ALGEBRA

I

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

ALGEBRA I

Wednesday, June 19, 2019 — 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

Part I

Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet. [48]

Use this space for computations.

1 The expression $w^4 - 36$ is equivalent to
(1) $(w^2 - 18)(w^2 - 18)$ (3) $(w^2 - 6)(w^2 - 6)$
(2) $(w^2 + 18)(w^2 - 18)$ (4) $(w^2 + 6)(w^2 - 6)$

2 If $f(x) = 4x + 5$, what is the value of $f(-3)$?
(1) -2 (3) 17
(2) -7 (4) 4

3 Which relation is *not* a function?

x	y
−10	−2
−6	2
−2	6
1	9
5	13

(1)

(3)

$3x + 2y = 4$

(2)

(4)

4 Given: $f(x) = (x - 2)^2 + 4$
$g(x) = (x - 5)^2 + 4$

When compared to the graph of $f(x)$, the graph of $g(x)$ is

(1) shifted 3 units to the left   (3) shifted 5 units to the left

(2) shifted 3 units to the right   (4) shifted 5 units to the right

5 Students were asked to write $6x^5 + 8x - 3x^3 + 7x^7$ in standard form. Shown below are four student responses.

Anne: $7x^7 + 6x^5 - 3x^3 + 8x$
Bob: $-3x^3 + 6x^5 + 7x^7 + 8x$
Carrie: $8x + 7x^7 + 6x^5 - 3x^3$
Dylan: $8x - 3x^3 + 6x^5 + 7x^7$

Which student is correct?

(1) Anne   (3) Carrie

(2) Bob   (4) Dylan

6 The function f is shown in the table below.

x	f(x)
0	1
1	3
2	9
3	27

Which type of function best models the given data?

(1) exponential growth function

(2) exponential decay function

(3) linear function with positive rate of change

(4) linear function with negative rate of change

**7** Which expression results in a rational number?

(1) $\sqrt{2} \cdot \sqrt{18}$ (3) $\sqrt{2} + \sqrt{2}$

(2) $5 \cdot \sqrt{5}$ (4) $3\sqrt{2} + 2\sqrt{3}$

8 A polynomial function is graphed below.
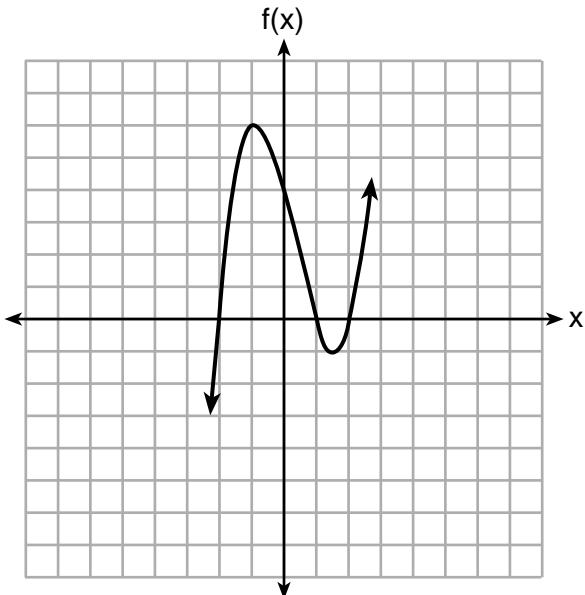
Which function could represent this graph?

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

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

9 When solving $p^2 + 5 = 8p - 7$, Kate wrote $p^2 + 12 = 8p$. The property she used is

(1) the associative property

(2) the commutative property

(3) the distributive property

(4) the addition property of equality

10 David wanted to go on an amusement park ride. A sign posted at the entrance read "You must be greater than 42 inches tall and no more than 57 inches tall for this ride." Which inequality would model the height, x, required for this amusement park ride?

(1) $42 < x \leq 57$ (3) $42 < x$ or $x \leq 57$

(2) $42 > x \geq 57$ (4) $42 > x$ or $x \geq 57$

11 Which situation can be modeled by a linear function?

(1) The population of bacteria triples every day.

(2) The value of a cell phone depreciates at a rate of 3.5% each year.

(3) An amusement park allows 50 people to enter every 30 minutes.

(4) A baseball tournament eliminates half of the teams after each round.

12 Jenna took a survey of her senior class to see whether they preferred pizza or burgers. The results are summarized in the table below.

	Pizza	Burgers
Male	23	42
Female	31	26

Of the people who preferred burgers, approximately what percentage were female?

(1) 21.3   (3) 45.6

(2) 38.2   (4) 61.9

**13** When $3a + 7b > 2a - 8b$ is solved for a, the result is

(1) $a > -b$ (3) $a < -15b$

(2) $a < -b$ (4) $a > -15b$

14 Three functions are shown below.

A: $g(x) = -\dfrac{3}{2}x + 4$

B: $f(x) = (x + 2)(x + 6)$

C:　　　　　　　　　　h(x)
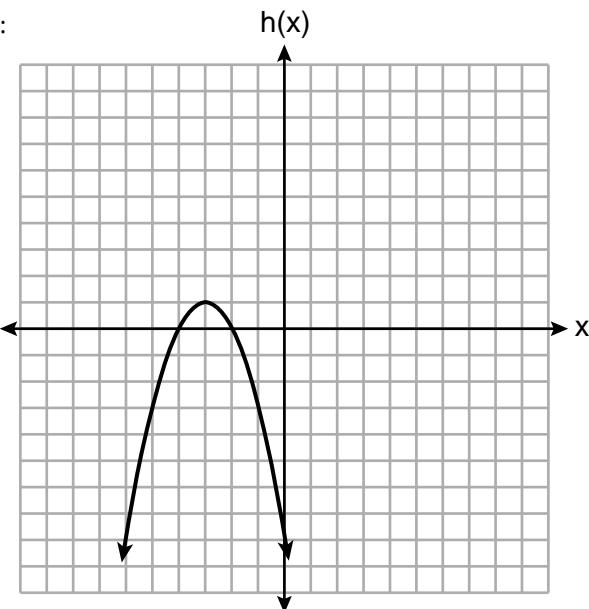
Which statement is true?

(1) *B* and *C* have the same zeros.

(2) *A* and *B* have the same *y*-intercept.

(3) *B* has a minimum and *C* has a maximum.

(4) *C* has a maximum and *A* has a minimum.

15 Nicci's sister is 7 years less than twice Nicci's age, *a*. The sum of Nicci's age and her sister's age is 41. Which equation represents this relationship?

(1) $a + (7 - 2a) = 41$　　　　(3) $2a - 7 = 41$

(2) $a + (2a - 7) = 41$　　　　(4) $a = 2a - 7$

16 The population of a small town over four years is recorded in the chart below, where 2013 is represented by $x = 0$. [Population is rounded to the nearest person]

Year	2013	2014	2015	2016
Population	3810	3943	4081	4224

The population, $P(x)$, for these years can be modeled by the function $P(x) = ab^x$, where b is rounded to the nearest thousandth. Which statements about this function are true?

       I. $a = 3810$

      II. $a = 4224$

    III. $b = 0.035$

    IV. $b = 1.035$

(1) I and III

(2) I and IV

(3) II and III

(4) II and IV

17 When written in factored form, $4w^2 - 11w - 3$ is equivalent to

(1) $(2w + 1)(2w - 3)$

(2) $(2w - 1)(2w + 3)$

(3) $(4w + 1)(w - 3)$

(4) $(4w - 1)(w + 3)$

18 Which ordered pair does *not* represent a point on the graph of $y = 3x^2 - x + 7$?

(1) $(-1.5, 15.25)$

(2) $(0.5, 7.25)$

(3) $(1.25, 10.25)$

(4) $(2.5, 23.25)$

19 Given the following three sequences:

      I.   2, 4, 6, 8, 10...

      II.   2, 4, 8, 16, 32...

    III. $a, a + 2, a + 4, a + 6, a + 8...$

Which ones are arithmetic sequences?

(1) I and II, only

(2) I and III, only

(3) II and III, only

(4) I, II, and III

20 A grocery store sells packages of beef. The function $C(w)$ represents the cost, in dollars, of a package of beef weighing w pounds. The most appropriate domain for this function would be

(1) integers   (3) positive integers

(2) rational numbers   (4) positive rational numbers

21 The roots of $x^2 - 5x - 4 = 0$ are

(1) 1 and 4   (3) –1 and –4

(2) $\dfrac{5 \pm \sqrt{41}}{2}$ (4) $\dfrac{-5 \pm \sqrt{41}}{2}$

22 The following table shows the heights, in inches, of the players on the opening-night roster of the 2015-2016 New York Knicks.

84	80	87	75	77	79	80	74	76	80	80	82	82

The population standard deviation of these data is approximately

(1) 3.5   (3) 79.7

(2) 13   (4) 80

23 A population of bacteria can be modeled by the function $f(t) = 1000(0.98)^t$, where t represents the time since the population started decaying, and $f(t)$ represents the population of the remaining bacteria at time t. What is the rate of decay for this population?

(1) 98%   (3) 0.98%

(2) 2%   (4) 0.02%

24 Bamboo plants can grow 91 centimeters per day. What is the approximate growth of the plant, in inches per hour?

(1) 1.49   (3) 9.63

(2) 3.79   (4) 35.83

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 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x = -\frac{5}{4}x+2$$

26 If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

27 Graph the following piecewise function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -5 \le x < 2 \\ -2x + 10, & 2 \le x \le 6 \end{cases}$$
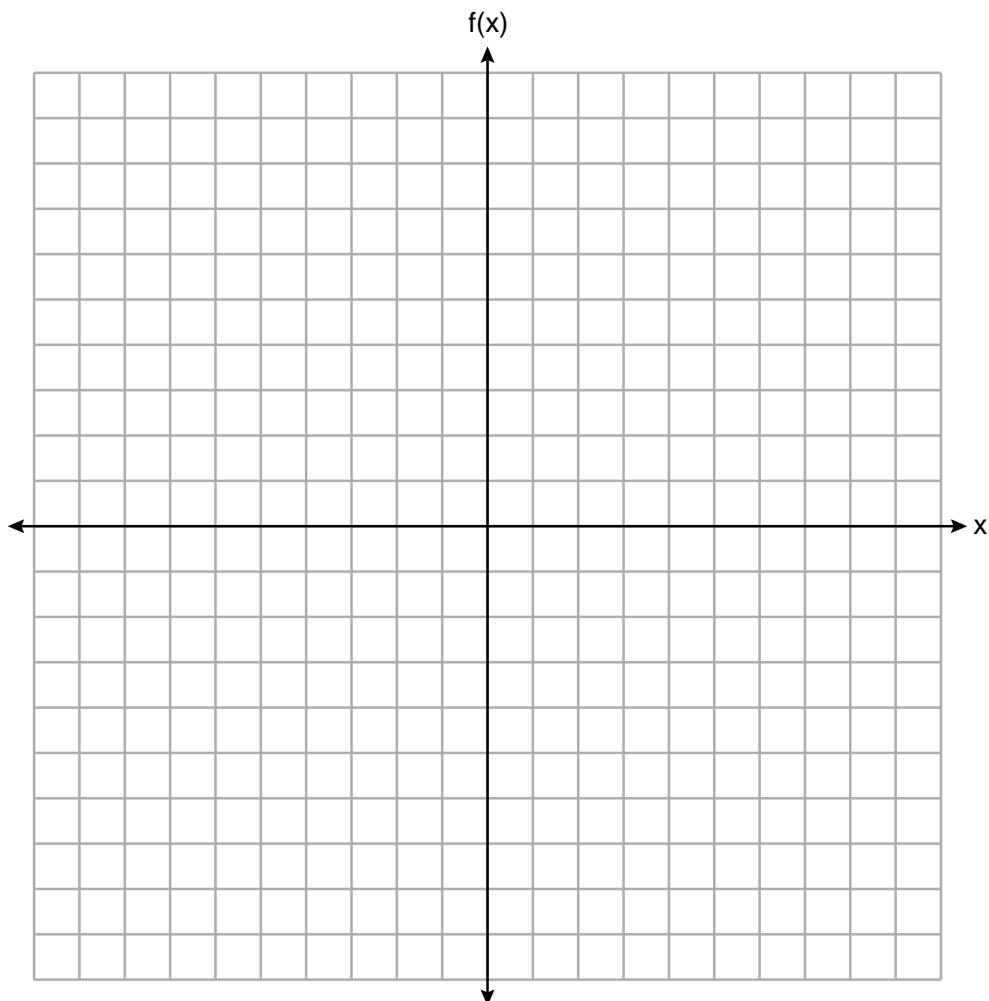
28 Solve $5x^2 = 180$ algebraically.

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

30 The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Solve the equation for h in terms of V, r, and π.

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2\left(a_{n-1} + 1\right)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

32 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

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 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt.

Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered.

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company *A*.

34 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.

