The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

INTEGRATED ALGEBRA

Tuesday, January 27, 2015 — 1:15 to 4:15 p.m., only

Student Name:_____

School Name: _____

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

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

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

This examination has four parts, with a total of 39 questions. You must answer all questions in this examination. Record your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in Parts II, III, and IV directly in this booklet. All work should be written in pen, except graphs and drawings, which should be done in pencil. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. The formulas that you may need to answer some questions in this examination are found at the end of the examination. This sheet is perforated so you may remove it from this booklet.

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

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

Notice…

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

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

Answer all 30 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question. [60]

1 If $A = \{1, 2, 3, 4, 5, 6, 7, 8\}$ and $B = \{2, 4, 6, 8, 10, 12\}$, the intersection of sets A and B is

(1) $\{10, 12\}$ (3) $\{1, 3, 5, 7\}$

(2) $\{2, 4, 6, 8\}$ (4) $\{1, 2, 3, 4, 5, 6, 7, 8, 10, 12\}$

2 What is the value of n in the equation $0.2(n - 6) = 2.8$?

(1) 8   (3) 20

(2) 2   (4) 44

3 The expression $\dfrac{24x^6y^3}{-6x^3y}$ is equivalent to

(1) $-4x^2y^3$ (3) $-4x^9y^4$

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

4 Which situation is represented by bivariate data?

(1) A student lists her algebra quiz grades for one month.

(2) A wrestler records his weight before each match.

(3) A musician writes down how many minutes she practices her instrument each day.

(4) An ice cream vendor tracks the daily high temperature and how many ice cream bars he sells each day.

5 A cylinder has a circular base with a radius of 3 units and a height of 7 units. What is the volume of the cylinder in cubic units?

(1) 2π

(3) 63π

(2) 42π

(4) 147π

6 The graph of $f(x)$ is shown below.
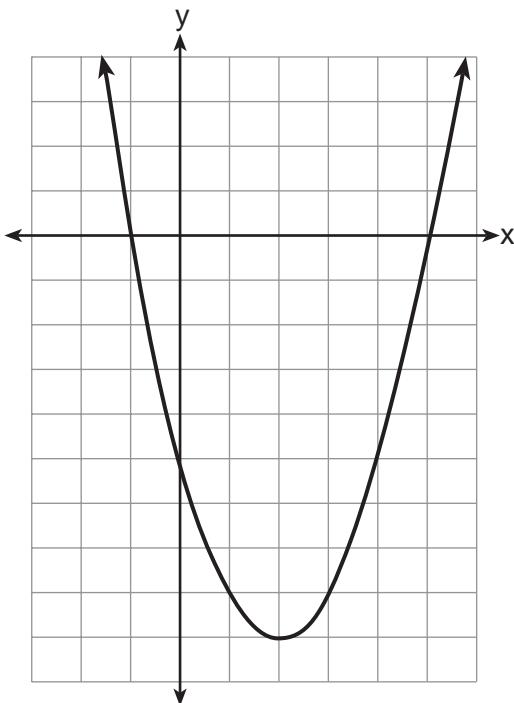
Based on this graph, what are the roots of the equation $f(x) = 0$?

(1) 1 and -5

(3) 2 and -9

(2) -1 and 5

(4) -1 and -5 and 5

7 Jose wants to ride his bike a total of 50 miles this weekend. If he rides m miles on Saturday, which expression represents the number of miles he must ride on Sunday?

(1) $m - 50$

(3) $50 - m$

(2) $m + 50$

(4) $50m$

8 Four students are playing a math game at home. One of the math game questions asked them to write an algebraic equation.

Brandon wrote: $3(5x - 0)$

William wrote: $7 < 2(6 + x)$

Alice wrote: $15x$

Kayla wrote: $11 = 2x + 3$

Which student wrote an algebraic equation?

(1) Brandon   (3) Alice

(2) William   (4) Kayla

9 A student spent 15 minutes painting a 2-foot by 3-foot bulletin board. To the *nearest tenth of a minute*, how long did it take the student to paint 1 square foot?

(1) 0.4   (3) 2.5

(2) 1.5   (4) 3.5

10 What is an equation of the line that passes through the points $(2,1)$ and $(6,-5)$?

(1) $y = -\frac{3}{2}x - 2$ (3) $y = -\frac{2}{3}x - 1$

(2) $y = -\frac{3}{2}x + 4$ (4) $y = -\frac{2}{3}x + \frac{7}{3}$

11 What is $\frac{10}{7x} - \frac{3}{5x}$ expressed in simplest form?

(1) $\frac{7}{2x}$ (3) $\frac{29}{35x}$

(2) $\frac{29}{2x}$ (4) $\frac{55}{35x}$

12 In the box-and-whisker plot below, what is the 2nd quartile?

(1) 25   (3) 45

(2) 30   (4) 50
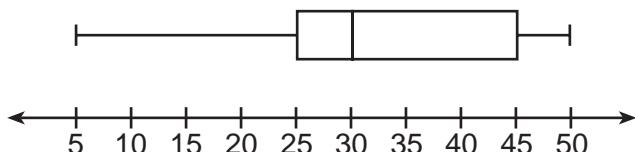
13 The length of a rectangle is three feet less than twice its width. If x represents the width of the rectangle, in feet, which inequality represents the area of the rectangle that is *at most* 30 square feet?

