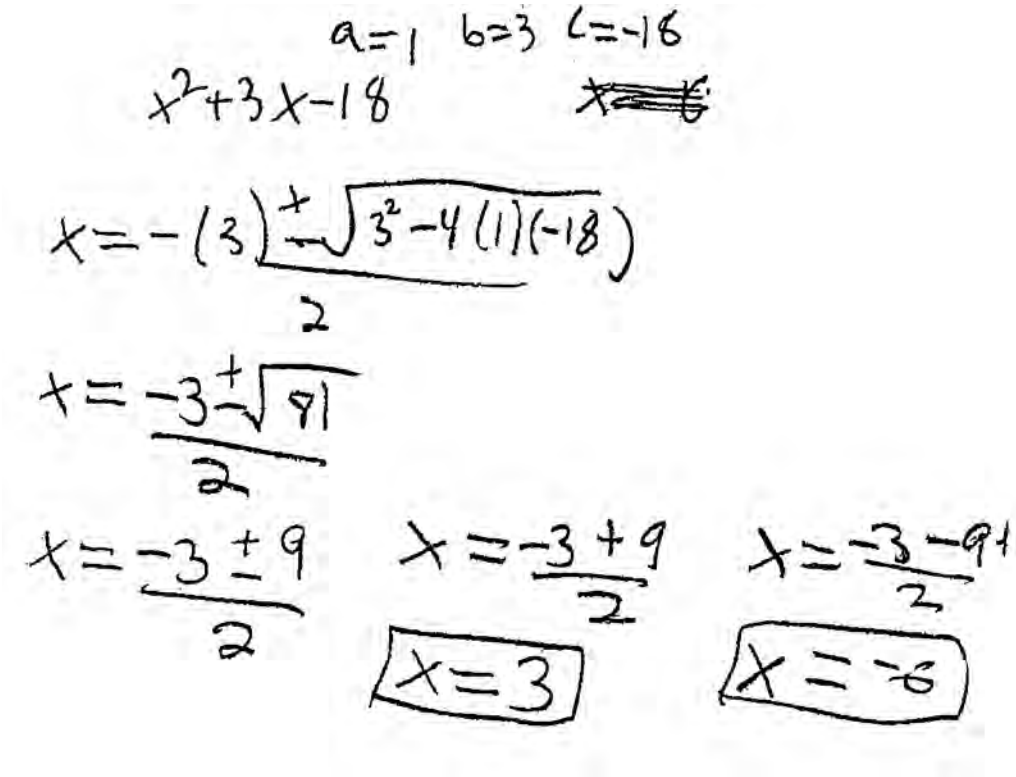
Explain what the zeros represent on the graph of $r(x)$.

The zeros represent the points at which the parabola crosses the x axis

Score 3: The student wrote an incomplete explanation by referencing points and not the x-values at which the parabola crosses the x-axis.

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.



Explain what the zeros represent on the graph of $r(x)$.

points where the parabola crosses the x axis.

Score 2: The student used a method other than factoring to find the zeros of $r(x)$ and wrote an incomplete explanation.

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

3, -6

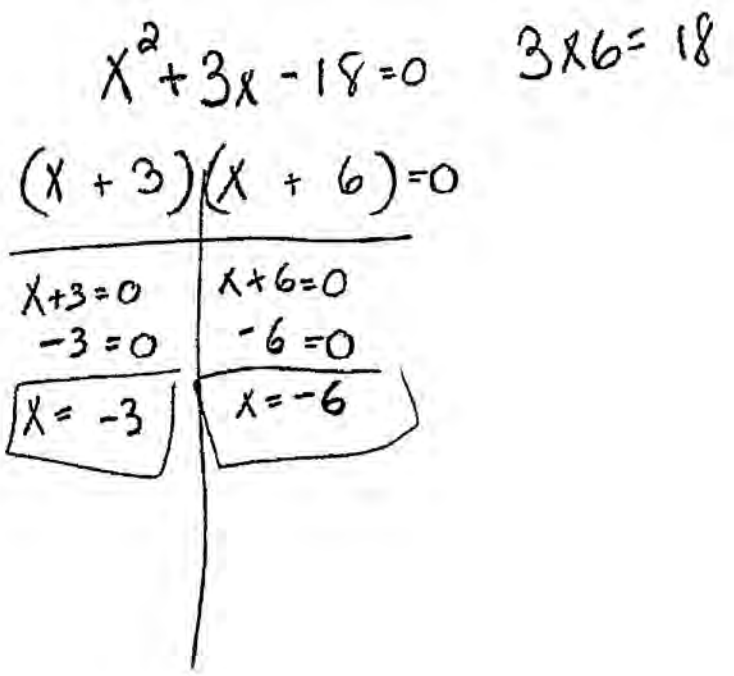
Explain what the zeros represent on the graph of $r(x)$.

When the line crosses the X-axis

Score 2: The student showed no work to find the zeros and wrote an incomplete explanation.

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.



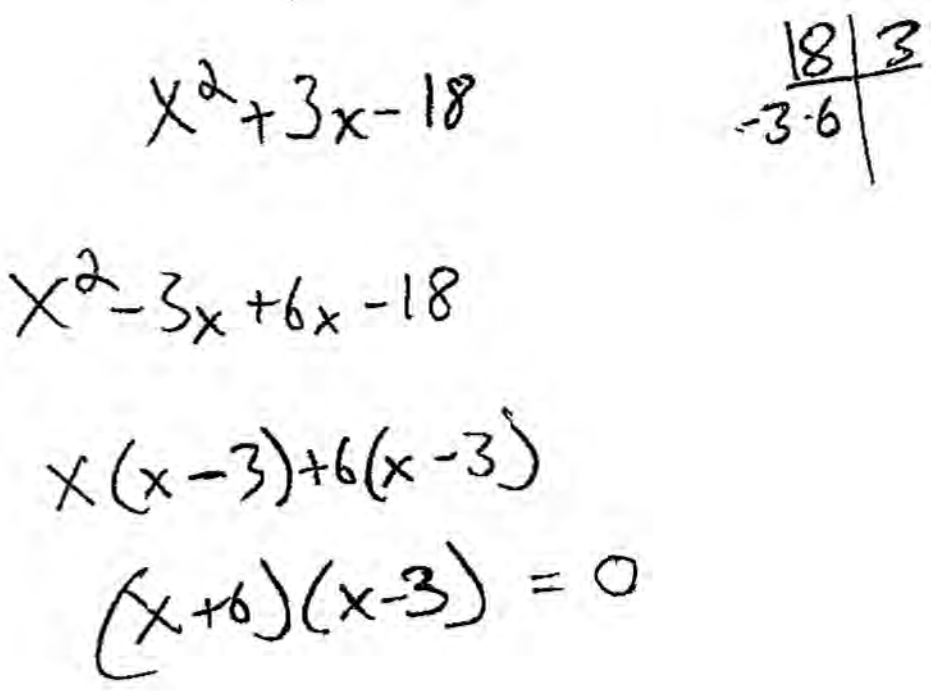
Explain what the zeros represent on the graph of $r(x)$.

Zeros represent the point of intersection between the equation in the graph.

Score 1: The student made a factoring error and wrote an incorrect explanation.

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

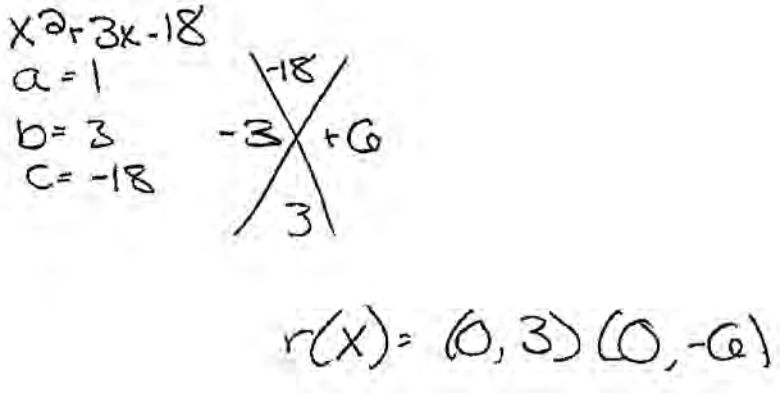


Explain what the zeros represent on the graph of $r(x)$.

Score 1: The student wrote a correctly factored equation.