$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$
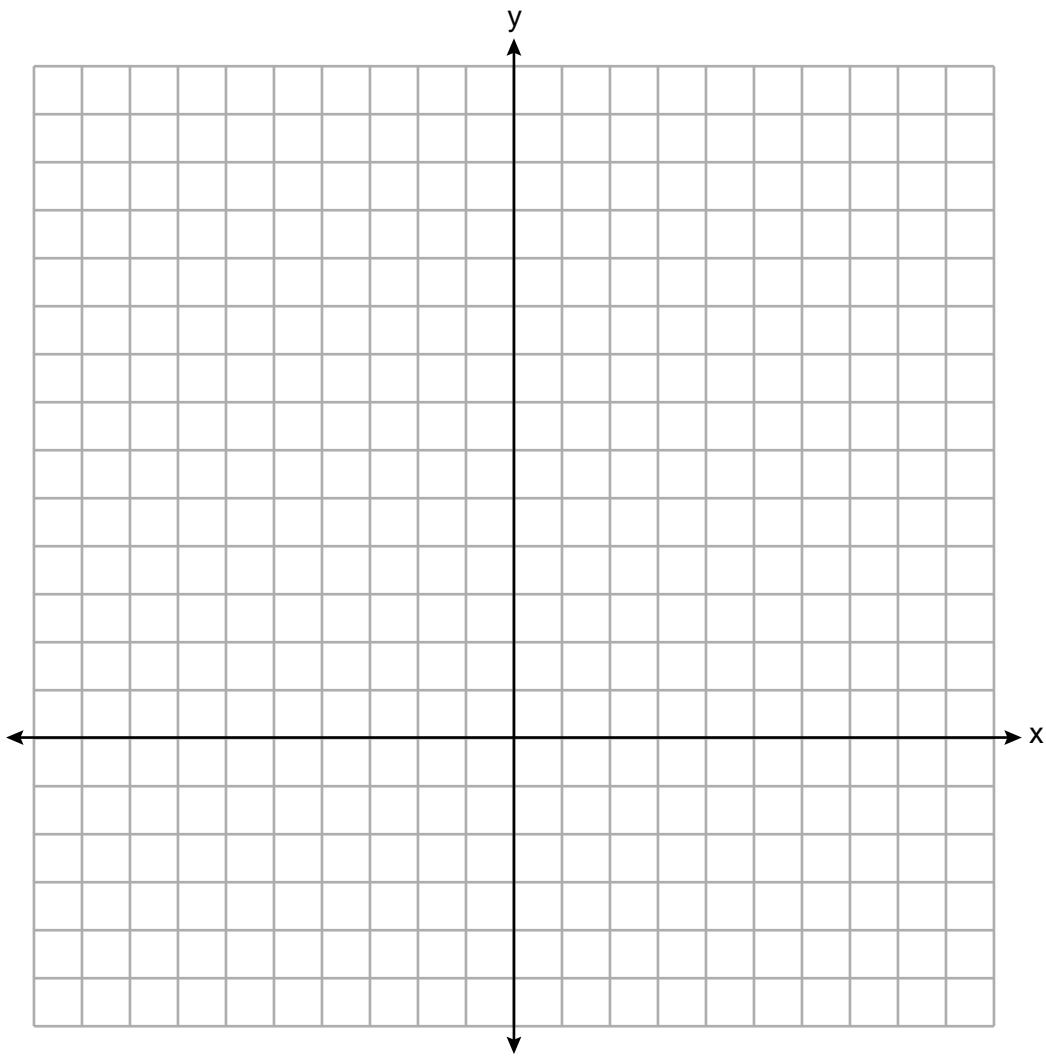
Determine and state all values of x for which $f(x) = g(x)$.

**35** The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

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

State the correlation coefficient of this line, to the *nearest hundredth*.

Explain what the correlation coefficient suggests in the context of the problem.

36 A system of inequalities is graphed on the set of axes below.
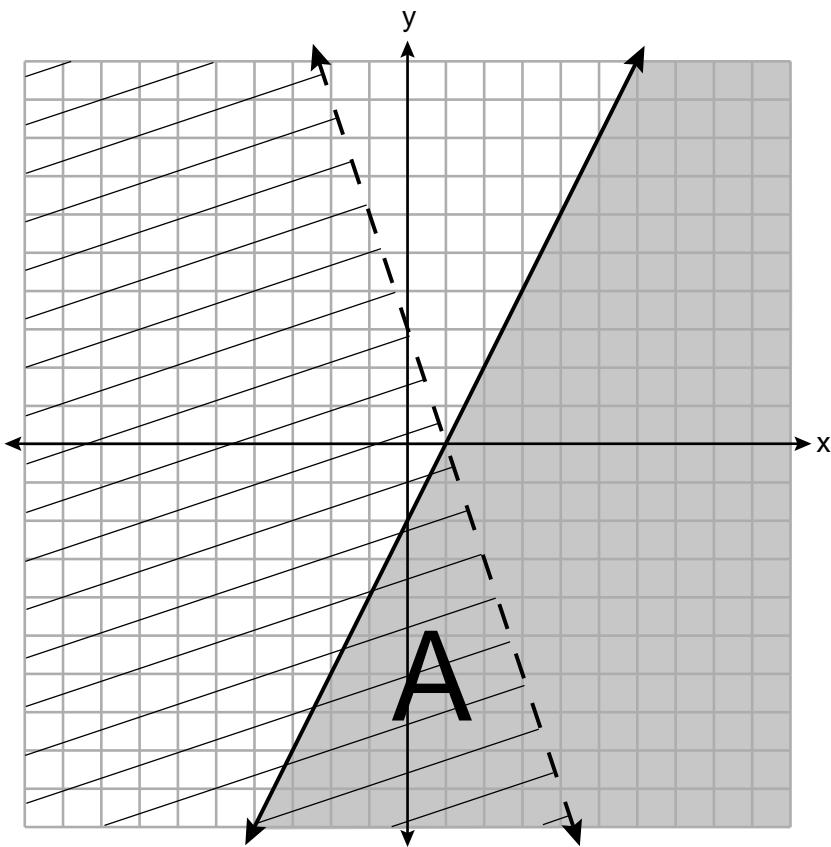
State the system of inequalities represented by the graph.

State what region *A* represents.

State what the entire gray region represents.

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 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.
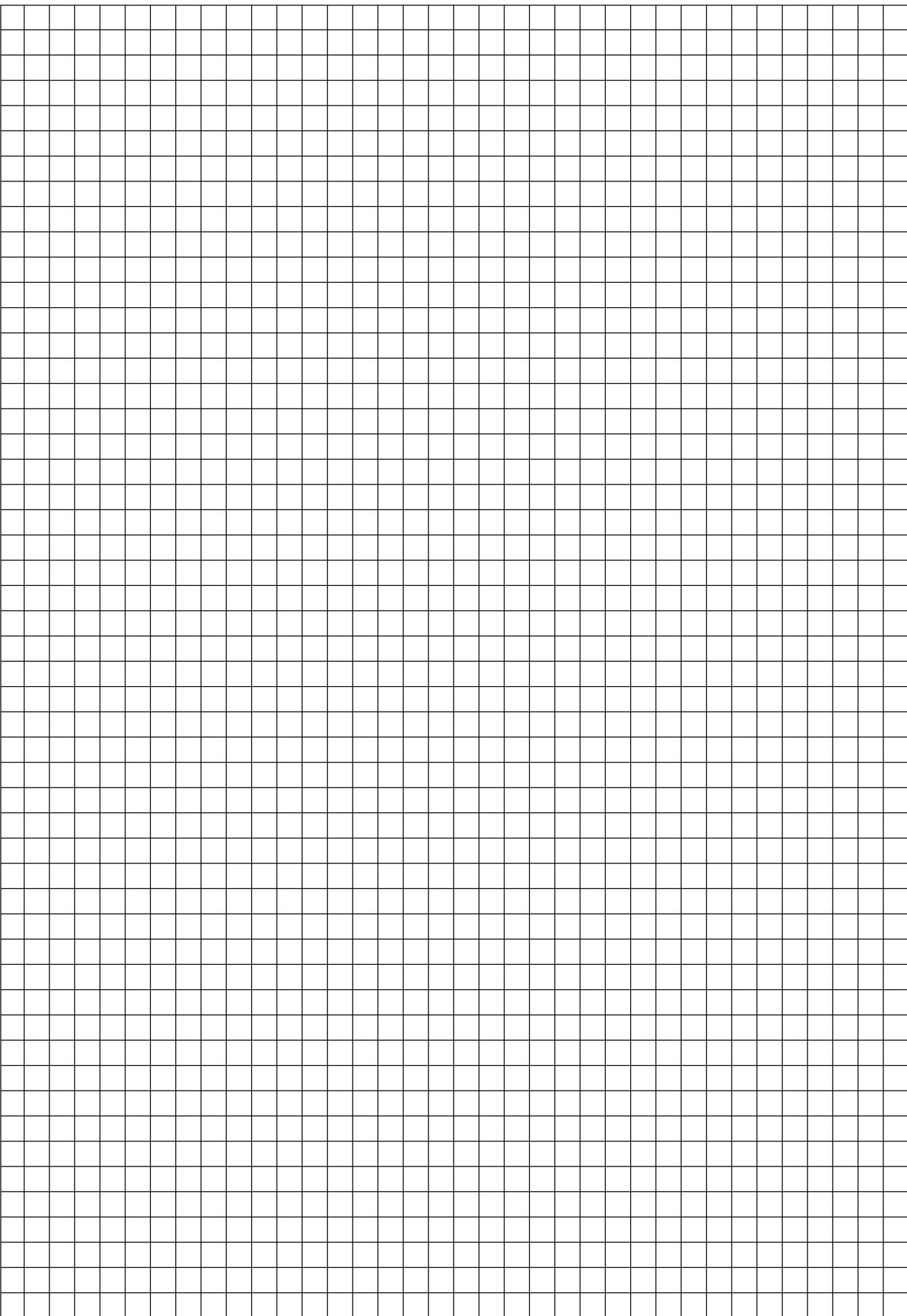
High School Math Reference Sheet

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	$A = \frac{1}{2}bh$	Pythagorean Theorem	$a^2 + b^2 = c^2$
Parallelogram	$A = bh$	Quadratic Formula	$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Circle	$A = \pi r^2$	Arithmetic Sequence	$a_n = a_1 + (n - 1)d$
Circle	$C = \pi d$ or $C = 2\pi r$	Geometric Sequence	$a_n = a_1 r^{n-1}$
General Prisms	$V = Bh$	Geometric Series	$S_n = \dfrac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$
Cylinder	$V = \pi r^2 h$	Radians	1 radian = $\dfrac{180}{\pi}$ degrees
Sphere	$V = \frac{4}{3}\pi r^3$	Degrees	1 degree = $\dfrac{\pi}{180}$ radians
Cone	$V = \frac{1}{3}\pi r^2 h$	Exponential Growth/Decay	$A = A_0 e^{k(t - t_0)} + B_0$
Pyramid	$V = \frac{1}{3}Bh$		

Regents Examination in Algebra I – June 2019
Scoring Key: Part I (Multiple-Choice Questions)

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

Regents Examination in Algebra I – June 2019
Scoring Key: Parts II, III, and IV (Constructed-Response Questions)

Examination	Date	Question Number	Scoring Key	Question Type	Credit	Weight
Algebra I	June '19	25	-	CR	2	1
Algebra I	June '19	26	-	CR	2	1
Algebra I	June '19	27	-	CR	2	1
Algebra I	June '19	28	-	CR	2	1
Algebra I	June '19	29	-	CR	2	1
Algebra I	June '19	30	-	CR	2	1
Algebra I	June '19	31	-	CR	2	1
Algebra I	June '19	32	-	CR	2	1
Algebra I	June '19	33	-	CR	4	1
Algebra I	June '19	34	-	CR	4	1
Algebra I	June '19	35	-	CR	4	1
Algebra I	June '19	36	-	CR	4	1
Algebra I	June '19	37	-	CR	6	1

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

The chart for determining students' final examination scores for the **June 2019 Regents Examination in Algebra I** will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on the day of the examination. Conversion charts provided for the previous administrations of the Regents Examination in Algebra I must NOT be used to determine students' final scores for this administration.

FOR TEACHERS ONLY

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RATING GUIDE

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site at: 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. This guidance is intended to be part of the scorer training. Schools are encouraged to incorporate the Model Response Sets into the scorer training or to use them as additional information during scoring. While not reflective of all scenarios, the model responses selected for the Model Response Set illustrate how less common student responses to constructed-response questions may be scored. The Model Response Set will be available on the Department's web site at http://www.nysedregents.org/algebraone/.

Mechanics of Rating

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

Do *not* attempt to correct the student's work by making insertions or changes of any kind. In scoring the constructed-response questions, use check marks to indicate student errors. Unless otherwise specified, mathematically correct variations in the answers will be allowed. Units need not be given when the wording of the questions allows such omissions.

Each student's answer paper is to be scored by a minimum of three mathematics teachers. No one teacher is to score more than approximately one-third of the constructed-response questions on a student's paper. Teachers may not score their own students' answer papers. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

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

Raters should record the student's scores for all questions and the total raw score on the student's separate answer sheet. Then the student's total raw score should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Wednesday, June 19, 2019. Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score. The student's scale score should be entered in the box provided on the student's separate answer sheet. The scale score is the student's final examination score.

General Rules for Applying Mathematics Rubrics

I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents Examination in Algebra I are designed to provide a systematic, consistent method for awarding credit. The rubrics are not to be considered all-inclusive; it is impossible to anticipate all the different methods that students might use to solve a given problem. Each response must be rated carefully using the teacher's professional judgment and knowledge of mathematics; all calculations must be checked. The specific rubrics for each question must be applied consistently to all responses. In cases that are not specifically addressed in the rubrics, raters must follow the general rating guidelines in the publication *Information Booklet for Scoring the Regents Examination in Algebra I*, use their own professional judgment, confer with other mathematics teachers, and/or contact the State Education Department for guidance. During each Regents Examination administration period, rating questions may be referred directly to the Education Department. The contact numbers are sent to all schools before each administration period.