(1) $x(2x - 3) \leq 30$ (3) $x(3 - 2x) \leq 30$

(2) $x(2x - 3) \geq 30$ (4) $x(3 - 2x) \geq 30$

14 Which set is a function?

(1) {(3,4), (3,5), (3,6), (3,7)}   (3) {(6,7), (7,8), (8,9), (6,5)}

(2) {(1,2), (3,4), (4,3), (2,1)}   (4) {(0,2), (3,4), (0,8), (5,6)}

15 The weights of 40 students were recorded. If the 75th percentile of their weights was 140 pounds, what is the total number of students who weighed *more than* 140 pounds?

(1) 10   (3) 30

(2) 20   (4) 4

16 What is the slope of the line represented by the equation $4x + 3y = 7$?

(1) $\dfrac{7}{4}$ (3) $-\dfrac{3}{4}$

(2) $\dfrac{7}{3}$ (4) $-\dfrac{4}{3}$

Use this space for computations.

17 What is $\sqrt{150} + \sqrt{24}$ expressed in simplest radical form?

(1) $7\sqrt{6}$ (3) $\sqrt{87}$

(2) $7\sqrt{12}$ (4) $\sqrt{174}$

18 In $\triangle ABC$ below, the measure of $\angle A = 90°$, $AB = 6$, $AC = 8$, and $BC = 10$.
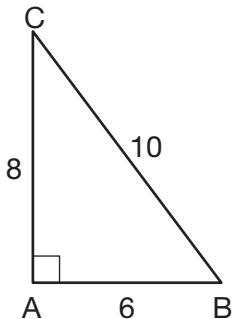
Which ratio represents the sine of $\angle B$?

(1) $\frac{10}{8}$ (3) $\frac{6}{10}$

(2) $\frac{8}{6}$ (4) $\frac{8}{10}$

19 The equations $6x + 5y = 300$ and $3x + 7y = 285$ represent the money collected from selling gift baskets in a school fundraising event. If x represents the cost for each snack gift basket and y represents the cost for each chocolate gift basket, what is the cost for each chocolate gift basket?

(1) $20   (3) $30

(2) $25   (4) $54

20 Which equation represents the axis of symmetry of the graph of the equation $y = x^2 + 4x - 5$?

(1) $x = -2$ (3) $y = -2$

(2) $x = 4$ (4) $y = 4$

Integrated Algebra – Jan. '15   [6]

21 For which value of x is the expression $\dfrac{x+2}{2x-1}$ undefined?

(1) 0   (3) $-\dfrac{1}{2}$

(2) -2 (4) $\dfrac{1}{2}$

22 Last year, Nick rode his bicycle a total of 8000 miles. To the *nearest yard,* Nick rode an average of how many yards per day?

1 mile = 1760 yards
1 year = 365 days

(1) 22   (3) 1659

(2) 236   (4) 38,575

23 The set of integers is *not* closed for

(1) division   (3) addition

(2) multiplication   (4) subtraction

24 A model rocket is launched into the air from ground level. The height, in feet, is modeled by $p(x) = -16x^2 + 32x$, where x is the number of elapsed seconds. What is the total number of seconds the model rocket will be in the air?

(1) 1   (3) 0

(2) 2   (4) 16

25 The diagram below shows the path a bird flies from the top of a 9.5-foot-tall sunflower to a point on the ground 5 feet from the base of the sunflower.
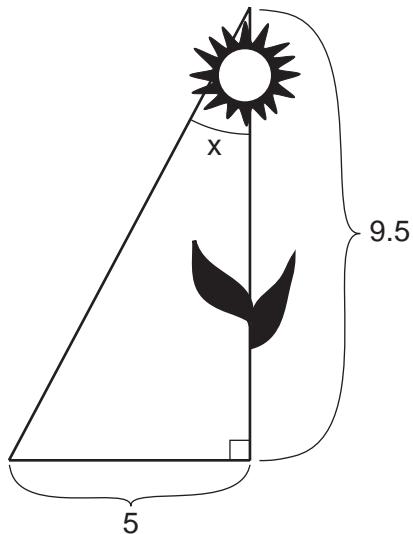
To the *nearest tenth of a degree*, what is the measure of angle x?

(1) 27.8   (3) 58.2

(2) 31.8   (4) 62.2

26 Which set of numbers represents the lengths of the sides of a right triangle?

(1) {7, 24, 25}   (3) {10, 12, 14}

(2) {9, 16, 23}   (4) {14, 16, 18}

27 How many different seven-letter arrangements of the letters in the word *HEXAGON* can be made if each letter is used only once?

(1) 28   (3) 720

(2) 49   (4) 5040

28 Three students each rolled a wooden cube with faces painted red, white, and blue. The color of the top face is recorded each time the cube is rolled. The table below shows the results.

Student	Number of Rolls	Red	White	Blue
1	30	11	7	12
2	50	19	11	20
3	20	8	4	8

If a fourth student rolled the cube 75 times, based on these experimental data, approximately how many times can the cube be expected to land with blue on top?