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

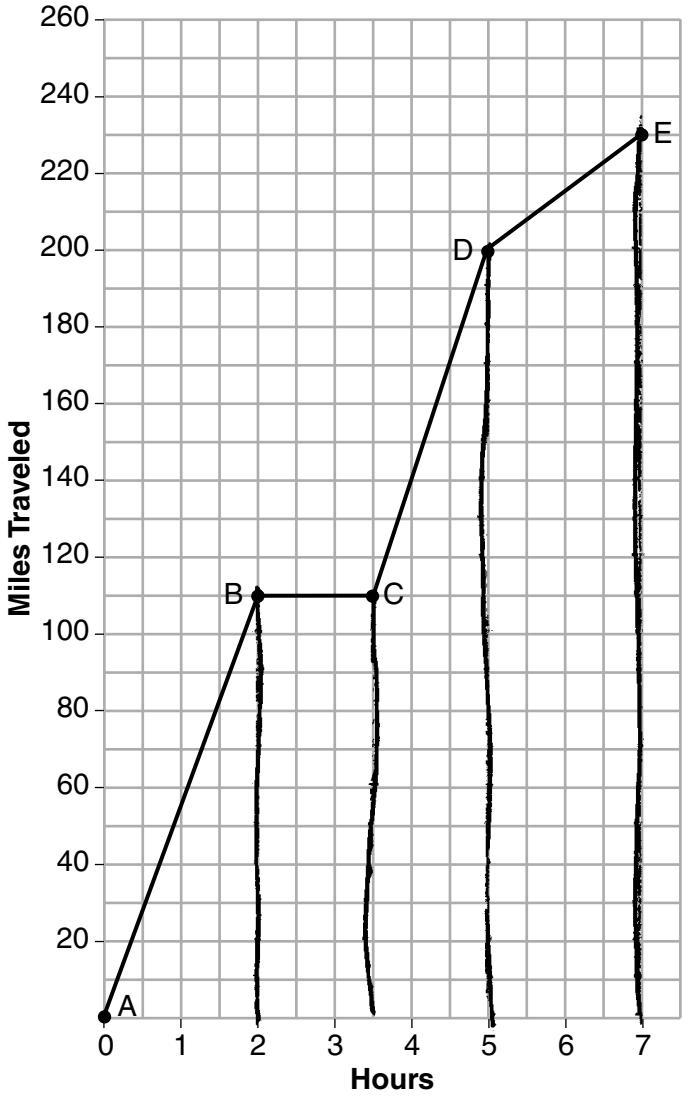


Explain what the zeros represent on the graph of $r(x)$.

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

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

AB: $\frac{110}{2} = 55$ CD: $\frac{90}{1.5} = 60$

BC: 0 DE: $\frac{30}{2} = 15$

From D to E. 15 miles per hour is an appropriate speed for city driving.

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.

Craig stopped at a text area on the highway to check his messages.

Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

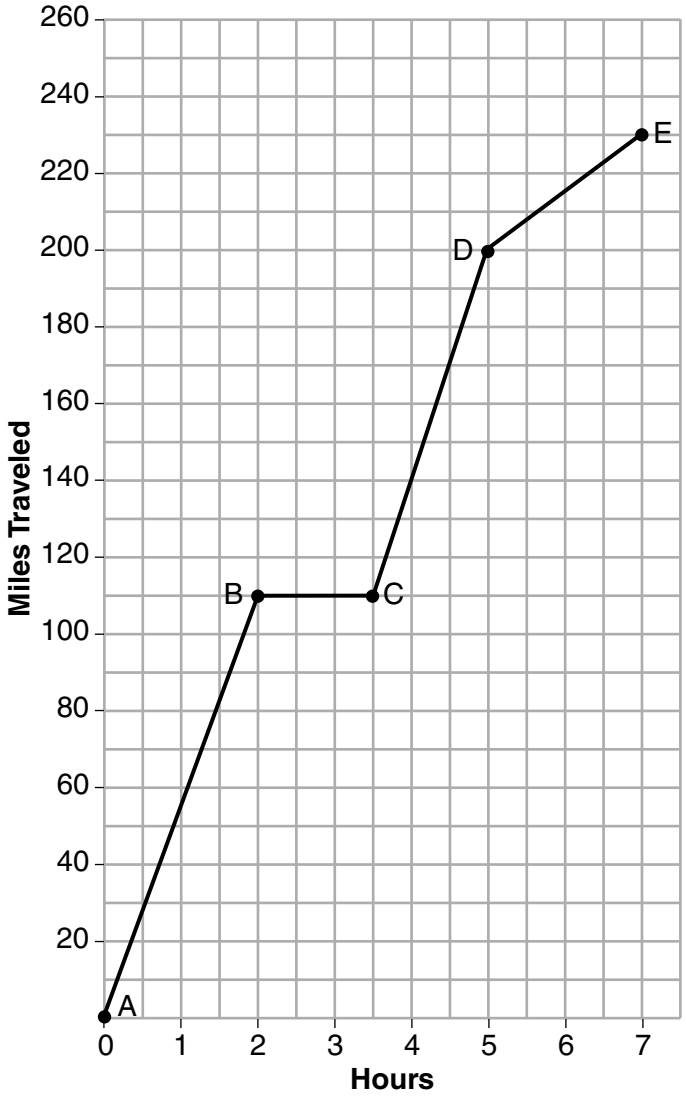
$\frac{230}{7} = 32.857142\overline{86}$

32.9 miles per hour

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

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

D to E it is slower but not stopped

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.

he took a nap

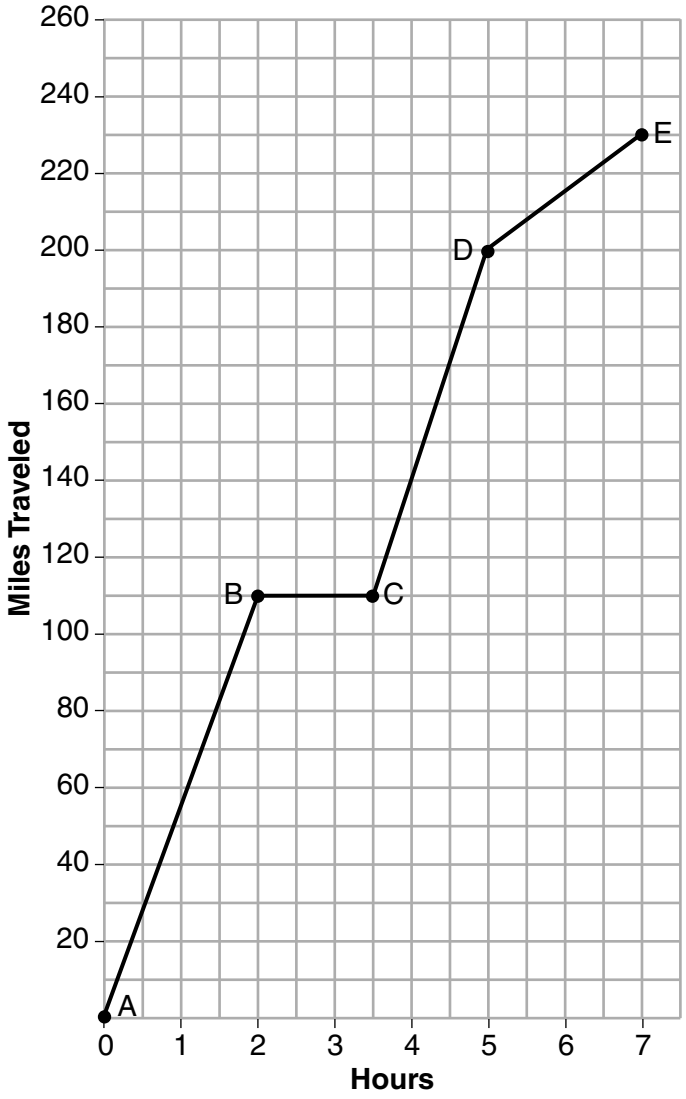
Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

32.4 mph

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

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



~~A-B~~
~~B-C~~
~~C-D~~
D-E

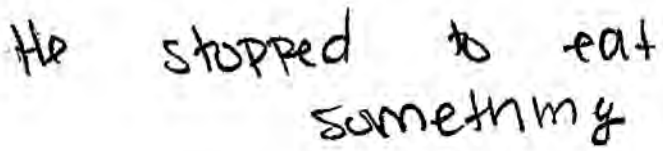
Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

D - E because that is the flattest slope being without completely flat

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.

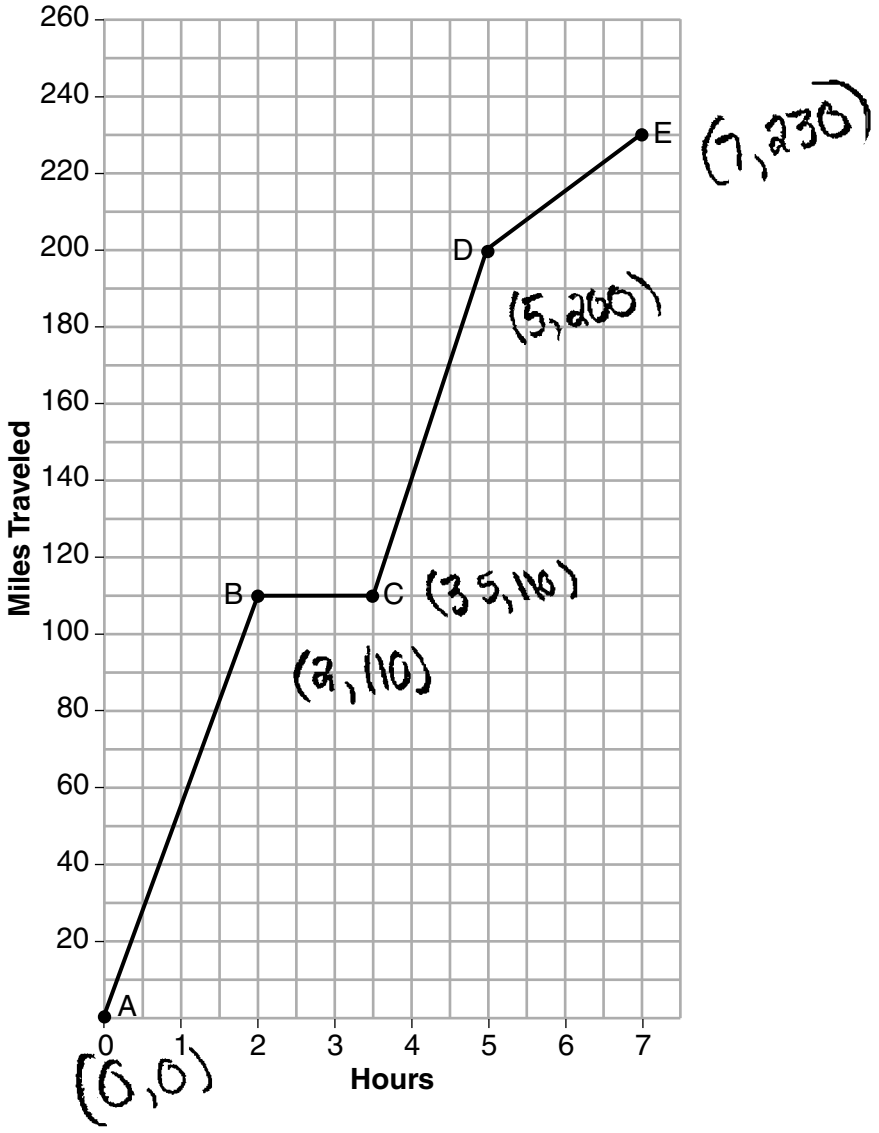


Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

Score 3: The student calculated the average speed incorrectly.