II. Full-Credit Responses

A full-credit response provides a complete and correct answer to all parts of the question. Sufficient work is shown to enable the rater to determine how the student arrived at the correct answer.

When the rubric for the full-credit response includes one or more examples of an acceptable method for solving the question (usually introduced by the phrase "such as"), it does not mean that there are no additional acceptable methods of arriving at the correct answer. Unless otherwise specified, mathematically correct alternative solutions should be awarded credit. The only exceptions are those questions that specify the type of solution that must be used; e.g., an algebraic solution or a graphic solution. A correct solution using a method other than the one specified is awarded half the credit of a correct solution using the specified method.

III. Appropriate Work

Full-Credit Responses: The directions in the examination booklet for all the constructed-response questions state: "Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc." The student has the responsibility of providing the correct answer *and* showing how that answer was obtained. The student must "construct" the response; the teacher should not have to search through a group of seemingly random calculations scribbled on the student paper to ascertain what method the student may have used.

Responses With Errors: Rubrics that state "Appropriate work is shown, but…" are intended to be used with solutions that show an essentially complete response to the question but contain certain types of errors, whether computational, rounding, graphing, or conceptual. If the response is incomplete; i.e., an equation is written but not solved or an equation is solved but not all of the parts of the question are answered, appropriate work has *not* been shown. Other rubrics address incomplete responses.

IV. Multiple Errors

Computational Errors, Graphing Errors, and Rounding Errors: Each of these types of errors results in a 1-credit deduction. Any combination of two of these types of errors results in a 2-credit deduction. No more than 2 credits should be deducted for such mechanical errors in a 4-credit question and no more than 3 credits should be deducted in a 6-credit question. The teacher must carefully review the student's work to determine what errors were made and what type of errors they were.

Conceptual Errors: A conceptual error involves a more serious lack of knowledge or procedure. Examples of conceptual errors include using the incorrect formula for the area of a figure, choosing the incorrect trigonometric function, or multiplying the exponents instead of adding them when multiplying terms with exponents.

If a response shows repeated occurrences of the same conceptual error, the student should not be penalized twice. If the same conceptual error is repeated in responses to other questions, credit should be deducted in each response.

For 4- and 6-credit questions, if a response shows one conceptual error and one computational, graphing, or rounding error, the teacher must award credit that takes into account both errors. Refer to the rubric for specific scoring guidelines.

Part II

For each question, use the specific criteria to award a maximum of 2 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(25) **[2]** 8, and correct algebraic work is shown.

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

or

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

or

   [1] 8, but a method other than algebraic is used.

or

   [1] 8, 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]** $-3x^2 - 18x + 19$ or an equivalent trinomial, and correct work is shown.

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

or

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

or

   [1] Appropriate work is shown to find $3x^2 + 4 - 6x^2 - 18x + 15$, but no further correct work is shown.

or

   [1] $-3x^2 - 18x + 19$, 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]** A correct graph is drawn.

    [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] Either $f(x) = |x|$ or $f(x) = -2x + 10$ is graphed correctly over its given domain.

    [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]** -6 and 6, and correct algebraic work is shown.

    [1] Appropriate work is shown, but one computational or factoring 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] Appropriate work is shown, but only one solution is stated.

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

    [1] -6 and 6, but a method other than algebraic is used.

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

    [1] -6 and 6, but no work is shown.

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

(29) **[2]** 1 a.m. to 12 noon, and a correct justification is given.

    [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] Correct rates for both intervals are found, but 1 a.m. to 12 noon is not stated.

    [0] 1 a.m. to 12 noon, but no justification is given.

<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.

(30) **[2]** $h = \dfrac{3V}{\pi r^2}$, and correct work is shown.

    [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] Appropriate work is shown, but the expression $\dfrac{3V}{\pi r^2}$ is written.

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

    [1] $h = \dfrac{3V}{\pi r^2}$, but no work is shown.

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

(31) **[2]** 8, 18, 38 are stated.

    [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.

    [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]** $(1,-9)$, and correct work using the method of completing the square 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 $f(x) = (x - 1)^2 - 9$, but the vertex is not stated or is stated incorrectly.

or

[1] $(1,-9)$, but a method other than completing the square is used.

or

[1] $(1,-9)$ is stated, 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.

Part III

For each question, use the specific criteria to award a maximum of 4 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(33) **[4]** $A = 5x + 50$, $B = 6x + 25$, 26, and correct algebraic work is shown.

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

or

[3] Correct equations are written and 26 is stated, but no further correct work is shown.

or

[3] Appropriate work is shown to find 25, but no further correct work is shown.

or

[3] One equation is incorrect, but an appropriate solution is found.

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

or

[2] Correct equations are written, but no further correct work is shown.

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

or

[1] The expressions $5x + 50$ and $6x + 25$ are written, but no further correct work is shown.

or

[1] 26, 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]** Correct graphs are drawn, and 0 and 3 are stated.

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

or

[3] Appropriate work is shown, but only 0 or 3 is stated.

or

[3] Appropriate work is shown, but the solution is written as $(0,3)$ and $(3,-3)$.

[2] Correct graphs are drawn, but no further correct work is shown.

or

[2] Appropriate work is shown to find 0 and 3, but the graphs are missing.

[1] $f(x)$ or $g(x)$ is graphed correctly, but no further correct work is shown.

or

[1] 0 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.

(35) **[4]** $y = 7.79x + 34.27$, 0.98, and a correct explanation in context is written.

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

or

[3] Appropriate work is shown, but an expression is written instead of an equation.

or

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

[2] $y = 7.79x + 34.27$ is written, but no further correct work is shown.

[1] $7.79x + 34.27$ is written, but no further correct work is shown.

or

[1] 0.98, but no further correct work is shown.

or

[1] A correct explanation in context 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]** $y < -3x + 3$ and $y \leq 2x - 2$ are stated, and two correct statements are written.

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

or

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

[2] Both inequalities are stated correctly, but no further correct work is shown.

or

[2] Both statements are written correctly, but no further correct work is shown.

[1] Only one inequality is stated correctly.

or

[1] Only one statement is written 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 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]** $4c + 3f = 16.53$ and $5c + 4f = 21.11$ are stated, a correct justification indicating a negative response is given, and correct algebraic work is shown to find $c = 2.79$ and $f = 1.79$.

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

or

[5] Appropriate work is shown, but only $c = 2.79$ or $f = 1.79$ is found.

or

[5] One equation is written incorrectly, but the system is solved appropriately, and an appropriate justification is given.

or

[5] Appropriate work is shown, but a method other than algebraic is used to find $c = 2.79$ and $f = 1.79$.

or

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

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

[3] A correct system of equations is written, and a correct justification is given, but no further correct work is shown.

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

[1] A correct justification indicating a negative response is given, but no further correct work is shown.

or

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

or

[1] $c = 2.79$ and $f = 1.79$, but no work is shown.

[0] 2.79 and 1.79, 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 Learning Standards
Algebra I
June 2019

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

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

Regents Examination in Algebra I

June 2019

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

The *Chart for Determining the Final Examination Score for the June 2019 Regents Examination in Algebra I* will be posted on the Department's web site at: **http://www.p12.nysed.gov/assessment/** on Wednesday, June 19, 2019. Conversion charts provided for previous administrations of the Regents Examination in Algebra I must NOT be used to determine students' final scores for this administration.

Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to 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

Wednesday, June 19, 2019 — 1:15 to 4:15 p.m.

MODEL RESPONSE SET

Table of Contents

25 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$-\frac{2}{3}x - 8 + \frac{2}{3}x = \frac{-5}{4}x + 2$$

$$\begin{array}{c} -8 \\ -2 \end{array} = \frac{-5}{4}x + \begin{array}{c} 2 \\ -2 \end{array}$$

$$\frac{-10}{-1.25} = \frac{-1.25x}{-1.25}$$

$$\boxed{8 = x}$$

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

25 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$-\frac{2}{3}x - 8 + \frac{2}{3}x = -\frac{5}{4}x + 2$$

$$-10 = -\frac{5}{4}x$$

$$\boxed{x = 8}$$

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

25 Solve algebraically for x:

$$-\frac{2}{3}(x+12) + \frac{2}{3}x = -\frac{5}{4}x + 2$$

$$\frac{-2}{3}x - 8 + \frac{2}{3}x$$

$$\begin{array}{c} -8 = -\frac{5}{4}x + 2 \\ -2 \qquad\qquad -2 \\ \hline -10 = -\frac{5}{4}x \\ \hline -\frac{5}{4} \qquad\quad -\frac{5}{4} \end{array}$$

$$\boxed{x = \frac{1}{2}}$$

Score 1: The student made a computational error when dividing by $-\frac{5}{4}$.

25 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$-\frac{2}{3}x-8+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$x-8 = -\frac{5}{4}x+2$$

$$\left(\frac{4}{9}\right)\frac{9}{4}x \quad = 10\left(\frac{4}{9}\right)$$

$$x = 4.\overline{4}$$

Score 1: The student made an error when combining $-\frac{2}{3}x$ and $\frac{2}{3}x$.

25 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$-\frac{2}{3}\left(x+12\right)+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$-\frac{2}{3}x+12+\frac{2}{3}x = \frac{-5}{4}x+2$$

$$12 = -\frac{5}{4}x+2$$

$$10 = \frac{-5}{4}x$$

$$x = -\frac{40}{9}$$

Score 0: The student did not distribute $-\frac{2}{3}$ to both terms and wrote an incorrect denominator.

25 Solve algebraically for x:

$$-\frac{2}{3}(x+12)+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$-\frac{2}{3}(x+12)+\frac{2}{3}x = -\frac{5}{4}x+2$$

$$-\frac{2}{3}x - 8 + \frac{2}{3}x = -\frac{5}{4}x + 2 \quad -2$$

$$-\frac{2}{3}x - 10 + \frac{2}{3}x = -\frac{5}{4}x$$

$$0 - 10 = -\frac{5}{4}x$$

$$\left(\frac{5}{5}\right)10 = -\frac{5}{4}x\left(\frac{5}{5}\right)$$

$$\boxed{12.5 = X}$$

Score 0: The student made a computational error simplifying $0-10$ and did not multiply by the reciprocal of $-\frac{5}{4}$.

26 If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

$$-3\left(2x^2 + 6x - 5\right)$$

$$-6x^2 - 18x + 15$$

$$3x^2 + 4 - 6x^2 - 18x + 15$$

$$\boxed{-3x^2 - 18x + 19}$$

negative three X squared — eighteen X + nineteen

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

26 If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

$$3x^2 + 4 - 3(2x^2 + 6x - 5)$$
$$3x^2 + 4 - 6x^2 - 18x + 15$$
$$19 - 18x - 3x^2$$

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

26 If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

$$3x^2 4 - 3(2x^2 + 6x - 5)$$
$$3x^2 + 4 - 6x^2 - 18x + 15$$
$$-3x^2 - 18 + 19$$

Score 1: The student wrote -18 instead of $-18x$.

26 If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

$$C = (3x^2 + 4) - 3(2x^2 + 6x - 5)$$
$$C = (3x^2 + 4) - (6x^2 + 18x - 15)$$
$$C = -3x^2 + 18x - 11$$

Score 1: The student only negated the $6x^2$ when subtracting the trinomial.

26 If $C = G - 3F$, find the trinomial that represents C when $F = 2x^2 + 6x - 5$ and $G = 3x^2 + 4$.

$$3(2x^2 + 6x - 5) = 6x^2 + 18x - 15$$
$$- \quad 3x^2 \qquad + 4$$
$$\overline{\qquad\qquad\qquad\qquad}$$
$$3x^2 + 18x - 11$$

Score 0: The student did not subtract in the correct order and made an error when subtracting.