(1) 25   (3) 35

(2) 30   (4) 40

29 Dominick graphs the equation $y = a|x|$ where a is a positive integer. If Gina multiplies a by -3, the new graph will become

(1) narrower and open downward

(2) narrower and open upward

(3) wider and open downward

(4) wider and open upward

30 Mr. Suppe recorded the height, in inches, of each student in his class. The results are recorded in the table below.

60	59	70	65	64
61	58	72	75	66
65	67	63	62	68
68	69	74	61	70

Which cumulative frequency histogram represents the data?
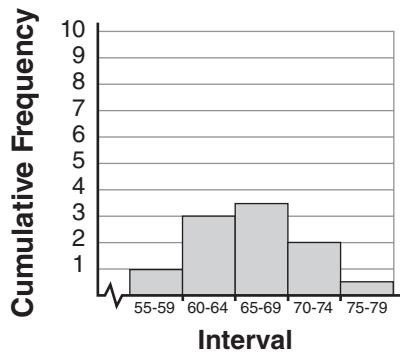
(1)
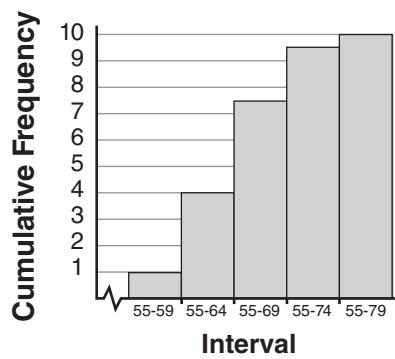
(3)
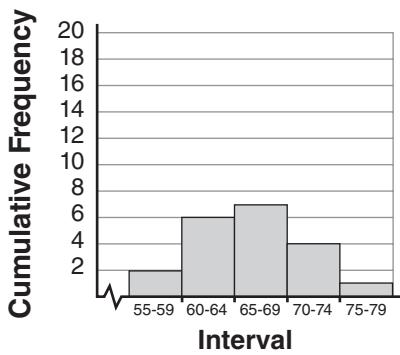
(2)
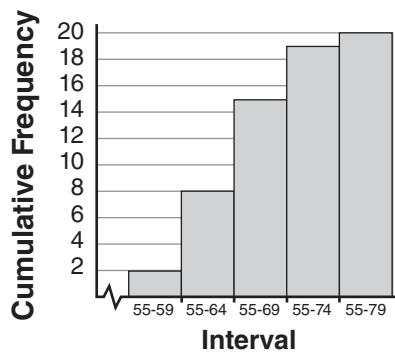
(4)

Part II

Answer all 3 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil.   [6]

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.
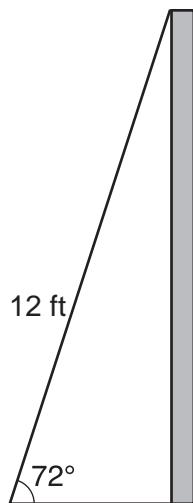
Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

33 The probability that a student owns a dog is $\frac{1}{3}$. The probability that the same student owns a dog and a cat is $\frac{2}{15}$. Determine the probability that the student owns a cat.

Answer all 3 questions in this part. Each correct answer will receive 3 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [9]

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

36 Graph $y < x$ and $x > 5$ on the axes below.
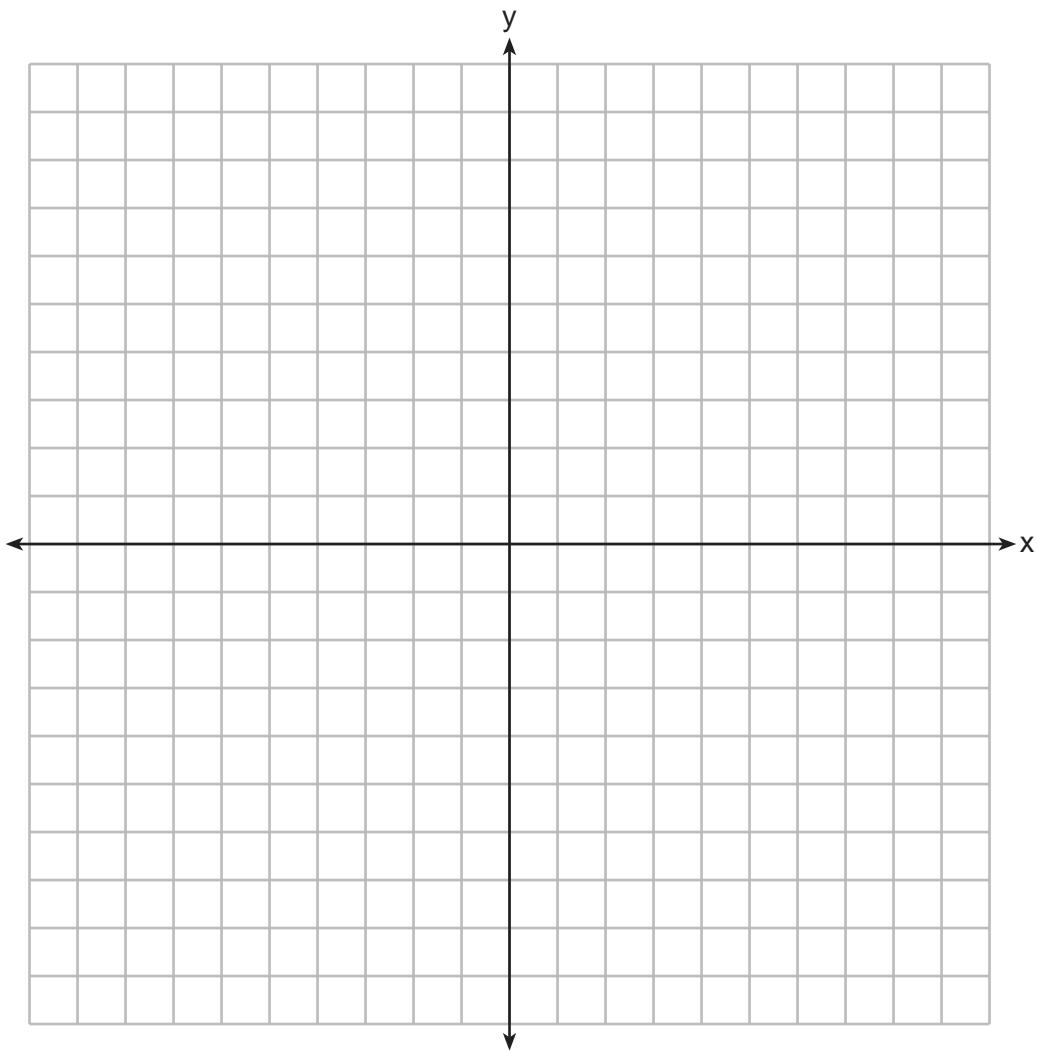
State the coordinates of a point in the solution set.