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

From hours 5 to 7 because craig would be stuck it traffic and the rate of change for hours 5 to 7. is slower than hours 0 to 2 and $3\frac{1}{2}$ to 5.

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.

Between interval B and C

craig could have gotten a

flat tire and had to stop

Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

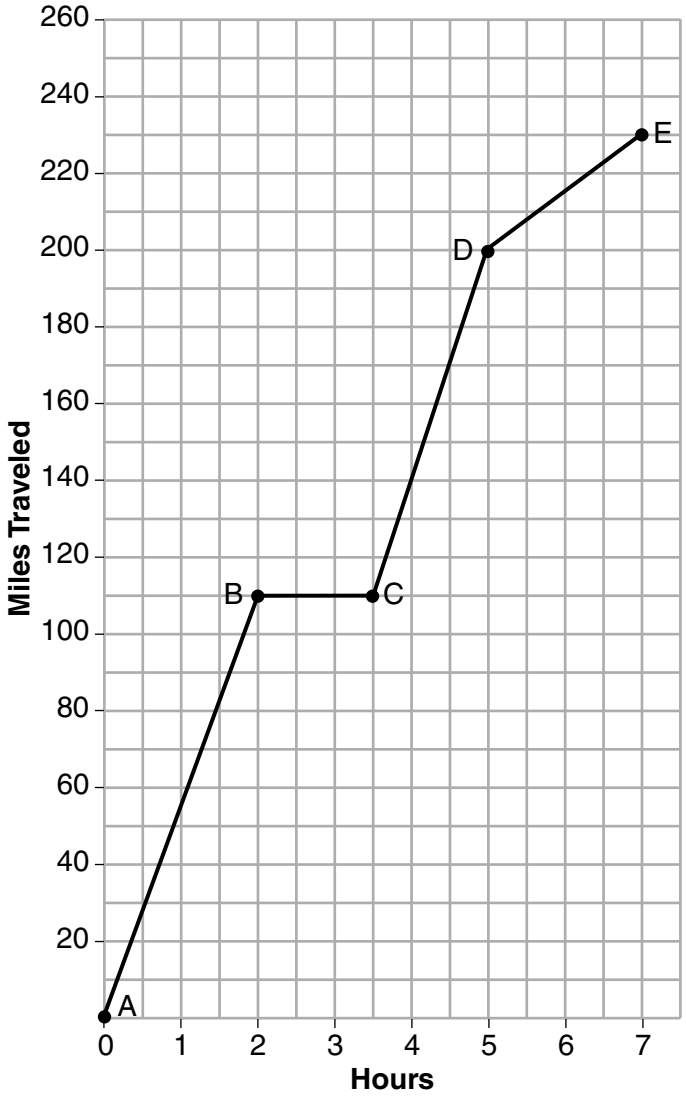
$R.O.C. = \frac{y-y}{x-x}$

$0-2 = \frac{110-0}{2-0} = \frac{110}{2} = 55 \text{ mph}$

Score 3: The student made an error in calculating the average speed of the entire trip.

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

Between D and E because there may have been traffic.

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.

He may have stopped somewhere to stay there or take a break from driving

Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

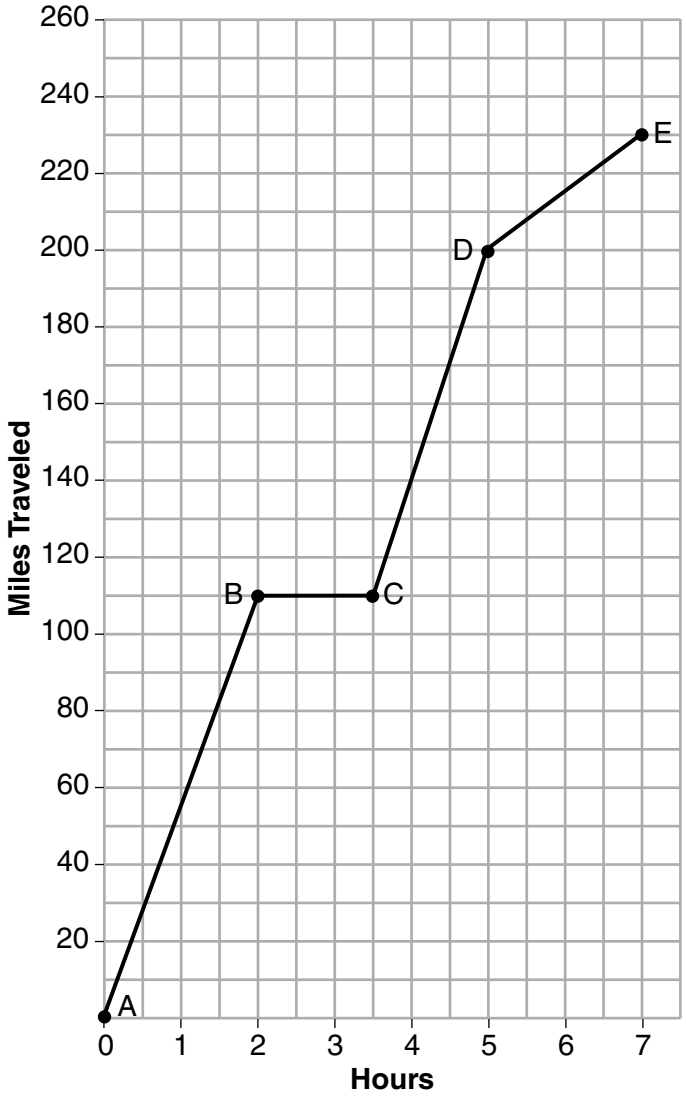
32.8 miles per hour

230 miles / 7 hours

Score 2: The student wrote a correct interval, but with an incomplete explanation, and made a rounding error.

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



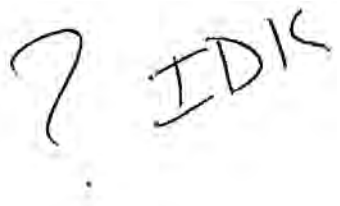
Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

B to C because the car was stopped for the whole interval.

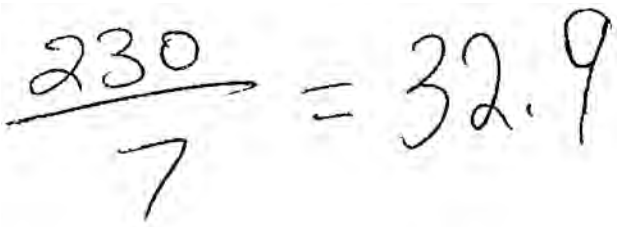
Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.



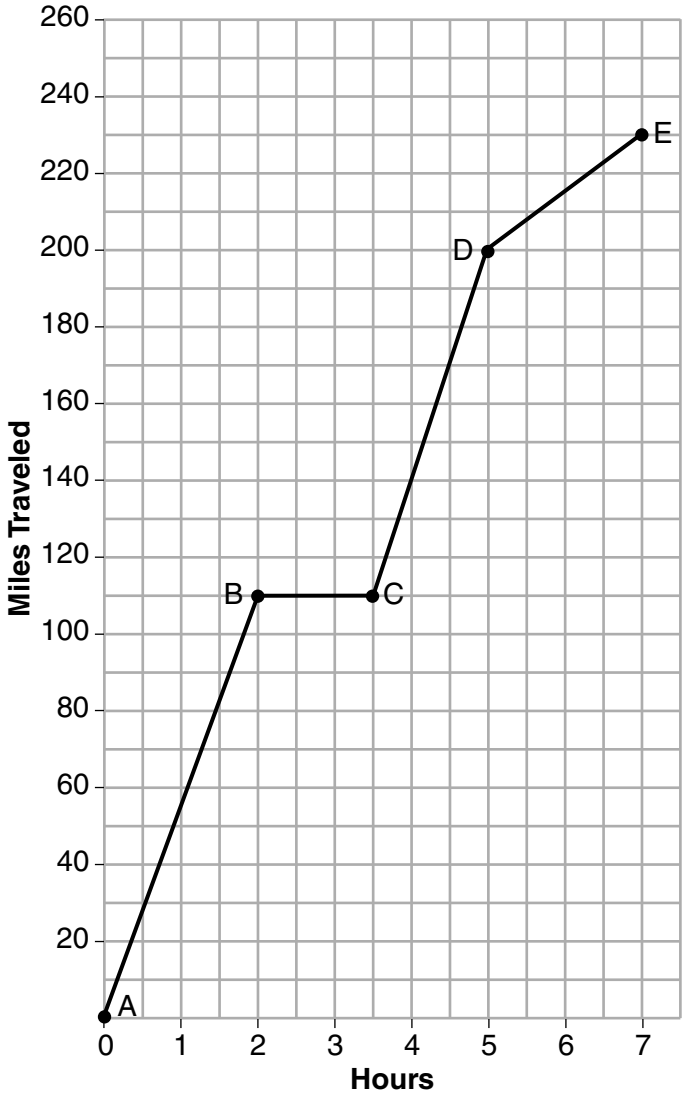
Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.