27 Graph the following piecewise function on the set of axes below.
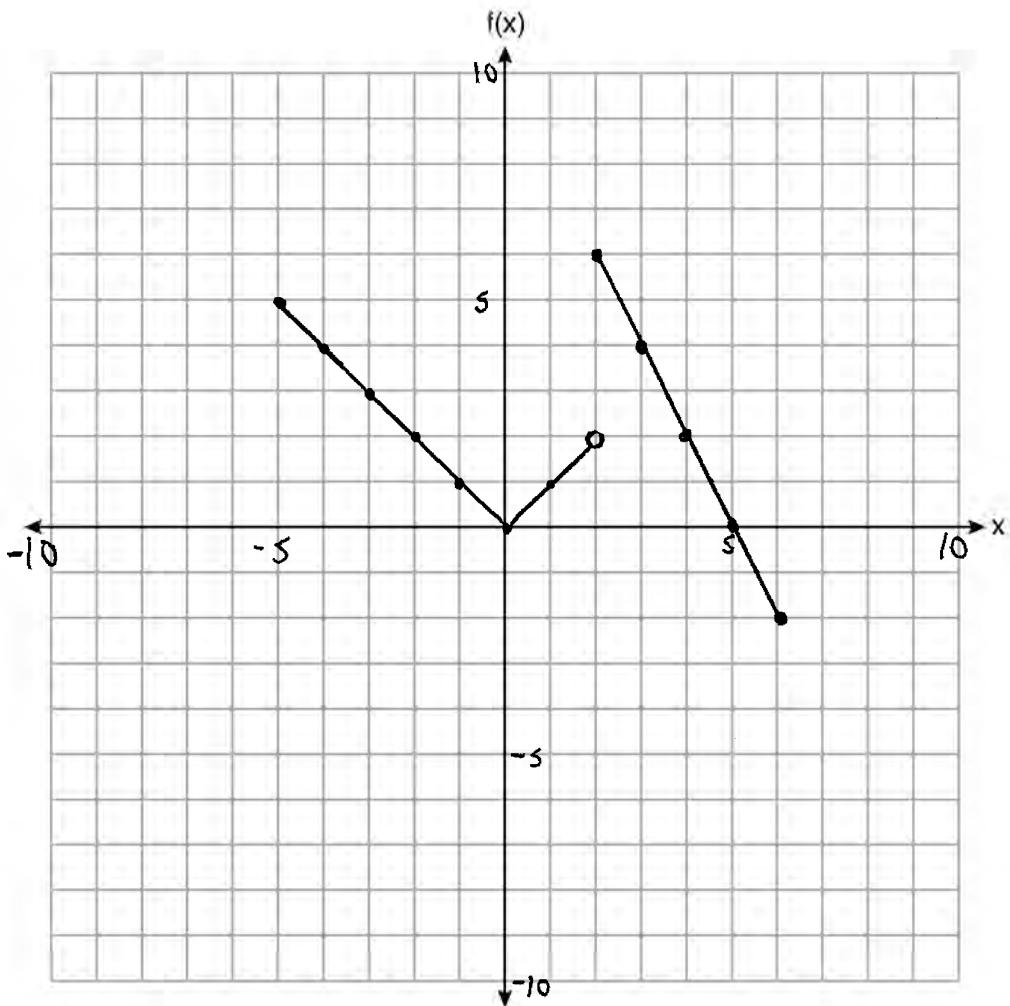
$$f(x) = \begin{cases} |x|, & -5 \le x < 2 \\ -2x+10, & 2 \le x \le 6 \end{cases}$$

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

27 Graph the following piecewise function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -5 \le x < 2 \\ -2x+10, & 2 \le x \le 6 \end{cases}$$
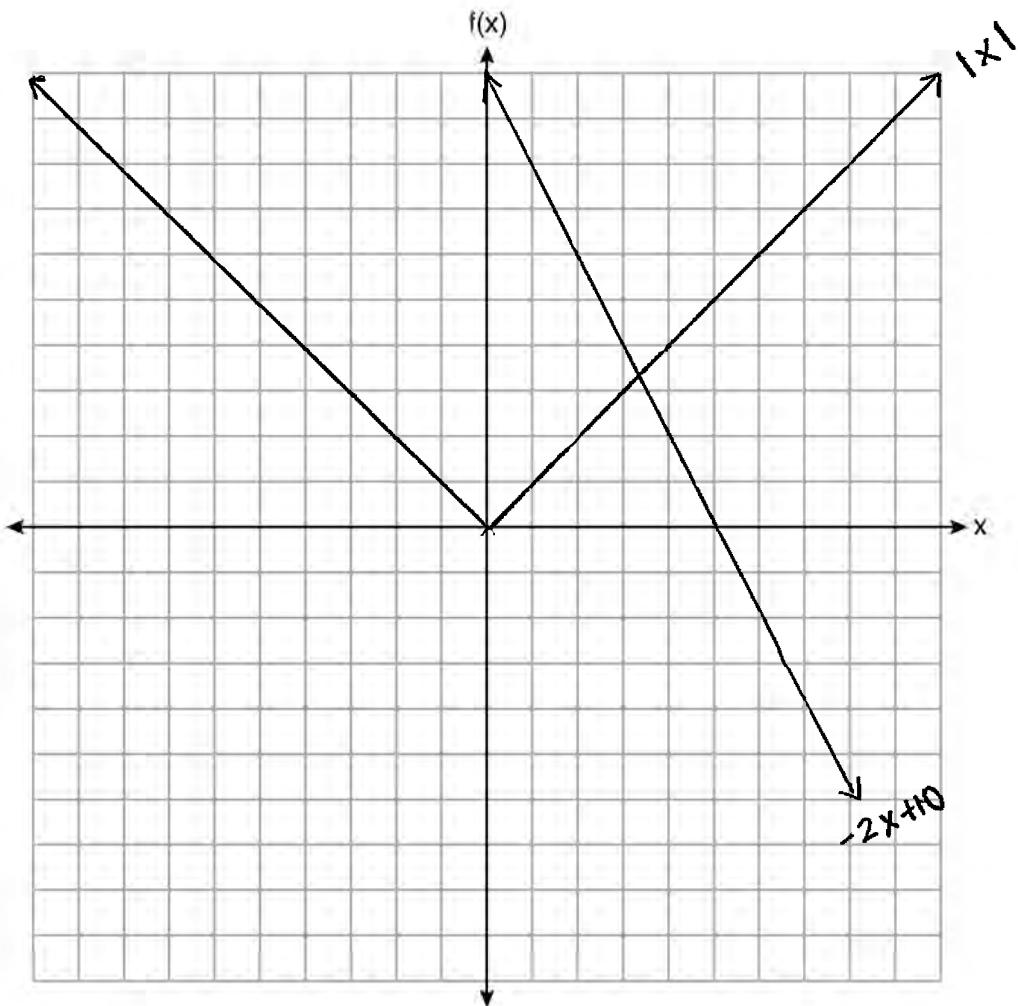
Score 1: The student graphed both functions appropriately, but disregarded the domain restrictions.

27 Graph the following piecewise function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -5 \le x < 2 \\ -2x + 10, & 2 \le x \le 6 \end{cases}$$
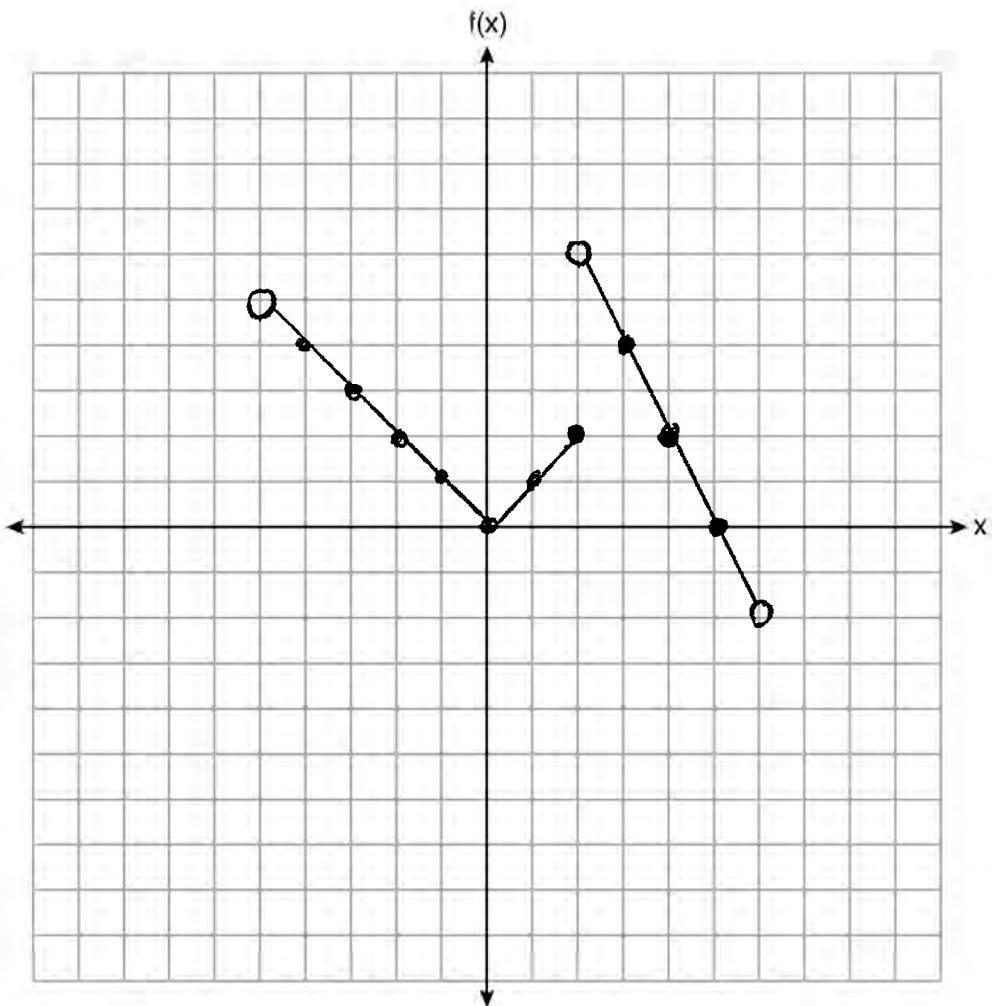
Score 1: The student graphed the endpoints of both functions incorrectly.

27 Graph the following piecewise function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -5 \le x < 2 \\ -2x+10, & 2 \le x \le 6 \end{cases}$$

$-2x+10, \quad 2 \le x \le 6$

$|x|, \quad -5 \le x < 2$
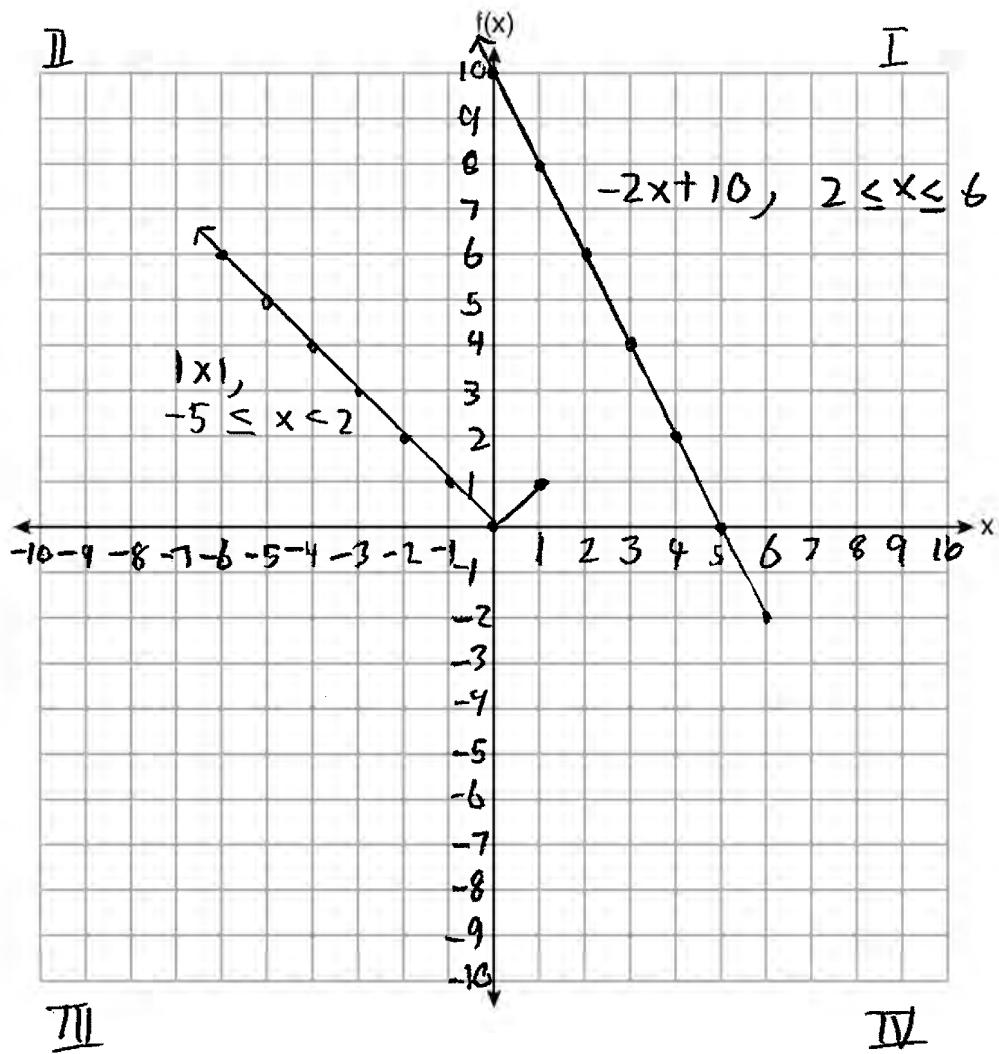
Score 0: The student made multiple graphing errors.

28 Solve $5x^2 = 180$ algebraically.

$$x^2 = 36$$

$$x = \pm 6$$

$$\boxed{x = +6, -6}$$

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

28 Solve $5x^2 = 180$ algebraically.

$$5x^2 - 180 = 0$$

$$x = \frac{0 \pm \sqrt{0 - 4(5)(-180)}}{2(5)}$$

$$x = \frac{\pm\sqrt{3600}}{10}$$

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

28 Solve $5x^2 = 180$ algebraically.

$$5x^2 = 180$$ (crossed out)

$$5^2 = 180$$ (crossed out)

$$25 \neq 180$$ (crossed out)

$$\frac{5x^2 = 180}{5} \quad \frac{180}{5}$$

$$\sqrt{x^2} = \sqrt{\frac{180}{5}}$$

$$x = \sqrt{\frac{180}{5}}$$

$$\boxed{x = \sqrt{36}}$$

Score 1: The student only found the positive value of x.