Part IV

Answer all 3 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [12]

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.

15 ft

Fountain

36 ft
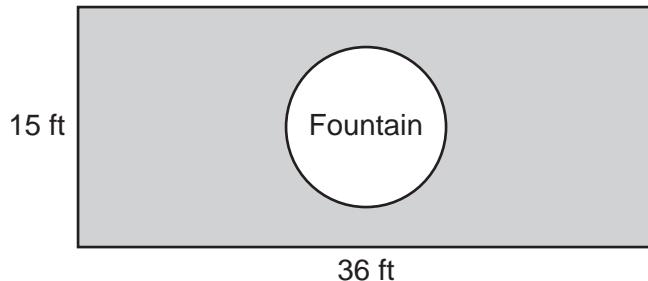
Find the area, to the *nearest square foot*, that must be paved.

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

39 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2 + xy}\right) \bullet \left(\frac{(x + y)^2}{2x}\right) \div \left(\frac{x^2 - y^2}{5y^2}\right)$$
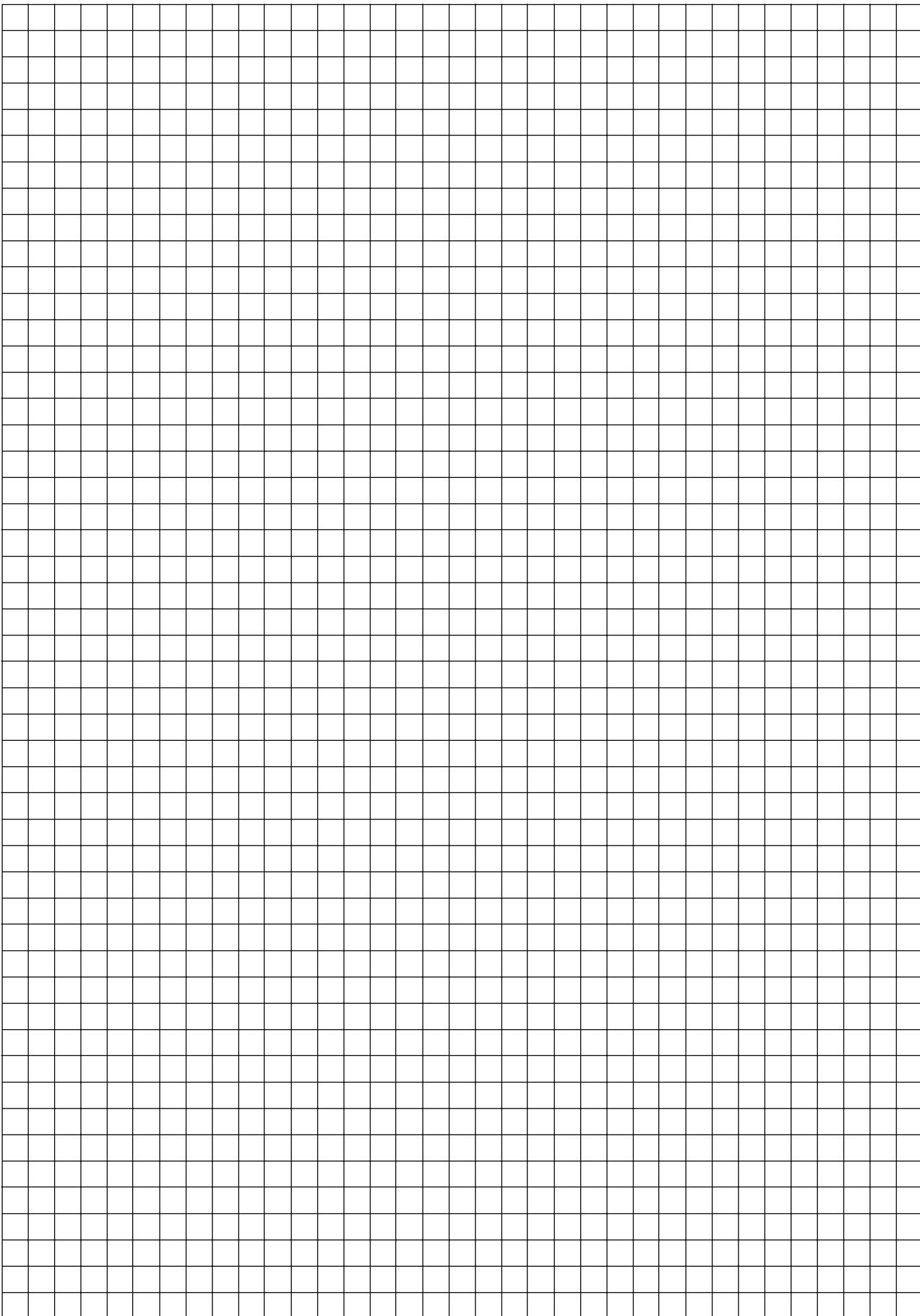
Reference Sheet