Score 1: The student calculated the average speed correctly.

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

A to B because he was driving up a really steep hill.

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.

he was driving really slow

Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

total miles / hours driven $\frac{230}{5.5} = 41.8$

Score 0: The student wrote a completely incorrect response.

Question 35

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

$2x^2+3x+10 = 4x+32$
$-4x-32 \quad -4x-32$
$2x^2-1x-22=0$

$\frac{1 \pm \sqrt{1+176}}{4}$

$x = 3.6, -3.1$

Explain why you chose the method used to solve this quadratic equation.

I used this method (the quadratic formula) since the equation $2x^2-1x-22=0$ could not be factored by grouping.

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

Question 35

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

$2x^2+3x+10 = 2(2x+16)$

$2x^2+3x+10 = 4x+16$

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

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

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

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

$x=-1.5 \quad x=2.0$

Explain why you chose the method used to solve this quadratic equation.

I choose this method because it factors easily.

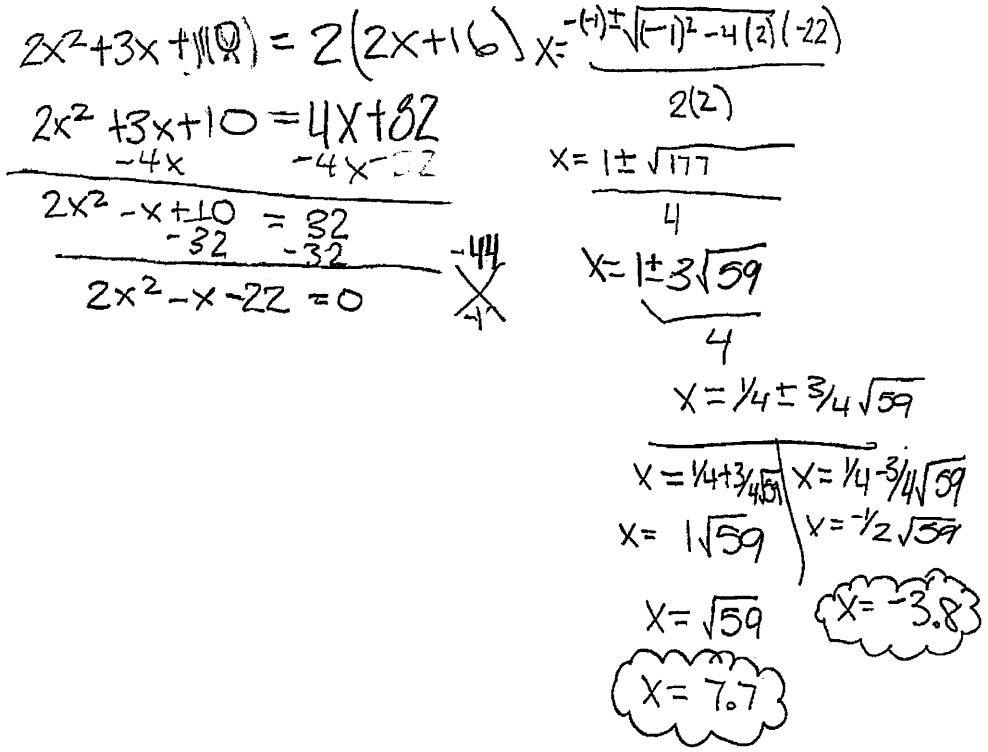
Score 3: The student did not distribute 2 to both $2x$ and 16.

Question 35

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.



Explain why you chose the method used to solve this quadratic equation.

I used quadratic formula because completing the Square did not work because factors of -44 do not add up to -1.

Score 2: The student made a correct substitution into the quadratic formula and wrote a correct explanation.

Question 35

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

$2x^2+3x+10=2(2x+16)$
$2x^2+3x+10=4x+32$
$2x^2+3x+10-4x-32=0$
$2x^2-x-22=0$
$a=2, b=-1, c=-22$
$\Delta=(-1)^2-4\times2\times(-22)$
$=1+176$
$=177$

$x=\frac{1\pm\sqrt{177}}{4}$

$x_1=\frac{1+\sqrt{177}}{4}\approx3.57$

$x_2=\frac{1-\sqrt{177}}{4}\approx-3.07$

Explain why you chose the method used to solve this quadratic equation.

Score 2: The student made a rounding error and did not write an explanation.

Question 35

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

$2x^2+3x+10=2(2x+16)$

$2x^2+3x+10=4x+32$

$-4x \quad -32 \quad -4x \quad -32$

$2x^2-1x-22=0$

$x=-3 \quad x=3.6$

1,44
2,22
4,11

Explain why you chose the method used to solve this quadratic equation.

I chose to find x by putting the quadratic equation in the calculator since doing it manually got me nowhere

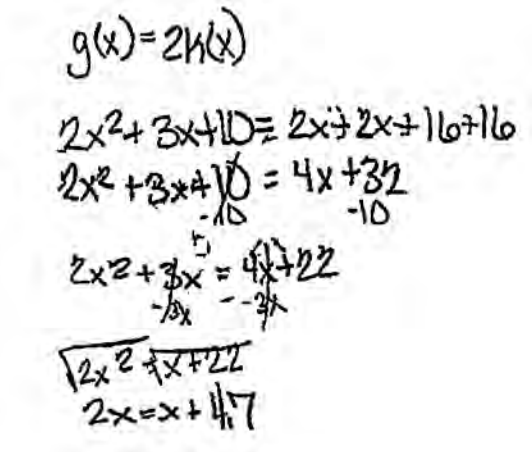
Score 1: The student wrote an appropriate explanation, but a method other than algebraic was used, and only one correct solution was stated.

Question 35

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.



Explain why you chose the method used to solve this quadratic equation.

I used substitution to solve because the question gave me the equations to work with so I substituded g(x) and k(x) into g(x)=2k(x)

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

Question 36

36 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

option 1 $f(x) = 10 + 100x$

option 2 $g(x) = 10(2)^x$

Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

opt 1

$f(x) = 10 + 100 \cdot 7$

$= 10 + 700$

$= 710$

opt 2

$g(x) = 10 \cdot 2^7$

$= 10 \cdot 128$

$= 1280$

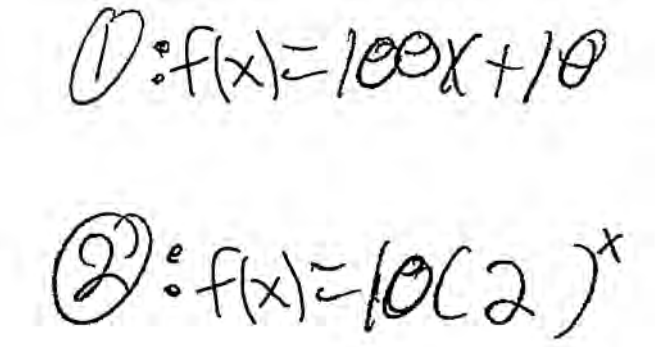
He will reach his goal with either option.

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

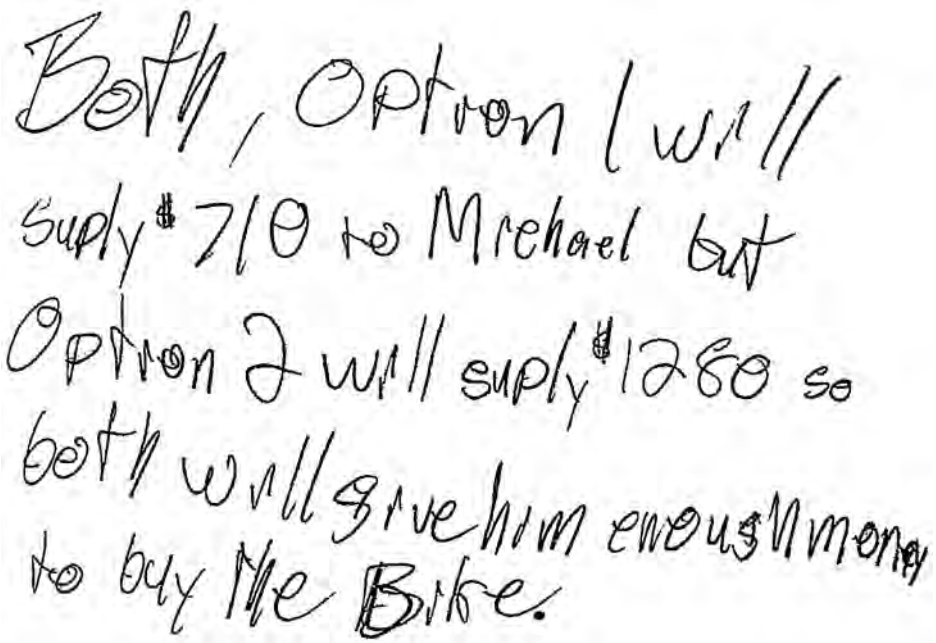
Question 36

36 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.



Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.



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

Question 36

36 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

option 1 $f(x) = 100x + 10$

option 2 $f(x) = 10(1.02)^x$

Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

$y = 100(7) + 10$ Option 1

$y = 710$

$y = 10(1.02)^7$ Option 2

$y = 11.5$

Score 3: The student wrote an incorrect function for option 2, but gave an appropriate determination and justification.

Question 36

36 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

#1 $100x + 10 \geq 700$

#2 $10(2)^x \geq 700$

Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

7 Weeks

$100(7) + 10 \geq 700$ ✓

$710 \geq 700$

Both

$10(2)^7 \geq 700$ ✓

$1280 \geq 700$

Score 3: The student did not write two correct functions, but wrote two appropriate inequalities that they used to justify their answer.

Question 36

36 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

option 1: $f(700) = 100(7)+10$

option 2: $f(700) = 10(2^7)$

Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

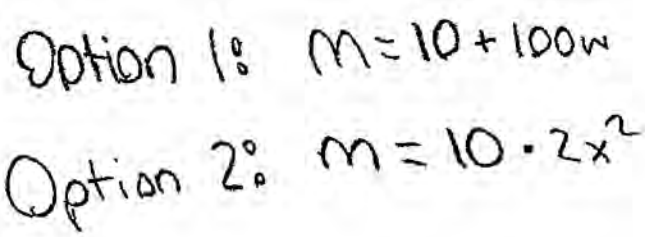
Both options will enable Michael to reach his goal, because after 7 weeks with Option 1 michael will have \$710, and \$1280 after Option 2

Score 2: The student made a correct determination, but did not write either function using proper notation.

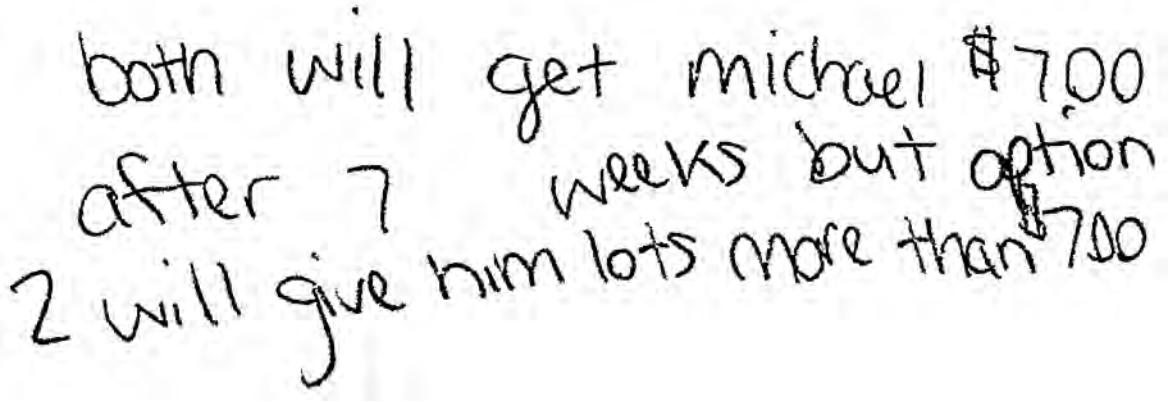
Question 36

36 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.



Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.



Score 1: The student stated both options will work.

Question 36

36 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

$100x + 10$

$10x^9$

Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

$100(7) + 10 \geq 700$

$700 \geq 700$

$10(7)^2 \geq 700$

$490 \geq 700$

Score 0: The student wrote only one appropriate expression.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

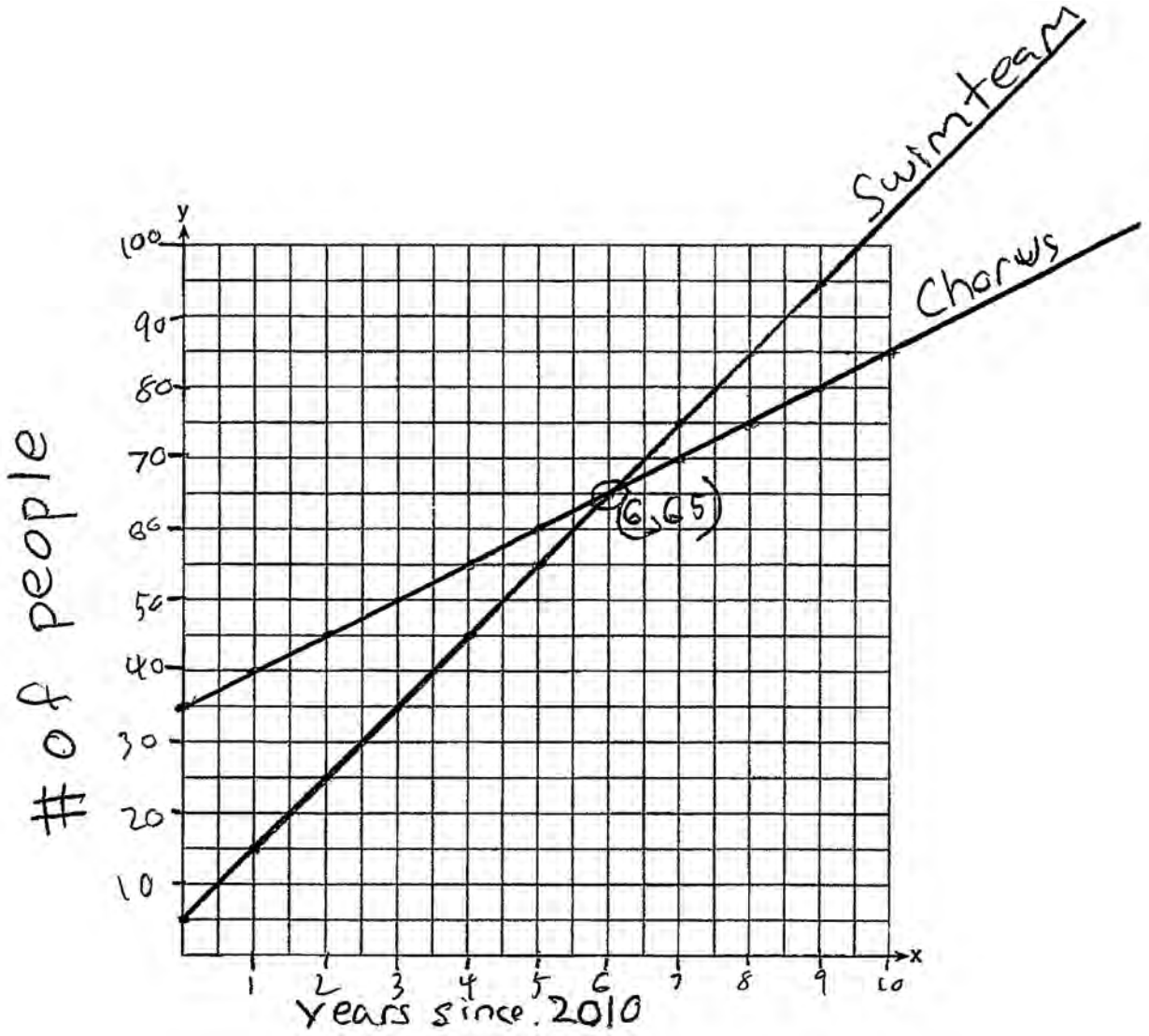
$y = 10x + 5$

$y = 5x + 35$

Question 37 is continued on the next page.

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

The coordinant (6, 65) displays that 6 years after 2010, both the swim team and the chorus had 65 members, and in the next year, the number of people on the swim team will surpass the chorus.