28 Solve $5x^2 = 180$ algebraically.

$$5x^2 - 180 = 0$$

$a = 5$
$b = 0$
$c = -180$

$$x = \frac{0 \pm \sqrt{0^2 - 4(5)(-180)}}{2(5)}$$

$$x = \frac{0 \pm \sqrt{360}}{10}$$

Score 1: The student substituted into the quadratic formula correctly, but no further correct work was shown.

28 Solve $5x^2 = 180$ algebraically.

$$\frac{\cancel{5}x^2}{\cancel{5}} = \frac{108}{5}$$

$$\sqrt{x^2} = \sqrt{36}$$

$$(x+6)^2 \quad \text{or} \quad (x+6)(x+6)$$

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

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

(handwritten annotations on table: 1 next to 1 a.m.; 3 next to 3 a.m.; 6 next to 6 a.m.; 12 next to 12 noon; 15 next to 3 p.m.)

1:00   12:00 6:00 15:00

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

1:00 – 12:00 (1am–12noon)
(1, 1)
(12, 33)

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

$m = \dfrac{33 - 1}{12 - 1}$

$m = \dfrac{32}{11}$

$m = 2.\overline{90}$ in/hr

6:00 – 15:00 (6am – 3pm)
(6, 11)
(15, 36)

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

$m = \dfrac{36 - 11}{15 - 6}$

$m = \dfrac{25}{9}$

$m = 2.7$ in/hr

[from 1am – 12 noon]

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

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

$\frac{4}{6}$

$\frac{22}{3}$
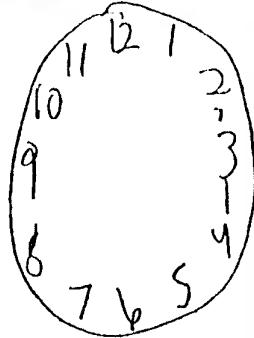
$\frac{32}{11} = 2.9\overline{0}$ $\frac{25}{9} = 2.777777778$

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

from 1am to 12 noon had the

greater snowfall rate per hour

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

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

$\boxed{\text{1 AM} - \text{noon}}$

$$\frac{33-1}{12-1} = \frac{32}{11}$$

$$\text{6AM} - \text{3pm}$$

$$\frac{36-11}{15-6} = \frac{25}{9}$$

$$\frac{32}{11} \qquad \frac{25}{9}$$

$$288 > 275$$

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

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

$$\frac{33}{11} = 3 \text{ inches per hour}$$

$$\frac{36}{9} = 4 \text{ inches per hour}$$

from 6am to 3pm, there was the greater snowfall rate.

Score 1: The student used the accumulated amount of snow in determining the rate of snowfall during both intervals.

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

11 hours

9 hours

32 in

25 in

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

$$\frac{32}{11} \approx 2.9$$

$$\frac{25}{9} \approx 2.8$$

Score 1: The student showed a correct justification, but did not indicate an interval.

29 A blizzard occurred on the East Coast during January, 2016. Snowfall totals from the storm were recorded for Washington, D.C. and are shown in the table below.

Washington, D.C.	
Time	**Snow** (inches)
1 a.m.	1
3 a.m.	5
6 a.m.	11
12 noon	33
3 p.m.	36

4
6
22
3

Which interval, 1 a.m. to 12 noon or 6 a.m. to 3 p.m., has the greatest rate of snowfall, in inches per hour? Justify your answer.

1 am to 12 noon

Score 0: The student did not give a justification.

30 The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Solve the equation for h in terms of V, r, and π.

$$\frac{3V}{\pi r^2} = \frac{\pi r^2 h}{\pi r^2}$$

$$\frac{3V}{\pi r^2} = h$$

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

30 The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Solve the equation for h in terms of V, r, and π.

$$\frac{\frac{1}{3}\pi r^2}{}\qquad \frac{}{\frac{1}{3}\pi r^2}$$
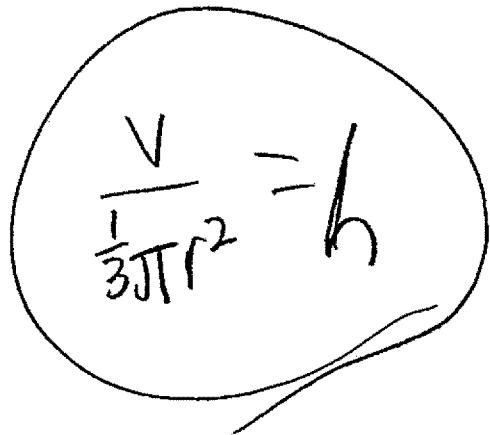
$$\frac{V}{\frac{1}{3}\pi r^2} = h$$

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

30 The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Solve the equation for h in terms of V, r, and π.

$$V = \frac{1}{3}\pi r^2 h$$

$$\frac{V}{\frac{1}{3}\pi h}$$

$$\sqrt{\frac{V}{\frac{1}{3}\pi h}} = \sqrt{r^2}$$

$$\sqrt{\frac{V}{\frac{1}{3}\pi h}} = r$$

$$\boxed{\sqrt{\frac{V}{\frac{1}{3}\pi h}} = r}$$

Score 1: The student showed appropriate work to solve the formula for *r*.

30 The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. Solve the equation for h in terms of V, r, and π.

$$(3)V = \frac{1}{3}\pi r^2 h\ (3)$$

$$\frac{3V}{\pi} = \frac{\pi r^2 h}{\pi}$$

$$\sqrt{\frac{3V}{\pi}} = \sqrt{r^2 h}$$

$$\sqrt{\frac{3V}{\pi}} = h$$

Score 0: The student made multiple errors involving the radical.

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2(a_{n-1} + 1)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

$$a_n = 2(a_{n-1} + 1)$$
$$a_2 = 2(3+1)$$
$$a_2 = 2(4)$$
$$\boxed{a_2 = 8}$$

$$a_n = 2(a_{n-1} + 1)$$
$$a_3 = 2(8+1)$$
$$a_3 = 2(9)$$
$$\boxed{a_3 = 18}$$

$$a_n = 2(a_{n-1} + 1)$$
$$a_4 = 2(18+1)$$
$$a_4 = 2(19)$$
$$\boxed{a_4 = 38}$$

The 3 next terms in the sequence are 8, 18, 38

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

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2(a_{n-1} + 1)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

$$8, 18, 38$$

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

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2(a_{n-1} + 1)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

Arithmetic sequence:

$$a_2 = 2(3+1)$$

$$a_2 = 8 \quad ^{4}$$

$$a_3 = 2(8+1)$$

^{q}

$$a_3 = 18$$

$$\{3, 8, 18\}$$

Score 1: The student stated the first three values in the sequence.

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2(a_{n-1} + 1)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

8 and 18

Score 1: The student stated a_2 and a_3 correctly.

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2(a_{n-1} + 1)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

$$a_1 = 3$$
$$a_2 = 2(3+1) = 7$$
$$a_3 = 2(7+1) = 15$$
$$a_4 = 2(15+1) = 31$$

Score 1:   The student distributed incorrectly.

31 Given the recursive formula:

$$a_1 = 3$$
$$a_n = 2(a_{n-1} + 1)$$

State the values of a_2, a_3, and a_4 for the given recursive formula.

$a_2 = 2(3 - 1 + 1)$

$a_2 = 6 - 1 + 1$

$a_2 = 6$

$a_3 = 2(6 - 1 + 1)$

$a_3 = 12 - 1 + 1$

$a_3 = 12$

$a_4 = 2(12 - 1 + 1)$

$a_4 = 24 - 1 + 1$

$a_4 = 24$

Score 0: The student subtracted 1 from the a_{n-1} term and distributed incorrectly.

32 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

$$\left(\frac{-2}{2}\right)^2 = 1$$

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

$$f(x) = (x - 1)^2 - 9$$

$$\boxed{(1, -9)}$$

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

32 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

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

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

$$C = \left(\frac{b}{2}\right)^2 \qquad x^2 - 2x + 1 = 9$$

$$C = \left(\frac{-2}{2}\right)^2 \qquad (x - 1)^2 = 9$$

$$C = 1 \qquad x - 1 = \pm 3$$

$$x = 1 + 3 \qquad x = 4$$
$$\text{or}$$
$$x = 1 - 3 \qquad x = -2$$

Score 1: The student used the method of completing the square to determine the zeros of $f(x)$.

Question 32

32 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

$$f(x) \, (x^2 - 2x + 1) - 1 - 8$$

$$f(x) = (x - 1)^2 - 9$$

$$f(x) = \{1, -9\}$$

$$\boxed{f(x) = \{1, -9\}}$$

Score 1: The student showed correct work to find $f(x) = (x - 1)^2 - 9$, but the vertex is stated incorrectly.

32 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

x	f(x)
-1	-5
0	-8
1	-9
2	-8
3	-8

$(1, -9)$

Score 1: The student found the correct vertex, but used a method other than completing the square.

32 Determine and state the vertex of $f(x) = x^2 - 2x - 8$ using the method of completing the square.

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

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

$$\begin{array}{cc} x+2=0 & \text{or} \quad x-4=0 \\ \underline{-2 \quad -2} & \underline{+4 \quad +4} \\ x=-2 & x=4 \end{array}$$

Roots

$$\{-2, 4\}$$

Score 0: The student did not use the method of completing the square and did not state the vertex.

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt.

Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered.

$$A = 5x + 50$$

$$B = 6x + 25$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company *A*.

$$5x + 50 = 6x + 25$$
$$-5x \qquad\qquad -5x$$

$$50 = x + 25$$
$$-25 \qquad -25$$

$$5(25) + 50 = 175$$
$$6(25) + 25 = 175$$

$$\boxed{x = 25}$$

Minimum
of 26
Shirts

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

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company A charges a $50 set-up fee and $5 per shirt. Company B charges a $25 set-up fee and $6 per shirt.

Write an equation for Company A that could be used to determine the total cost, A, when x shirts are ordered. Write a second equation for Company B that could be used to determine the total cost, B, when x shirts are ordered.

$$A = 50 + 5x$$
$$B = 25 + 6x$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company A.

$$50 + 5x < 25 + 6x$$
$$25 < x$$
$$\boxed{X = 26}$$

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

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt.

Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered.

$$\text{Company } A = 50 + 5x$$

$$\text{Company } B = 25 + 6x$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company *A*.

$$50 + 5x < 25 + 6x$$
$$-25 \qquad -25$$

$$25 + 5x < +6x$$
$$-5x \quad -5x$$

$$25 < x$$

The minimum is
25 shirts

Score 3: The student showed correct algebraic work to find $x > 25$, but stated an incorrect minimum.

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt.

Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered.

$$y = 50 + 5x$$

$$y = 25 + 6x$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company *A*.

26 Shirts

Company A = 180

Company B = 181
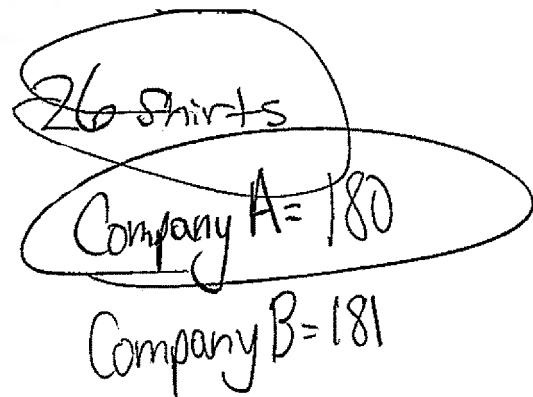
Score 2: The student wrote two appropriate equations, but not in terms of *A* and *B*, and 26 was stated.

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company *A* charges a $50 set-up fee and $5 per shirt. Company *B* charges a $25 set-up fee and $6 per shirt.

Write an equation for Company *A* that could be used to determine the total cost, *A*, when *x* shirts are ordered. Write a second equation for Company *B* that could be used to determine the total cost, *B*, when *x* shirts are ordered.

$$y = \$5x + \$50$$
$$y = \$6x + \$25$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company *A*.

Minimum 10 shirts

$$5(2) + 50 = 60$$
$$5(3) + 50 = 65$$
$$5(4) + 50 = 70$$
$$5(5) + 50 = 75$$
$$5(6) + 50 = 80$$
$$5(7) + 50 = 85$$
$$5(8) + 50 = 90$$
$$5(10) + 50 = 95$$
$$5(10) + 50 = 100$$

Score 1: The student wrote two appropriate equations, but not in terms of *A* and *B*.

33 A school plans to have a fundraiser before basketball games selling shirts with their school logo. The school contacted two companies to find out how much it would cost to have the shirts made. Company A charges a $50 set-up fee and $5 per shirt. Company B charges a $25 set-up fee and $6 per shirt.

Write an equation for Company A that could be used to determine the total cost, A, when x shirts are ordered. Write a second equation for Company B that could be used to determine the total cost, B, when x shirts are ordered.

$$\text{company } A = 50f + 5s$$
$$\text{Company } B = 25f + 6s$$

Determine algebraically and state the *minimum* number of shirts that must be ordered for it to be cheaper to use Company A.