Trigonometric Ratios	$\sin A = \dfrac{opposite}{hypotenuse}$
	$\cos A = \dfrac{adjacent}{hypotenuse}$
	$\tan A = \dfrac{opposite}{adjacent}$

Area	trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$

Volume	cylinder	$V = \pi r^2 h$

Surface Area	rectangular prism	$SA = 2lw + 2hw + 2lh$
	cylinder	$SA = 2\pi r^2 + 2\pi rh$

Coordinate Geometry	$m = \dfrac{\Delta y}{\Delta x} = \dfrac{y_2 - y_1}{x_2 - x_1}$

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FOR TEACHERS ONLY

INTEGRATED ALGEBRA

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 Integrated Algebra. More detailed information about scoring is provided in the publication *Information Booklet for Scoring the Regents Examinations in Mathematics*.

Do *not* attempt to correct the student's work by making insertions or changes of any kind. In scoring the open-ended 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 open-ended 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/ on Tuesday, January 27, 2015. Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score. The student's scale score should be entered in the box provided on the student's separate answer sheet. The scale score is the student's final examination score.

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

Part I

Allow a total of 60 credits, 2 credits for each of the following.

(1) 2	(11) 3	(21) . . . . . 4 . . . . .
(2) 3	(12) 2	(22) . . . . . 4 . . . . .
(3) 4	(13) 1	(23) . . . . . 1 . . . . .
(4) 4	(14) 2	(24) . . . . . 2 . . . . .
(5) 3	(15) 1	(25) . . . . . 1 . . . . .
(6) 2	(16) 4	(26) . . . . . 1 . . . . .
(7) 3	(17) 1	(27) . . . . . 4 . . . . .
(8) 4	(18) 4	(28) . . . . . 2 . . . . .
(9) 3	(19) 3	(29) . . . . . 1 . . . . .
(10) 2	(20) 1	(30) . . . . . 4 . . . . .

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.

Beginning in January 2013, the Department is providing supplemental scoring guidance, the "Sample Response Set," for the Regents Examination in Integrated Algebra. This guidance is not required as part of the scorer training. It is at the school's discretion to incorporate it into the scorer training or to use it as supplemental information during scoring. While not reflective of all scenarios, the sample student responses selected for the Sample Response Set illustrate how less common student responses to open-ended questions may be scored. The Sample Response Set will be available on the Department's web site at http://www.nysedregents.org/IntegratedAlgebra/.

General Rules for Applying Mathematics Rubrics

I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents Examination in Integrated Algebra 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 Examinations in Mathematics*, 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 any response. 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. A response with one conceptual error can receive no more than half credit.

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.

If a response shows two (or more) different major conceptual errors, it should be considered completely incorrect and receive no credit.

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; i.e., awarding half credit for the conceptual error and deducting 1 credit for each mechanical error (maximum of two deductions for mechanical errors).

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.

(31) **[2]** 3.7, and correct work is shown.

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

or

 [1] Appropriate work is shown, but one conceptual error is made, such as using an incorrect trigonometric function. An appropriate distance is given.

or

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

or

 [1] 3.7, 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]** 36, 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] A correct equation is written, but no further correct work is shown.

or

 [1] 36, 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.

(33)   **[2]** $\frac{2}{5}$ or equivalent, and correct work is shown.

[1] Appropriate work is shown, but one computational error is made. An appropriate probability is found.

or

[1] Appropriate work is shown, but one conceptual error is made. An appropriate probability is found.

or

[1] $\frac{2}{5}$, but no work is shown.

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

Part III

For each question, use the specific criteria to award a maximum of 3 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(34) **[3]** 7.50 or equivalent and correct work is shown.

[2] Appropriate work is shown, but one computational error is made. An appropriate cost is found.

or

[2] Appropriate work is shown, but 15, the price of one DVD, is found.

[1] Appropriate work is shown, but two or more computational errors are made. An appropriate cost is found.

or

[1] Appropriate work is shown, but one conceptual error is made. An appropriate cost is found.

or

[1] A correct single variable equation or system of equations is written, but no further correct work is shown.

or

[1] 7.50, but a method other than algebraic is used.

or

[1] 7.50, 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) **[3]** 16 and correct work is shown.

[2] Appropriate work is shown, but one computational error is made. An appropriate answer is given.

or

[2] Appropriate work is shown to find 85, the minimum score needed on the retest, but no further correct work is shown.

[1] Appropriate work is shown, but one conceptual error is made, but an appropriate answer is given.

or

[1] Appropriate work is shown, but two or more computational errors are made, but an appropriate answer is given

or

[1] 16 and 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) **[3]** Correct graphs are drawn and at least one is labeled, and coordinates of a point within the solution set are found.

[2] Correct graphs are drawn and at least one is labeled, but no coordinates or incorrect coordinates are stated.

or

[2] Appropriate work is shown, but one graphing or labeling error is made. Appropriate coordinates are stated.

[1] Appropriate work is shown, but two or more graphing or labeling errors are made. Appropriate coordinates are stated.

or

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

or

[1] Only one correct graph is drawn and labeled, but no further correct work is shown.

or

[1] Only correct coordinates of a point in the solution set are stated, but no graphs are drawn.

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

Part IV

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

(37) **[4]** 490 and 4385.50 and correct work is shown.

[3] Appropriate work is shown, but one computational is made or the answer is rounded. Appropriate answers are given.

or

[3] Appropriate work is shown to find 490, but no further correct work is shown.