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

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

2

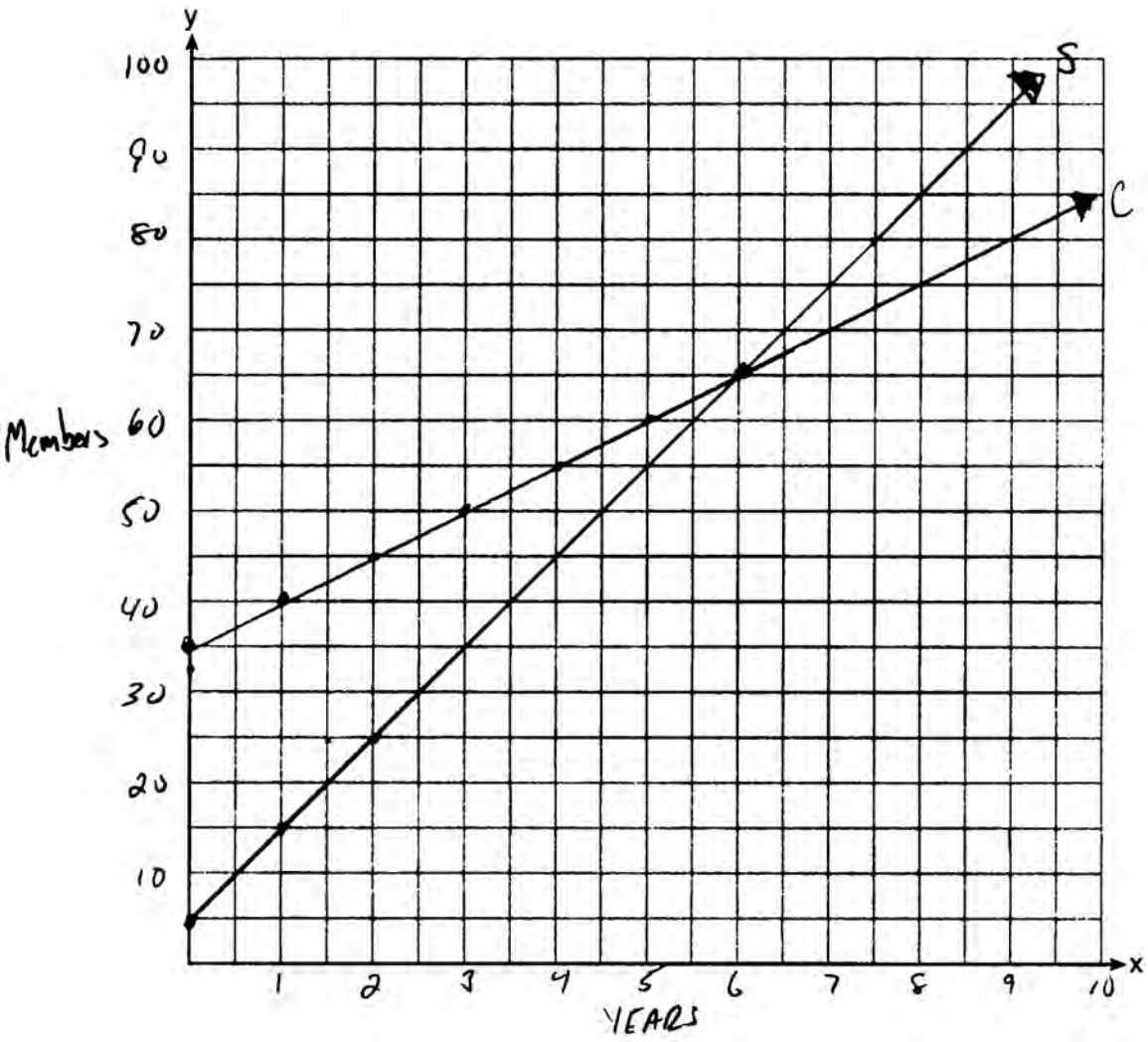
S : $5 + 10x = y$

C : $35 + 5x = y$

Question 37 is continued on the next page.

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

The intersection point means both clubs had the same number of students at the same time

Score 5: The student wrote an incomplete explanation.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

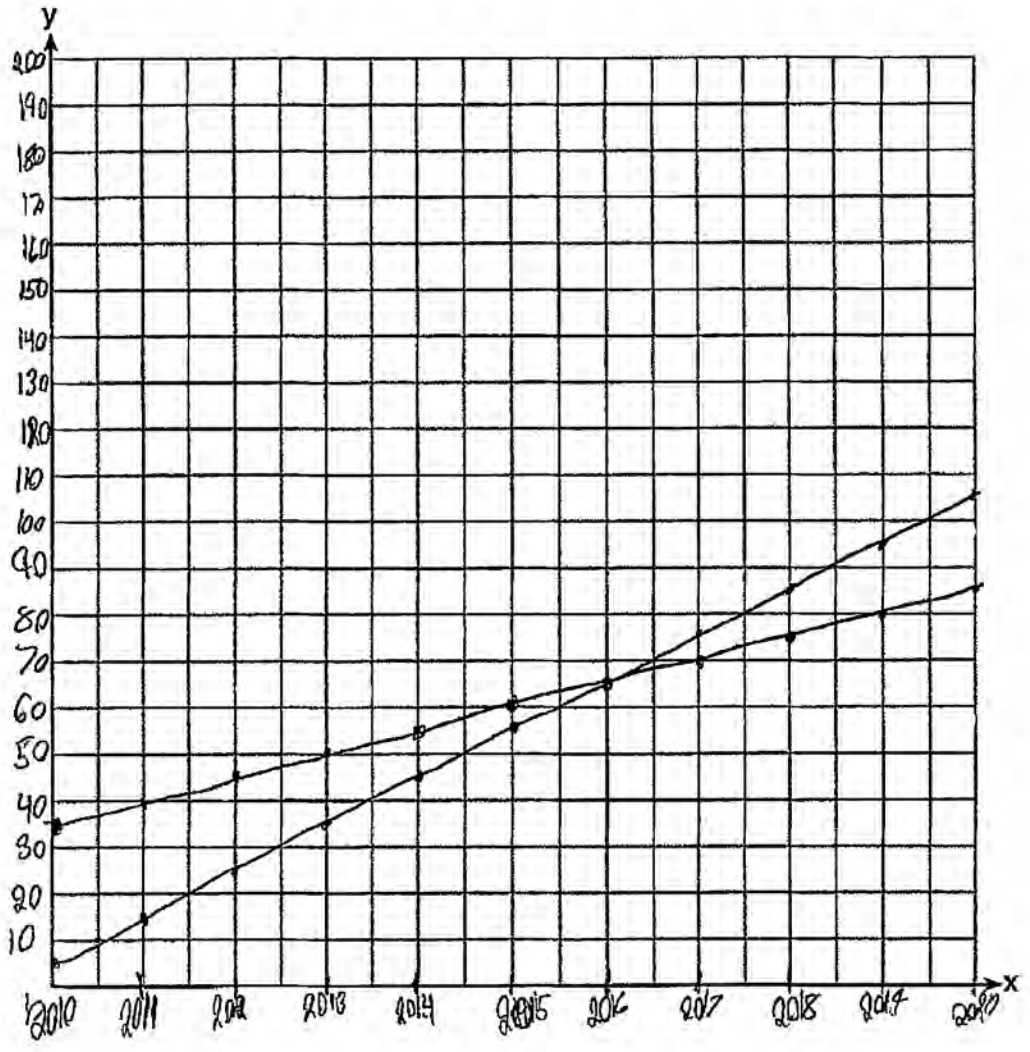
$y = 5x + 35$

$y = 10x + 5$

Question 37 is continued on the next page.

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

at the Point of intersection They have the Same amount of Students

Score 4: The student wrote a correct system of equations. Both lines are graphed correctly, but neither one is labeled. An incomplete explanation was written.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

swim $y = 10x + 5$

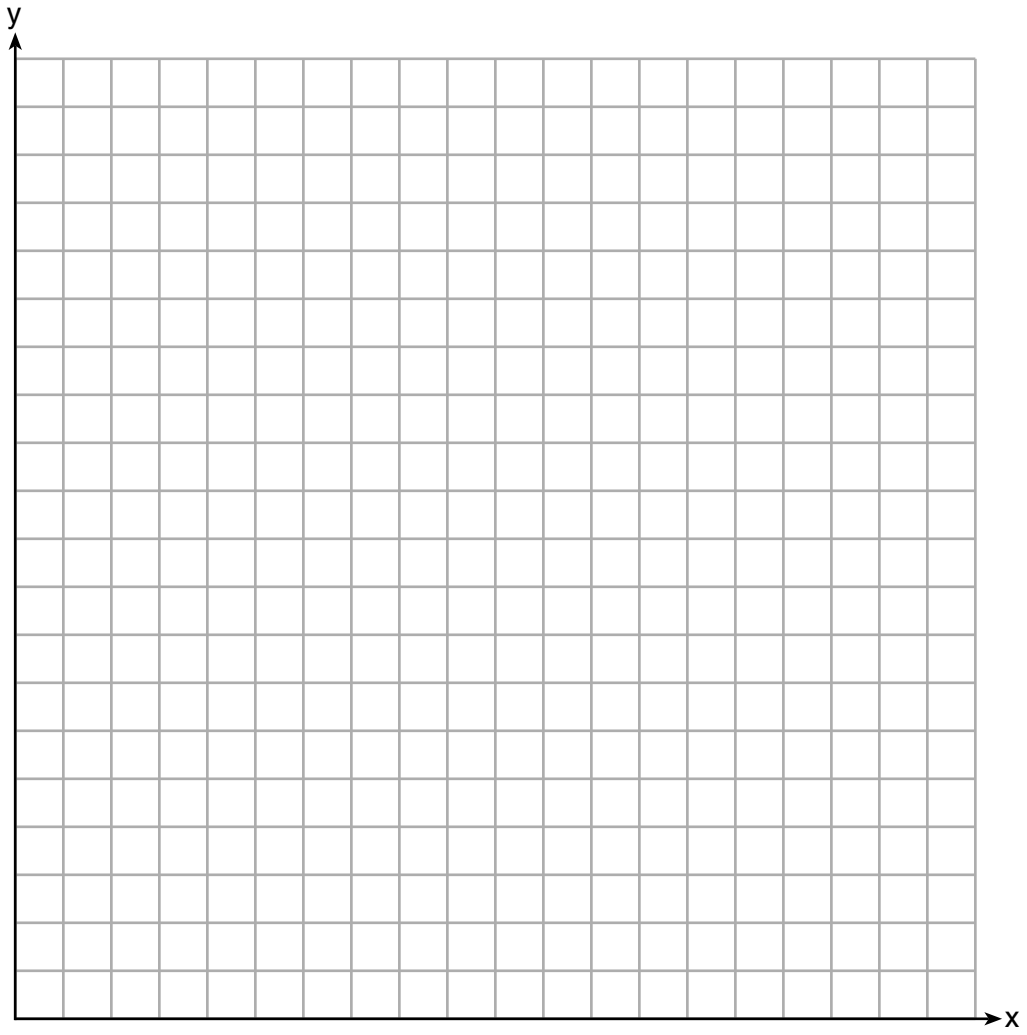
chorus $y = 5x + 35$

Question 37 is continued on the next page.