6 shirts

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

34 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.
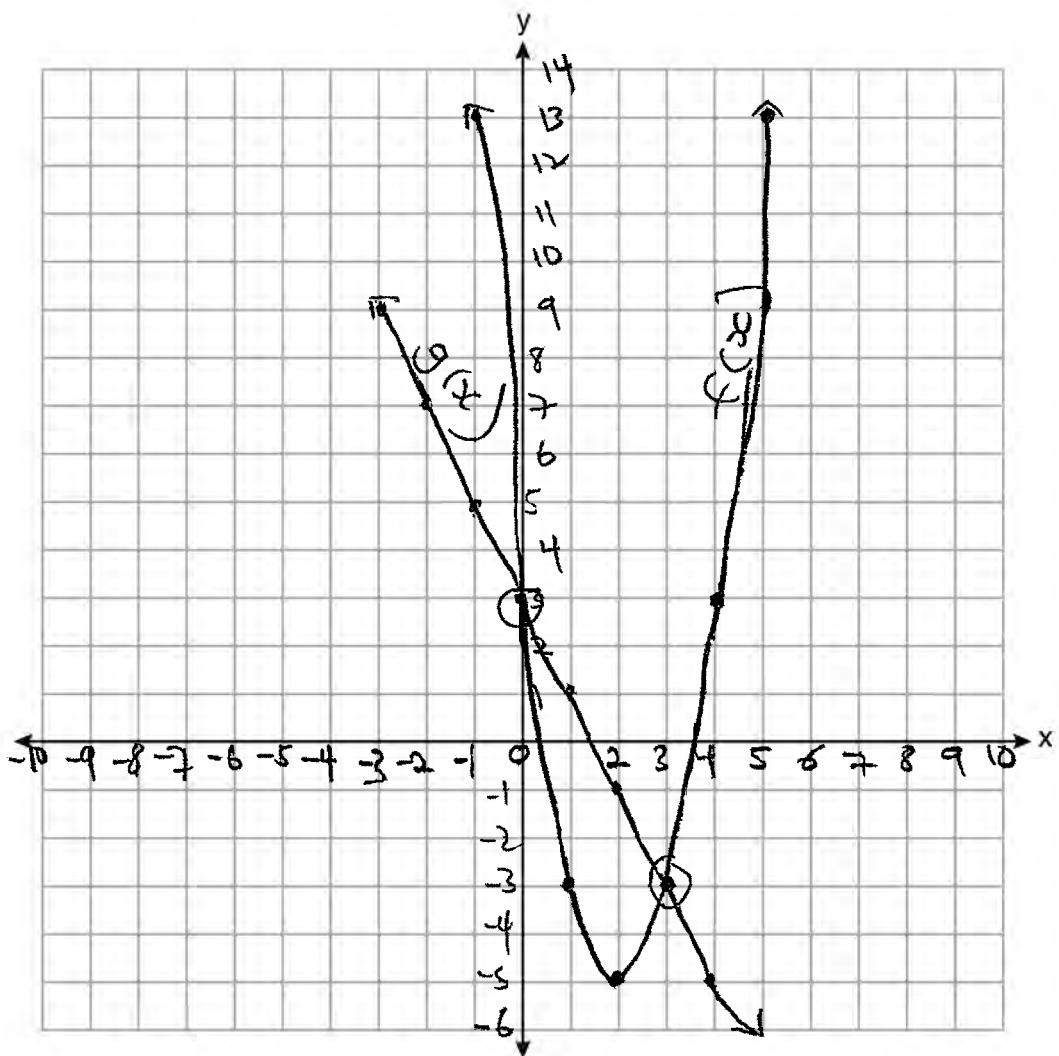
$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$

Determine and state all values of x for which $f(x) = g(x)$.

$$0, 3$$

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

34 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.
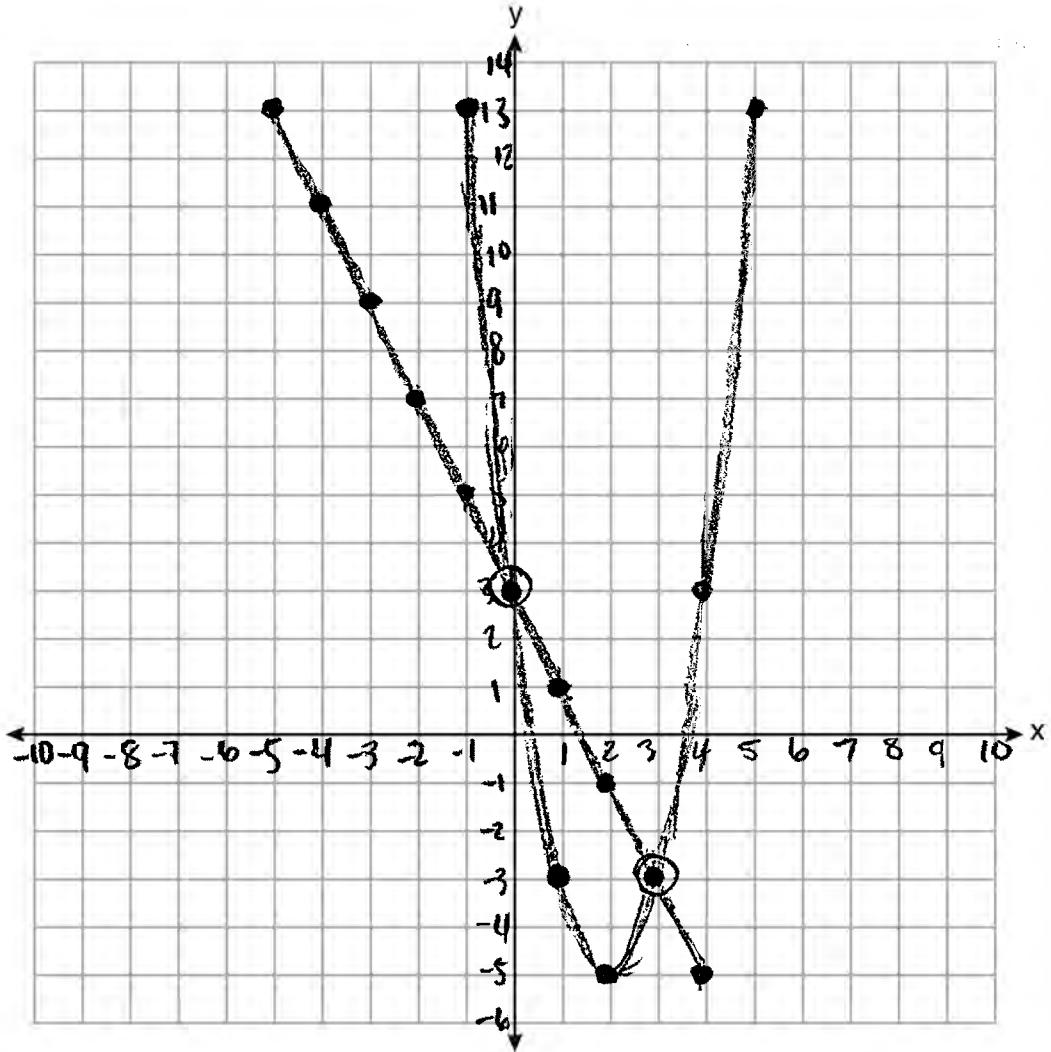
$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$

Determine and state all values of x for which $f(x) = g(x)$.

$f(x) = g(x)$ when $X = 0$ and 3

Score 3: The student did not use arrows or the entire grid when graphing the functions.

34 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.
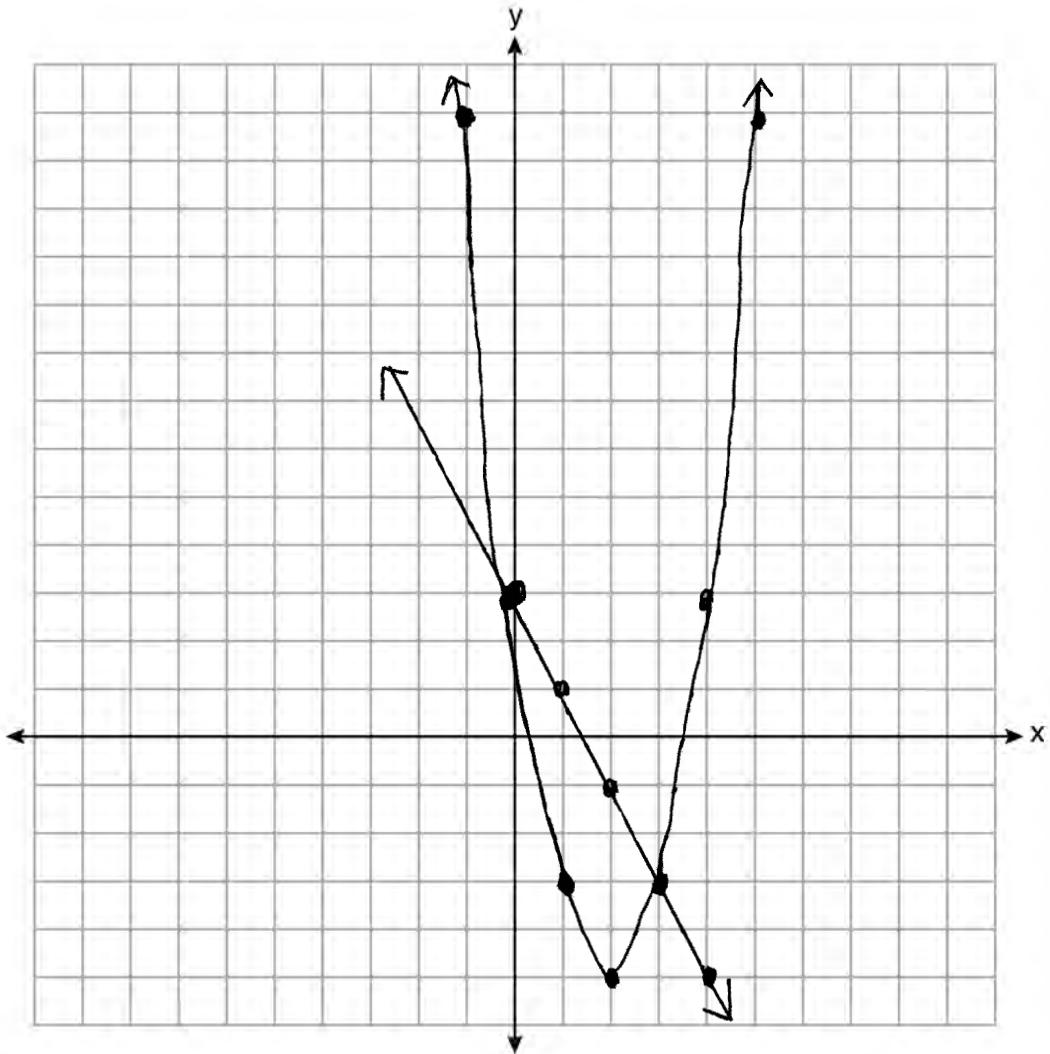
$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$

Determine and state all values of x for which $f(x) = g(x)$.

$(3, 0)$

Score 2: The student graphed both functions correctly, but no further correct work was shown.

34 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.
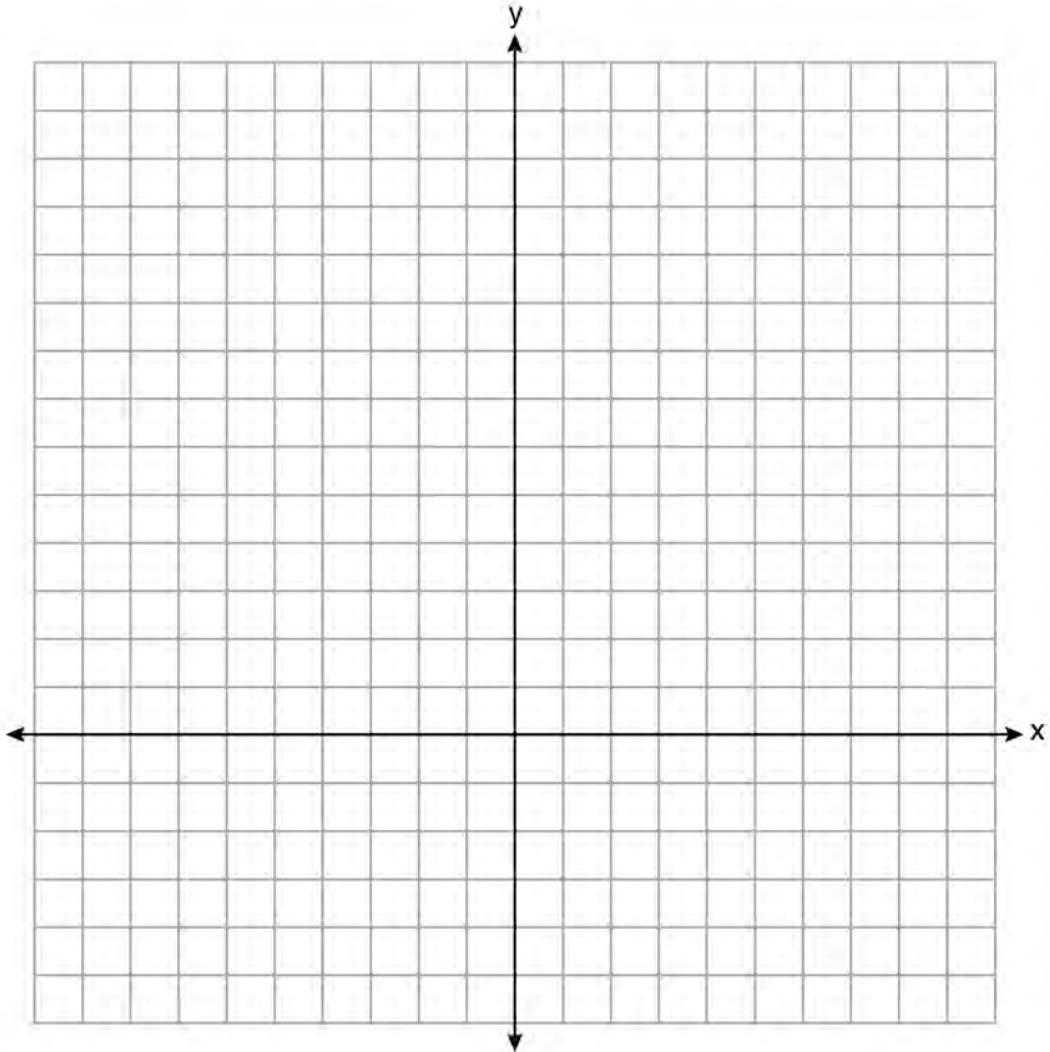
$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$

Determine and state all values of x for which $f(x) = g(x)$.

$$2x^2 - 8x + 3 = -2x + 3$$
$$+2x \quad -3 \qquad +2x \quad -3$$
$$2x^2 - 6x = 0$$
$$2x(x-3) = 0$$
$$x = 3$$

Score 1: The student showed correct algebraic work to find $x = 3$.