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

or

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

or

[2] Appropriate work is shown to find the areas of the rectangle and the circle, but no further correct work is shown.

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

or

[1] Appropriate work is shown to find the area of the circle, but no further correct work is shown.

or

[1] 490 and 4385.50, but no work is shown.

[0] One conceptual error and two or more computational errors are made.

or

[0] 490 or 4385.50, 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.

(38)   **[4]** $(2,-3)$ and $(-6,-11)$ or equivalent, and correct algebraic work is shown.

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

or

    [3] Appropriate work is shown, but only one correct ordered pair is found or only the correct value for x or for y is found.

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

or

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

or

    [2] $x^2 + 4x - 12 = 0$ is written, but the equation is not solved or is solved incorrectly.

or

    [2] An appropriate system of equations is solved, but a method other than algebraic is used.

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

or

    [1] The equation $x^2 + 5x - 17 = x - 5$ is set up correctly, but no further correct work is shown.

or

    [1] $(2,-3)$ and $(-6,-11)$, but no work is shown.

    [0] $(2,-3)$ or $(-6,-11)$, 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.

(39)   **[4]** $\dfrac{25y^3}{x-y}$ and correct work is shown.

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

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

or

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

or

[2] The expression is expressed as products, and all numerators and denominators are factored correctly, but no further correct work is shown.

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

or

[1] All numerators and denominators are factored correctly, but no further correct work is shown.

or

[1] $\dfrac{25y^3}{x-y}$, 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.

Map to Core Curriculum

Content Strands	Item Numbers
Number Sense and Operations	17, 23, 27, 32
Algebra	1, 2, 3, 7, 8, 10, 11, 13, 16, 18, 19, 20, 21, 24, 25, 26, 31, 34, 38, 39
Geometry	5, 6, 14, 29, 36, 37
Measurement	9, 22
Statistics and Probability	4, 12, 15, 28, 30, 33, 35

Regents Examination in Integrated Algebra
January 2015
Chart for Converting Total Test Raw Scores to Final Examination Scores (Scale Scores)

The *Chart for Determining the Final Examination Score for the January 2015 Regents Examination in Integrated Algebra* will be posted on the Department's web site at: **http://www.p12.nysed.gov/assessment/** on Tuesday, January 27, 2015. Conversion charts provided for previous administrations of the Regents Examination in Integrated Algebra 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

INTEGRATED ALGEBRA

Tuesday, January 27, 2015 — 1:15 a.m. to 4:15 p.m., only

SAMPLE RESPONSE SET

Table of Contents

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.
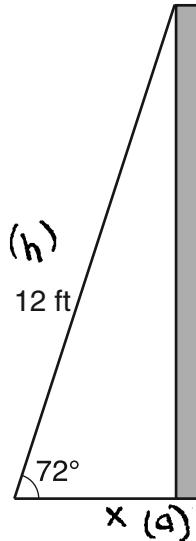

Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$$\frac{\cos 72}{1} = \frac{x}{12}$$

$$x = 12 \cos 72$$

$$x = 3.7 \text{ ft}$$

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

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.

Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$$\sin 72 = \frac{\omega}{12}$$
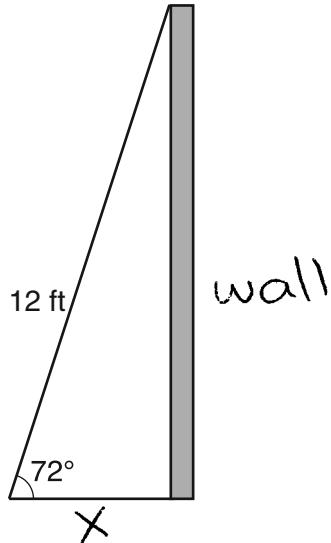
$$\omega = 12 \times \sin 72 = 11.4$$

$$12^2 = x^2 + 11.4^2$$

$$x^2 = 144 - 129.96 = 14.04$$

$$x = \sqrt{14.04} = 3.7$$

Score 2:   The student used the correct trigonometric ratio to find the height of the wall. The student then used the Pythagorean Theorem to correctly find the distance from the wall.

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.
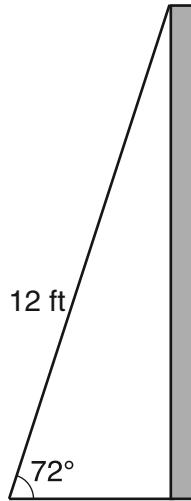
Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$$\cos(72) = \frac{x}{12}$$

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

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.

h''

12 ft

72°

X

"∂"
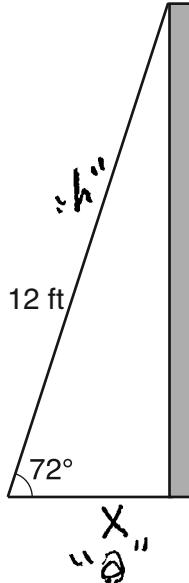
Find, to the *nearest tenth of a foot*, the distance from the wall to the base of the ladder.

let x = distance from wall to base of ladder

SOH CAH TOA

$\cos \theta = \dfrac{A}{H}$

$\dfrac{\cos 72}{1} = \dfrac{x}{12}$

$12\cos 72 = x$

$3.708...0 = x$

$4 \approx x$

∴ the distance from the wall to the base of the ladder is 4ft.

Score 1: The student showed appropriate work, but made a rounding error by finding the answer to the nearest whole number instead of the nearest tenth.