Question 37

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

x is the number of years after 2010 in which the number of students in each activity is the same (y)

Score 4: The student wrote a correct system of equations and explained both coordinates in the context of the problem.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

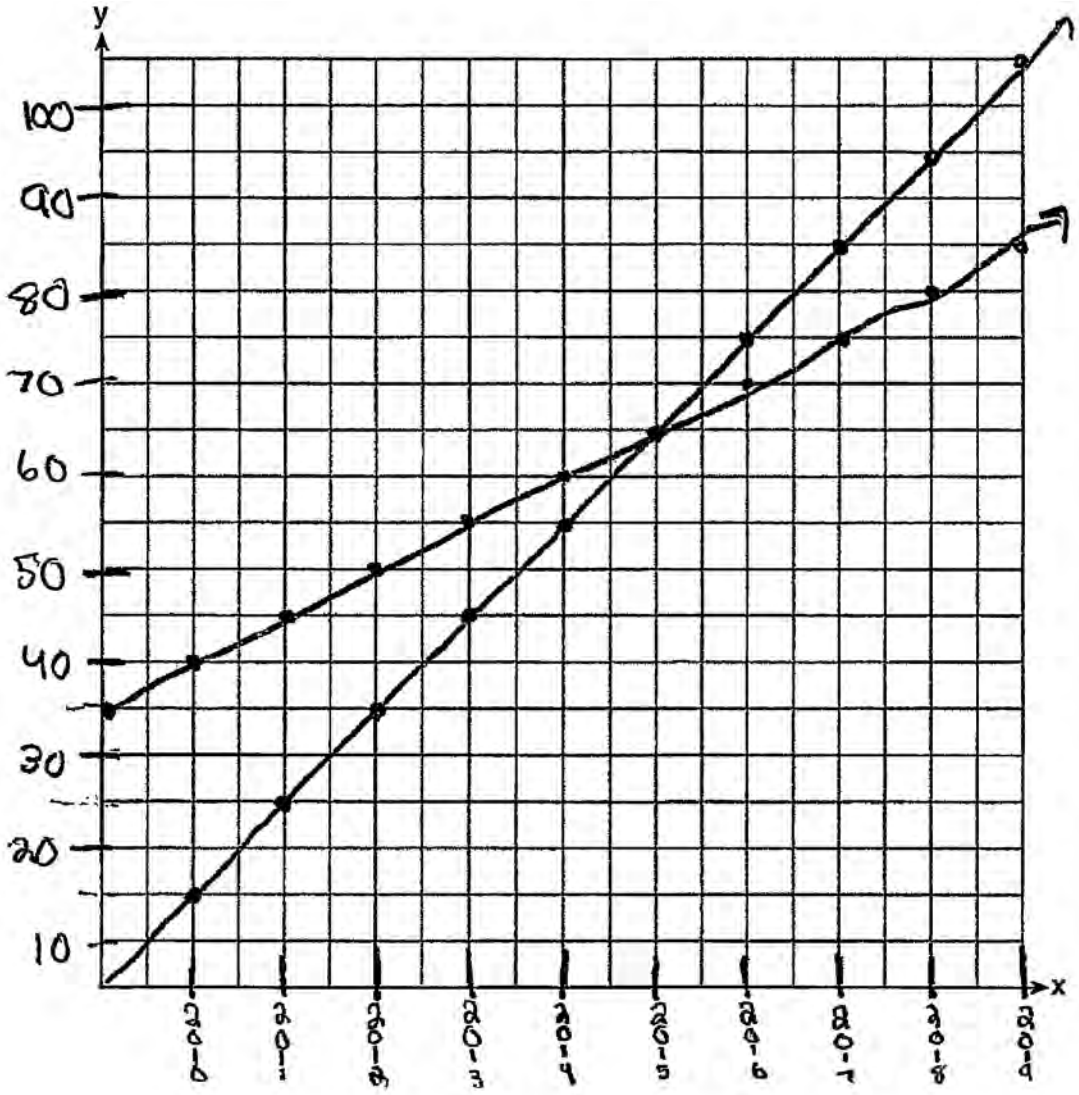
Write a system of equations to model this situation, where x represents the number of years since 2010.

$y = 5 + 10x$ $y = 35 + 5x$

Question 37 is continued on the next page.

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

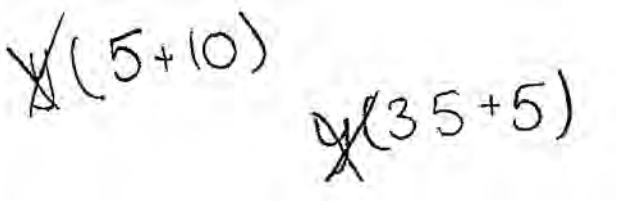
The point of intersection means that this year born teams have the same number of players on the team

Score 3: The student wrote a correct system of equations, but did not graph them correctly. An incomplete explanation was written.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

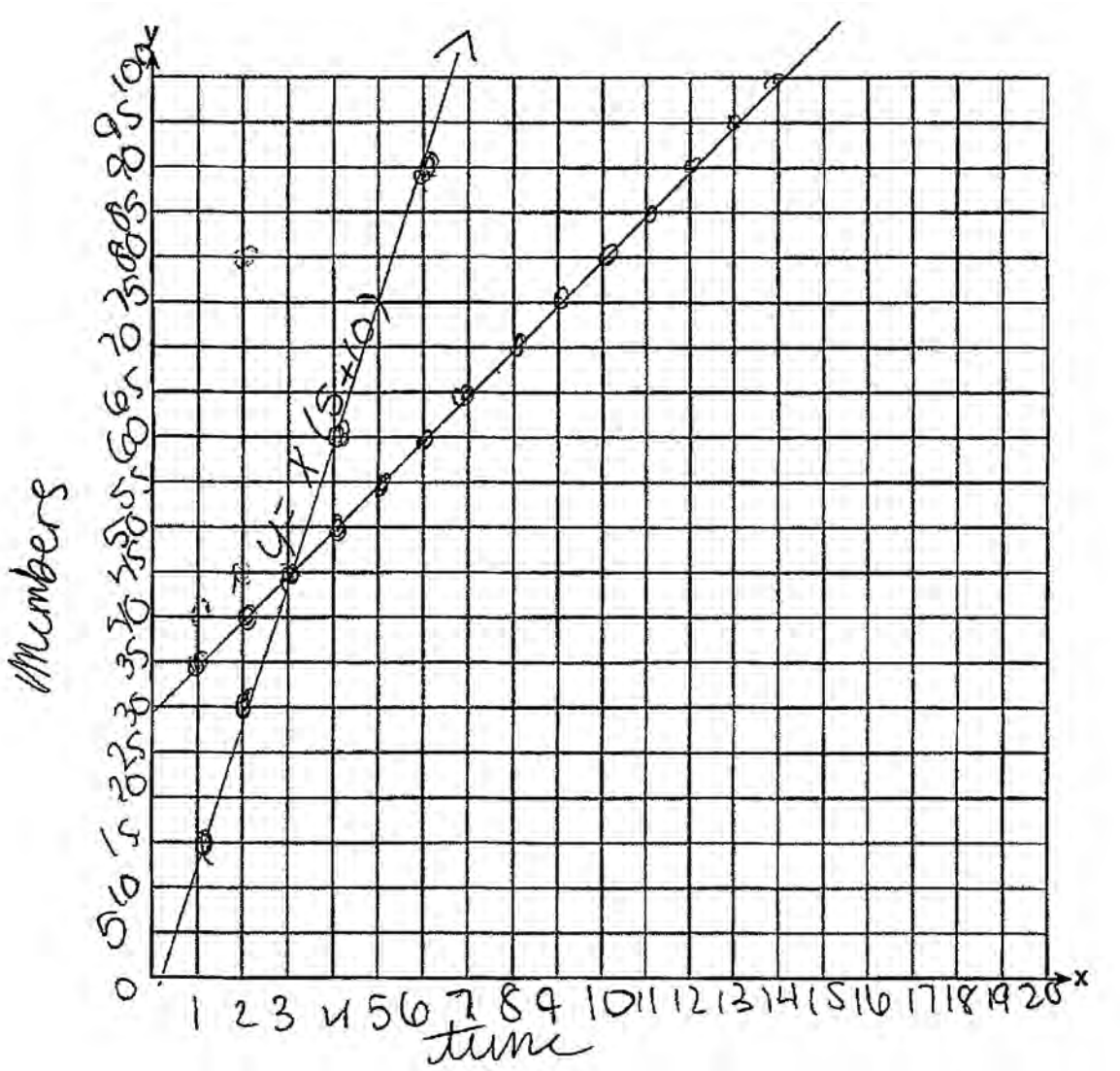
Write a system of equations to model this situation, where x represents the number of years since 2010.



Question 37 is continued on the next page.

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

this means that in 3 years they will both have 45 members then after the swim team will have more

Score 2: The student wrote an appropriate explanation based on their graph.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

let x = represent the # of years.