34 Graph $y = f(x)$ and $y = g(x)$ on the set of axes below.

$$f(x) = 2x^2 - 8x + 3$$
$$g(x) = -2x + 3$$

x	f(x)
-3	45
-2	27
-1	13
0	3
1	-3
2	-3
3	-3

x	g(x)
-3	9
-2	7
-1	5
0	3
1	1
2	-1
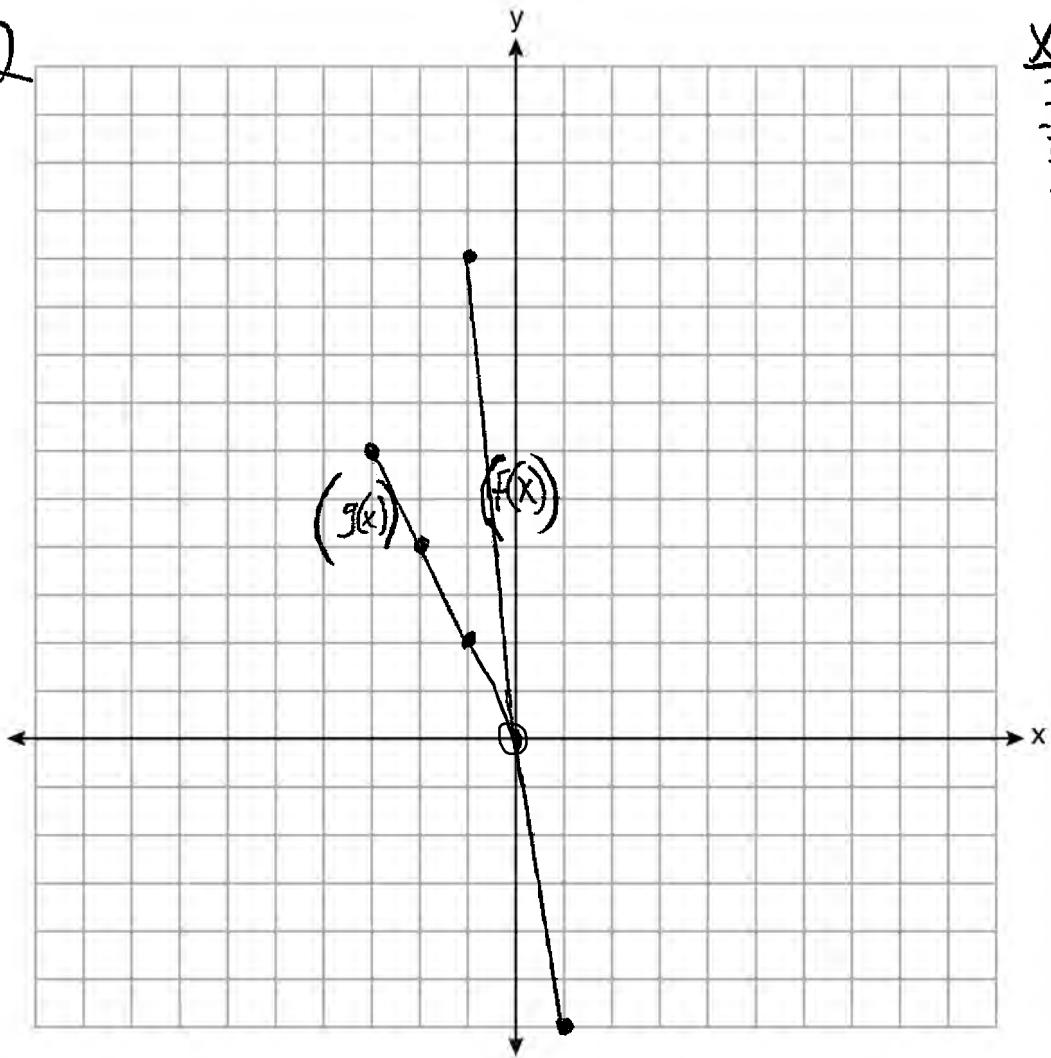
Determine and state all values of x for which $f(x) = g(x)$.

$$(0, 3)$$

Score 0: The student graphed both functions incorrectly and stated only one point of intersection.

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

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

$$y = 7.79x + 34.27$$

State the correlation coefficient of this line, to the *nearest hundredth*.

$$r = 0.98$$

Explain what the correlation coefficient suggests in the context of the problem.

The correlation coefficient suggests that there is a strong correlation between the hours spent studying and test scores.

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

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

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

$$y = 7.79x + 34.27$$

State the correlation coefficient of this line, to the *nearest hundredth*.

$$r = .9815741571$$

$$r = .98$$

Explain what the correlation coefficient suggests in the context of the problem.

The correlation coefficient suggests that there is a strong positive correlation of the data because it is close to 1.

Score 3: The student did not write the explanation in context.

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

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

$$y = ax + b \qquad a = 7.79$$
$$b = 34.27$$

State the correlation coefficient of this line, to the *nearest hundredth*.

Explain what the correlation coefficient suggests in the context of the problem.

Score 2: The student wrote a correct linear regression equation.

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

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

$$7.79x + 34.27.$$

State the correlation coefficient of this line, to the *nearest hundredth*.

$$r = .98$$

Explain what the correlation coefficient suggests in the context of the problem.

The closer to one the higher the test scores and hours spent studying.

Score 2: The student wrote an expression and did not explain the correlation coefficient correctly.

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

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

$$y = ex + b$$
$$y = 7.8x + 34.3$$

$$r = 1$$

State the correlation coefficient of this line, to the *nearest hundredth*.

?

not sure what is

$$r = .98$$
$$r^2 = .96$$

Explain what the correlation coefficient suggests in the context of the problem.

Score 1: The student made a rounding error when writing the linear regression equation and did not indicate which value was the correlation coefficient.

35 The table below shows the number of hours ten students spent studying for a test and their scores.

Hours Spent Studying (x)	0	1	2	4	4	4	6	6	7	8
Test Scores (y)	35	40	46	65	67	70	82	88	82	95

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

$$y = .35x + 0$$

State the correlation coefficient of this line, to the *nearest hundredth*.

.96

Explain what the correlation coefficient suggests in the context of the problem.

The correlation suggests that their
is a positive correlation in
time spent studying for
thest and their grades.

Score 0: The student did not indicate "strong" when explaining their correlation coefficient.

36 A system of inequalities is graphed on the set of axes below.
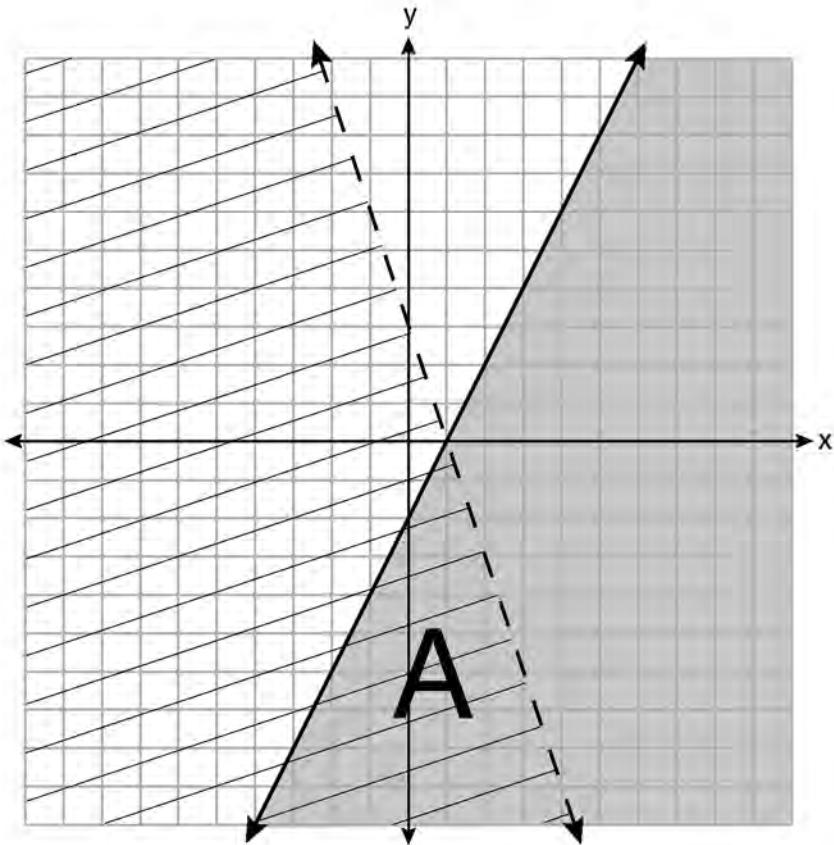
State the system of inequalities represented by the graph.

$$y \leq 2x - 2$$
$$y < -3x + 3$$

State what region *A* represents.

The Solution to the System

State what the entire gray region represents.

Solution to $y \leq 2x - 2$ only

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

36 A system of inequalities is graphed on the set of axes below.
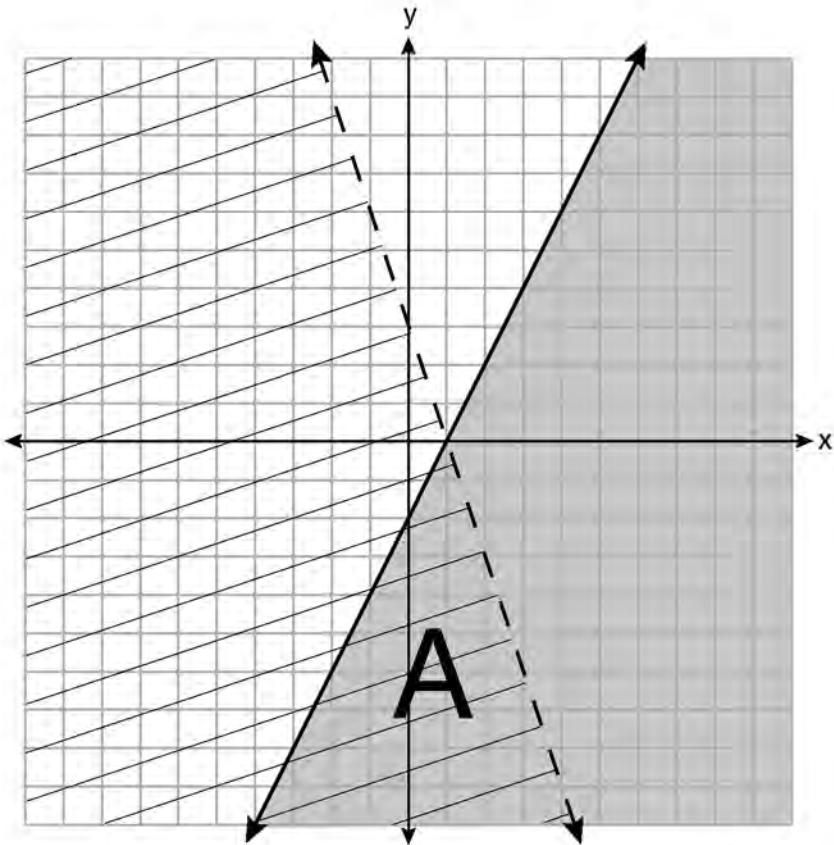
State the system of inequalities represented by the graph.

$$y = 2x - 2$$
$$y = -3x + 3$$

State what region *A* represents.

The solution set for the system

State what the entire gray region represents.

The solution for y = 2x - 2

Score 3: The student wrote equations instead of inequalities.