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.

12 ft

72°

Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$$\text{Sin } 72 = \frac{x}{12}$$
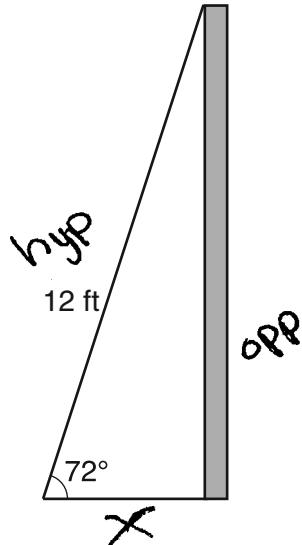
$$\frac{.95}{1} = \frac{x}{12}$$

$$x = 11.4$$

Score 1: The student used an incorrect trigonometric function.

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.
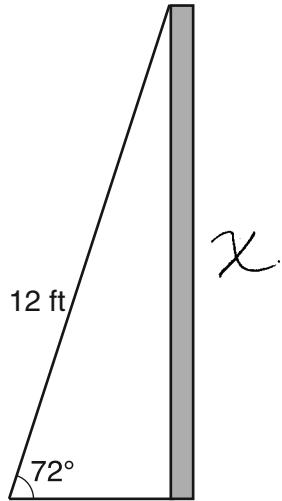
Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$$\sin 72 = \frac{x}{12}$$

$$x = 11.4126$$

$$\boxed{x = 11.4}$$

Score 1: The student made a conceptual error by finding the height of the wall instead of the distance from the wall to the ladder.

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.

(h)

12 ft

72°

X (a)
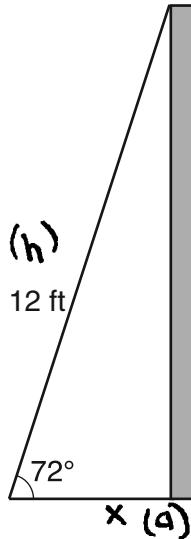
Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

$$\cos 72 = \frac{x}{12}$$
$$\frac{\cos 72}{1} = \frac{x}{12}$$

$$12 \cos 72 = x$$
$$x = -11.6$$

Score 1: The student made an error by using radian mode instead of degree mode in the calculator.

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.

H

12 ft

72°

a

Find, to the *nearest tenth of a foot*, the distance from the wall to the base of the ladder.

$$\text{Sin } 72 = \frac{x}{12}$$

$$\frac{}{1}$$

O
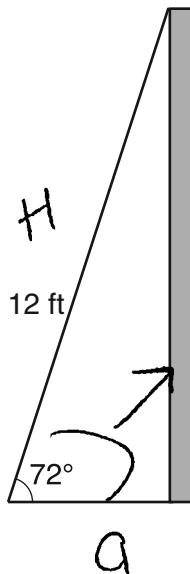
$$x = 11 \text{ ft}$$

Score 0: The student made two errors by finding the height of the wall and rounding to the nearest foot.

31 As shown in the diagram below, a ladder 12 feet long leans against a wall and makes an angle of 72° with the ground.
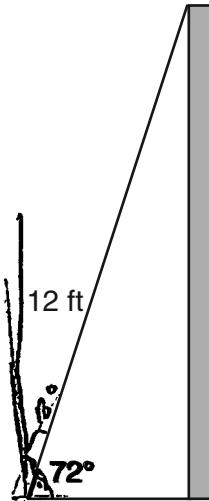
Find, to the *nearest tenth of a foot,* the distance from the wall to the base of the ladder.

SOH CAH TOA

$\cos 72 = \frac{12}{x}$

Score 0: The student wrote the trigonometric ratio incorrectly and did not calculate the answer.

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

$$X = \text{Original price}$$

$$100\% - 20\% = 80\%$$

So

$$0.80X = 28.80$$

$$X = \frac{28.80}{0.80} = 36$$

Dress was $36.00

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

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

$$X - Original\ price$$

$$\frac{28.80}{X} = \frac{100-20}{100} = \frac{80}{100}$$

$$80x = 2880$$

$$X = \frac{2880}{80} = 36$$

$$\$\ 36$$

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

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

$$28.8$$
$$\times .8$$
$$\overline{\$ 23.04}$$

Score: 1 The student made one conceptual error by taking 80% of $28.80.

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

$$100 + 20 = 120\%$$

$$28.80 \times 1.20 = 34.56$$

$$\$ 34.56$$

Score: 1 The student made one conceptual error by taking 120% of $28.80.

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

$$100X - 20X = 28.80$$

$$80X = 28.80$$

$$X = \frac{28.80}{80} = 0.36$$

$$\cancel{\$} = 0.36$$

Score: 1 The student made a conceptual error by not writing percentages as decimals.

Question 32

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

$$
\begin{array}{r}
28.8 \\
\times\ 0.2 \\
\hline
5.76
\end{array}
$$

$$
\begin{array}{r}
28.80 \\
+\ 5.76 \\
\hline
34.56
\end{array}
$$

Score: 1   The student made one conceptual error by taking 120% of $28.80.

Integrated Algebra – Jan. '15   [16]

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

$$28.80$$
$$+ \ 0.20$$
$$\overline{29.00}$$

Score: 0 The student showed completely irrelevant work.

32 Carla bought a dress at a sale for 20% off the original price. The sale price of the dress was $28.80. Find the original price of the dress, in dollars.

$$\frac{28.8}{.2} = 144$$

$ 144

Score: 0 The student showed completely irrelevant work.