Swim @2010 $5 + (10x) =$

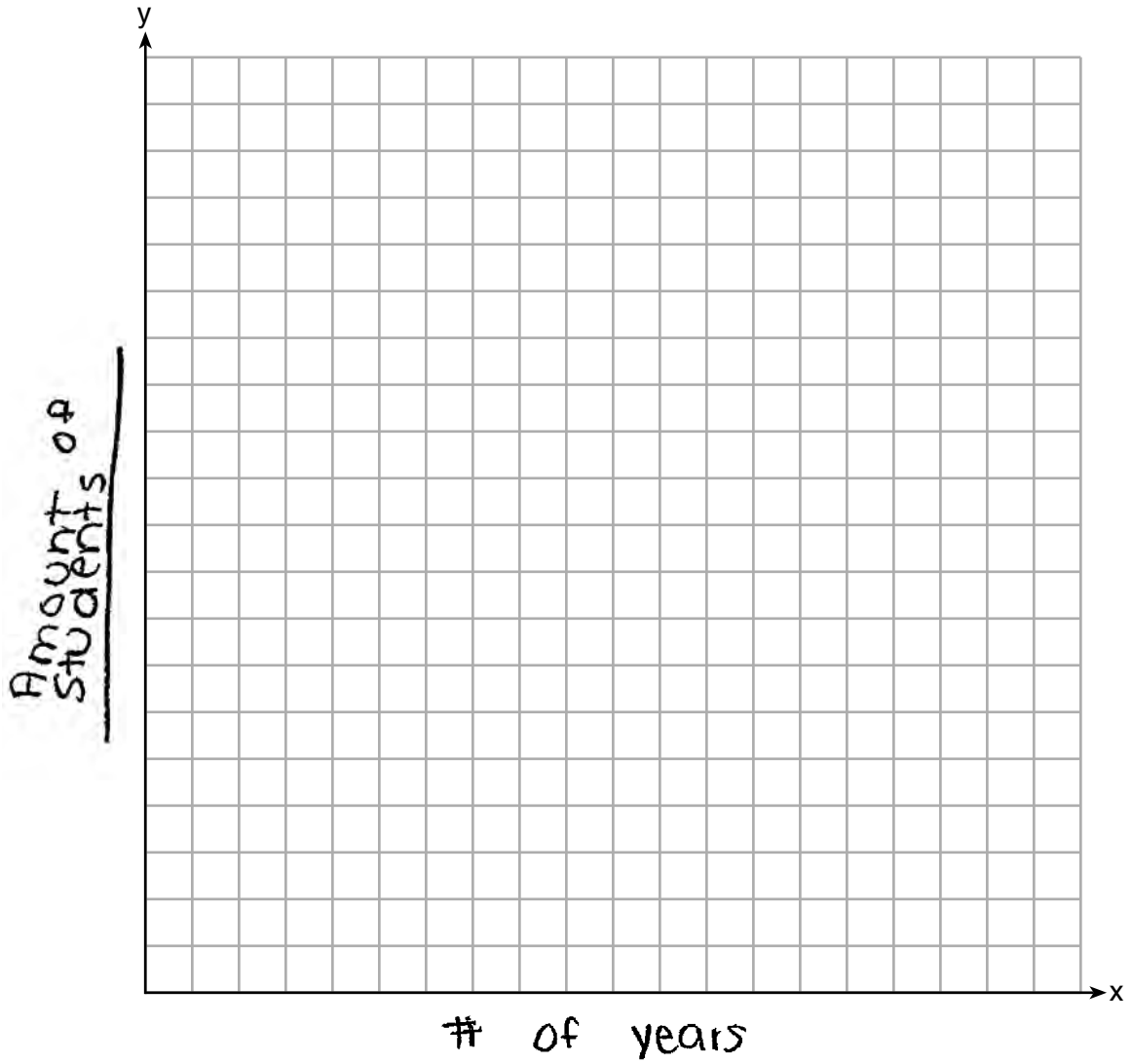
2010 - Chorus $35 + 5x$

Question 37 is continued on the next page.

Question 37

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

Each coordinate represent a the ~~a stud~~ the # of students after X how many years.

Score 1: The student wrote two appropriate expressions.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

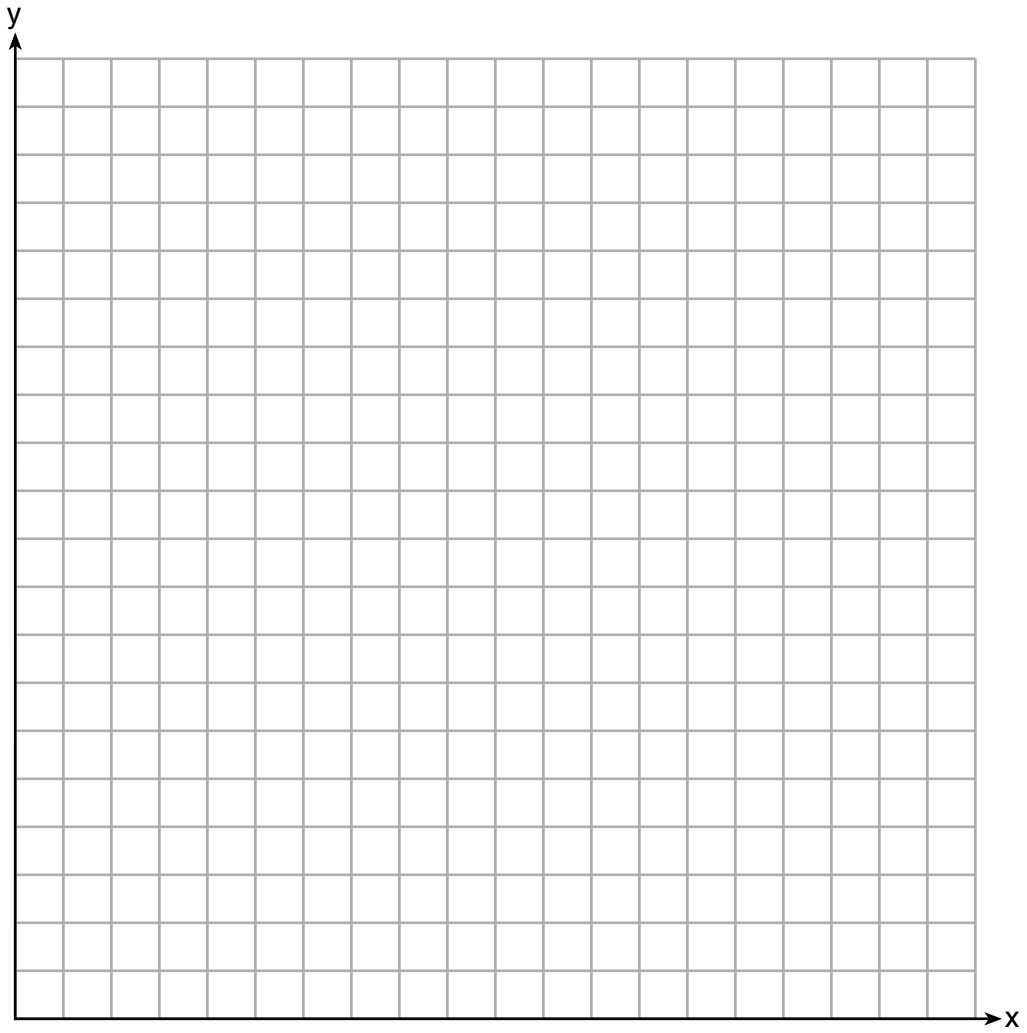
$35 + 5(x) > 35$

$5 + 10(x) > 5$

Question 37 is continued on the next page.

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

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) – June 2017

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

(Use for the June 2017 exam only.)

Raw Score	Scale Score	Performance Level
86	**100**	5
85	**99**	5
84	**97**	5
83	**96**	5
82	**95**	5
81	**94**	5
80	**93**	5
79	**92**	5
78	**91**	5
77	**90**	5
76	**90**	5
75	**89**	5
74	**88**	5
73	**88**	5
72	**87**	5
71	**87**	5
70	**86**	5
69	**86**	5
68	**86**	5
67	**85**	5
66	**84**	4
65	**84**	4
64	**83**	4
63	**83**	4
62	**83**	4
61	**82**	4
60	**82**	4
59	**82**	4
58	**82**	4

Raw Score	Scale Score	Performance Level
57	**81**	4
56	**81**	4
55	**81**	4
54	**80**	4
53	**80**	4
52	**80**	4
51	**80**	4
50	**79**	3
49	**79**	3
48	**79**	3
47	**78**	3
46	**78**	3
45	**78**	3
44	**77**	3
43	**77**	3
42	**76**	3
41	**76**	3
40	**75**	3
39	**75**	3
38	**74**	3
37	**74**	3
36	**73**	3
35	**72**	3
34	**72**	3
33	**71**	3
32	**70**	3
31	**69**	3
30	**68**	3
29	**67**	3

Raw Score	Scale Score	Performance Level
28	**66**	3
27	**65**	3
26	**64**	2
25	**63**	2
24	**61**	2
23	**60**	2
22	**59**	2
21	**57**	2
20	**56**	2
19	**55**	2
18	**52**	1
17	**50**	1
16	**48**	1
15	**46**	1
14	**44**	1
13	**42**	1
12	**40**	1
11	**37**	1
10	**34**	1
9	**32**	1
8	**29**	1
7	**26**	1
6	**23**	1
5	**19**	1
4	**16**	1
3	**12**	1
2	**8**	1
1	**4**	1
0	**0**	1

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

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

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