36 A system of inequalities is graphed on the set of axes below.
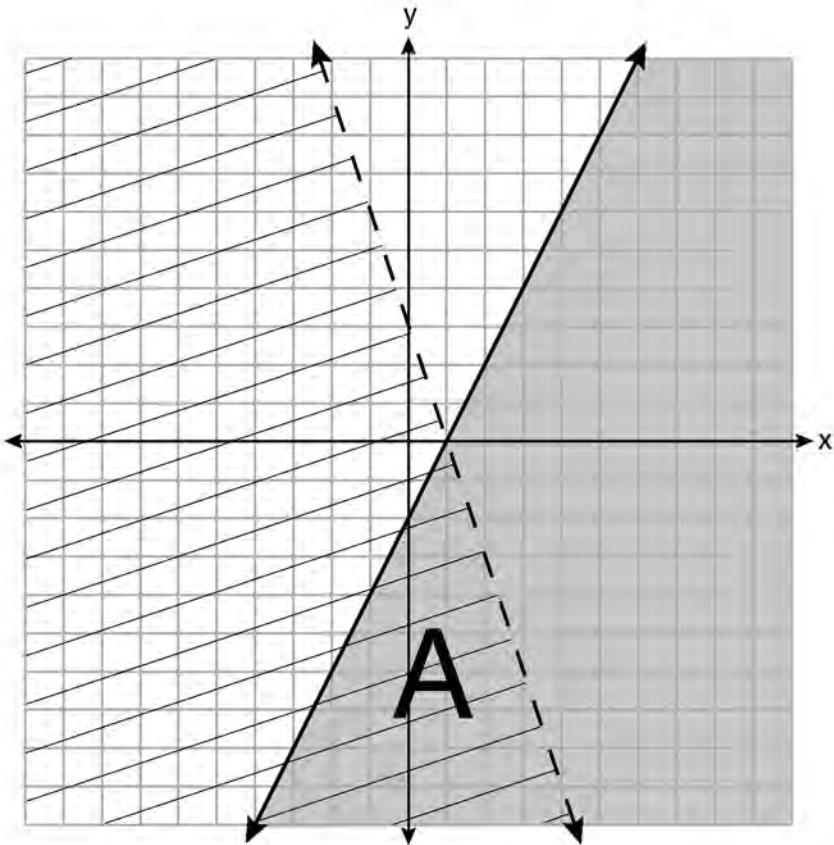
State the system of inequalities represented by the graph.

① $2x - 2 \le 1$

② $\angle$

State what region *A* represents.

Region A represents the solution set shared by both inequalities

State what the entire gray region represents.

It represents the solution set of one of the inequalities

Score 2: The student correctly stated what each of the two regions represent.

36 A system of inequalities is graphed on the set of axes below.
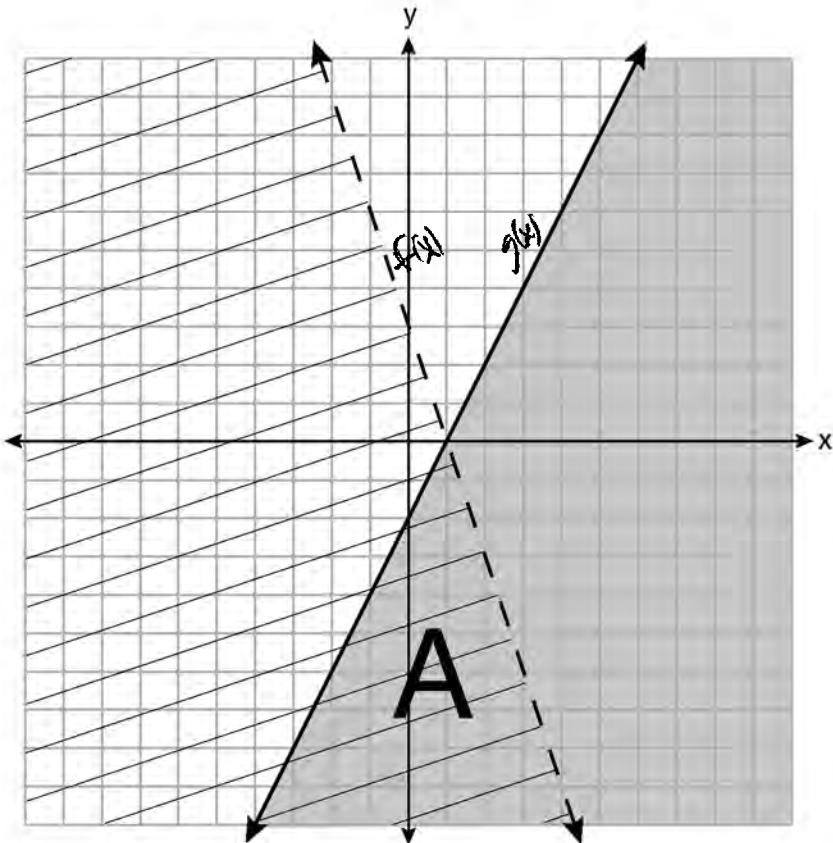
State the system of inequalities represented by the graph.

$$f(x) > 3x + 3$$

$$g(x) \leq 2x - 2$$

State what region A represents.

*It represents the area in which he systems equal each other*

State what the entire gray region represents.

It represents the values which make up that system.

Score 1: The student wrote one correct inequality.

36 A system of inequalities is graphed on the set of axes below.
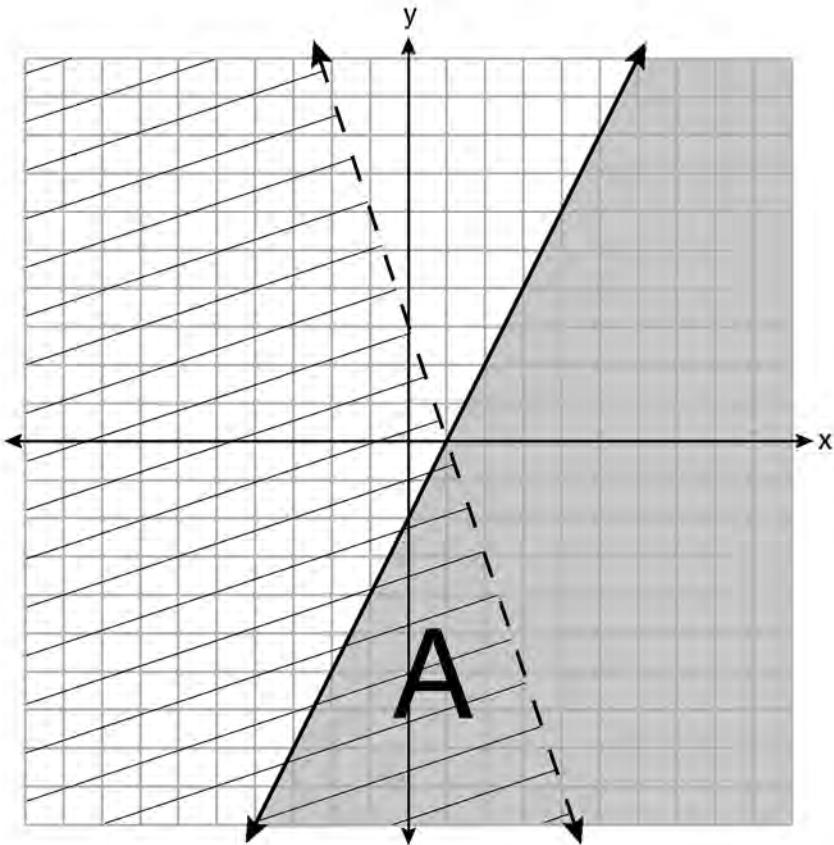
State the system of inequalities represented by the graph.

State what region *A* represents.

All of the points That work with the equations

State what the entire gray region represents.

Which points do not work

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

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$4c + 3f = 16.53$$
$$5c + 4f = 21.11$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$5c + 4f = 21.11$$
$$5(2.49) + 4(2.87) = 21.11$$
$$12.45 + 11.48 = 23.93$$

No, 23.93 does not = 21.11

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

$$4(4c + 3f = 16.53)$$
$$3(5c + 4f = 21.11)$$

$$16c + 12f = 66.12$$
$$-(15c + 12f = 63.33)$$
$$c = 2.79$$

$$5(2.79) + 4f = 21.11$$
$$13.95 + 4f = 21.11$$
$$4f = 7.16$$
$$f = 1.79$$

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

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$5c + 4f = 21$$
$$4c + 3f = 16.53$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

B= 4c+3f = 16.53   G= 5c+4f=21.11

$$5c + 4f = 21.11$$
$$5(2.49) + 4(2.87) \neq 21.11$$

The Green's is incorrect because when I plugged it into the equation 5c+4f=21.11, it was not equivalent.

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

3(5c+4f =21) 3
−4(4c+3f = 16.53) −4

$$15c + 12f = 63$$
$$-16c - 12f = -66.12$$
$$-1c = -3.12$$
$$\frac{-1}{-1} \quad \frac{-1}{}$$
$$c = 3.12$$

4(3.12)+3f=16.53
12.48+3f=16.53
−12.48   −12.48
$$\frac{3f}{3} = \frac{4.05}{3}$$
f = 1.35

$3.12 was the cost for cheeseburgers | $1.35 was the cost for fries

Score 5: The student wrote one incorrect equation, but solved the system appropriately.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$4c + 3f = 16.53$$
$$5c + 4f = 21.11$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$5(2.49) = 12.45$$
$$4(2.87) = \underline{11.48}$$
$$\$23.93$$

The Prices are incorrect because they don't add to $21.11

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

$$4[4c+3f = 16.53]$$
$$-3[5c +4f = 21.11]$$

$$16c + 12f = 66.12$$
$$+ \quad -15c -12f = -63.33$$
$$\overline{}$$
$$C = 2.79$$

Cheeseburgers cost $2.79 each.

Score 5: The student showed correct work, but only found the cost of one cheeseburger.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

Let x = cheeseburger
y = fries

$16.53 = 4x+3y
$21.11 = 5x+4y

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

2.49
x 5
12.45

2.87
x 4
11.48

12.45+11.48=23.93

They are incorrect because when you multiply $2.49 by 5 cheeseburgers and $2.87 by 4 fries. You'll get $12.45 and $11.48. Then you add them and get the total of $23.93 which isn't the bill's amount.

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

4(16.53 = 4x+3y) → 66.12 = 4x +12y
-3(21.11 = 5x+4y) → -63.33 = -15x-12y

2.79 = 19x
19   19
0.1468421053 = x
0.15 = x

21.11 = 5x+4y
21.11 = 5(0.15) +4y
21.11 = 0.75 +4y
-.75 - .75

20.36 = 4y
4   4
5.09 = y

A cheeseburger cost $0.15
A medium fry cost $5.09

Score 4: The student did not multiply the 4x by 4 and made an error combining the x terms when solving for the cost of a cheeseburger.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$5c + 4f = 21.11$$
$$4c + 3f = 16.53$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$2.49(5) + 2.87(4) =$$

No, the price would have come out to 23.93 $ $11.48 + 12.45 = 23.93$

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

$$5c + 4f = 21.11$$
$$-4c - 3f = -16.53$$
$$\overline{}$$
$$c + f = 4.58$$

Score 4: The student only found the sum of one cheeseburger and one order of medium fries.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$5c + 4f = 21.11$$
$$+4c + 3f = 16.53$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$5(2.49) + 4(2.87) = 23.93$$

No, the total would have been $23.93 instead of 21.11

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

$$9c + 7f = 37.64$$

Score 3: The student wrote two correct equations and a correct justification.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$3c + 4f = 16.53$$
$$5c + 4f = 21.11$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$5(2.49) + 4(2.87) = 21.11$$
$$12.45 + 11.48 = 23.93 \ No$$

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

Score 2: The student wrote one correct equation and gave a correct justification.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$4 \times f + 5 \times c \geq 21.11$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

$$4 \times 2.87 = 11.48$$
$$5 \times 2.49 = \underline{12.45}$$
$$23.93$$

No, because it does not add up

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

Cost of one1 cheeseburger = 4.dollars

Cost of one medium frie = 5.dollars

Score 1:   The student gave a correct justification.

37 When visiting friends in a state that has no sales tax, two families went to a fast-food restaurant for lunch. The Browns bought 4 cheeseburgers and 3 medium fries for $16.53. The Greens bought 5 cheeseburgers and 4 medium fries for $21.11.

Using c for the cost of a cheeseburger and f for the cost of medium fries, write a system of equations that models this situation.

$$9c + 7f = 37.64$$

The Greens said that since their bill was $21.11, each cheeseburger must cost $2.49 and each order of medium fries must cost $2.87 each. Are they correct? Justify your answer.

No, according to a calculator, the total would be $23.93

Using your equations, algebraically determine both the cost of one cheeseburger and the cost of one order of medium fries.

$$9c + 7f = 37.64$$

Score 0: The student did not justify the $23.93, and no further correct work was shown.

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

Regents Examination in Algebra I – June 2019

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

(Use for the June 2019 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	97	5	55	81	4	26	64	2
83	96	5	54	80	4	25	63	2
82	95	5	53	80	4	24	61	2
81	94	5	52	80	4	23	60	2
80	93	5	51	80	4	22	58	2
79	92	5	50	79	3	21	57	2
78	91	5	49	79	3	20	55	2
77	90	5	48	79	3	19	54	1
76	90	5	47	78	3	18	52	1
75	89	5	46	78	3	17	50	1
74	88	5	45	78	3	16	48	1
73	88	5	44	77	3	15	46	1
72	87	5	43	77	3	14	44	1
71	86	5	42	76	3	13	42	1
70	86	5	41	76	3	12	39	1
69	86	5	40	75	3	11	37	1
68	85	5	39	75	3	10	34	1
67	84	4	38	74	3	9	31	1
66	84	4	37	74	3	8	28	1
65	84	4	36	73	3	7	25	1
64	83	4	35	72	3	6	22	1
63	83	4	34	72	3	5	19	1
62	83	4	33	71	3	4	15	1
61	82	4	32	70	3	3	12	1
60	82	4	31	69	3	2	8	1
59	82	4	30	68	3	1	4	1
58	82	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.