33 The probability that a student owns a dog is $\frac{1}{3}$. The probability that the same student owns a dog and a cat is $\frac{2}{15}$. Determine the probability that the student owns a cat.

prob. dog = $\frac{1}{3}$

prob. cat = x

$\frac{1}{3} \cdot x = \frac{2}{15}$

$\left(\frac{3}{1}\right)\frac{1}{3} \cdot x = \frac{2}{15}\left(\frac{3}{1}\right)$

$\boxed{x = \frac{2}{5}}$

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

33 The probability that a student owns a dog is $\frac{1}{3}$. The probability that the same student owns a dog and a cat is $\frac{2}{15}$. Determine the probability that the student owns a cat.
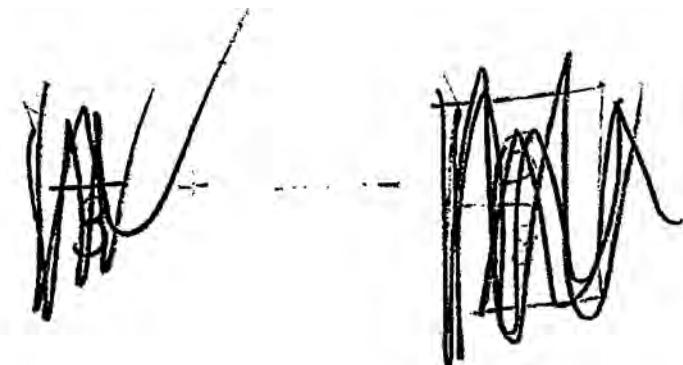
$$\frac{2}{15} \Big/ \frac{1}{3} = \boxed{\frac{2}{5}}$$

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

33 The probability that a student owns a dog is $\frac{1}{3}$. The probability that the same student owns a dog and a cat is $\frac{2}{15}$. Determine the probability that the student owns a cat.

$$\frac{1\times5}{3\times5} = \frac{5}{15}$$

$$\frac{5}{15} - \frac{2}{15} = \frac{3}{15}$$

$$\frac{3}{15} = \frac{1}{5}$$

$$\frac{1}{5}$$

Score: 1   The student made a conceptual error by subtracting rather than dividing.

33 The probability that a student owns a dog is $\frac{1}{3}$. The probability that the same student owns a dog and a cat is $\frac{2}{15}$. Determine the probability that the student owns a cat.

$$\frac{1}{3}$$

$$\frac{2}{15}$$

$$\frac{5}{15} \times \frac{2}{15} = \frac{6}{225} = \boxed{\frac{2}{45}}$$

Score: 1 The student made a conceptual error by multiplying instead of dividing.

33 The probability that a student owns a dog is $\frac{1}{3}$. The probability that the same student owns a dog and a cat is $\frac{2}{15}$. Determine the probability that the student owns a cat.

Score: 0   The student wrote a correct response that was obtained by an obviously incorrect procedure.

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

$$x = \text{Cost of CD}$$
$$2x = \text{Cost of DVD}$$

$$2(2x) + 2(x) = 45$$
$$4x + 2x = 6x = 45$$
$$x = 7.5$$

Score: 3 The student has a complete and correct response.

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

let x = Cost of music CD

let $2x$ = Cost of DVD

$$2(2x) + 2x = 45$$

$$4x + 2x = 45$$

$$\frac{6x}{6} = \frac{45}{6}$$

$$x = 7.50$$

Score: 3 The student has a complete and correct response.

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

$$\text{Cost of DVD} = x$$
$$\text{Cost of CD music} = \tfrac{1}{2}x$$
$$2x + x = 45$$
$$3x = 45$$
$$x = 15$$

Score: 2 The student showed a correct method, but calculated the cost of a DVD instead of a CD.

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

$$CD \ Cost = m$$
$$DVD \ Cost = 2m$$
$$Amt \ m = 45$$
$$5m = 45$$
$$m = 9.$$

Score: 2 The student made one error by not considering the purchase of two CDs.

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

$$2x + 2x = 45$$

$$4x = 45$$

$$x = 11.25$$

$$\$ = 11.25$$

Score: 1 The student made one conceptual error in writing an equation where the cost of a DVD is equal to the cost of a CD.

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

$$DVD = 2CD$$
$$2DVD + 2CD = 45$$

Score: 1 The student wrote a correct system of equations, but showed no further correct work.

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

$$CD = \cancel{\$5}$$
$$DVD = \cancel{\$10}$$
$$20 + 10 = 30$$

$$CD = \cancel{10}$$
$$DVD = \cancel{20}$$
$$\cancel{40 + 20 = 60}$$

$$CD = 7.5$$
$$DVD = 15 \quad \checkmark$$
$$30 + 15 = 45$$
$$OK$$

Score: 1   The student wrote the correct price of a CD, but used a method other than algebraic.

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

Let x = cost of DVD

2x = cost of CD

2x + 4x = 45

6x = 45

x = 7.5

Cost of CD = 2 × 7.5

= 15

Score: 1 The student made one conceptual error by assuming that the cost of a CD is twice the cost of a DVD.

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

$$2DVD - 2CD$$
$$+ \quad 45$$
$$\overline{}$$
$$2DVD - 47CD$$
$$2D + 47$$

Score: 0   The student showed completely incorrect work.

34 A DVD costs twice as much as a music CD. Jack buys 2 DVDs and 2 CDs and spends $45. Determine how much one CD costs, in dollars. [Only an algebraic solution can receive full credit.]

$$x = CD$$
$$2x = DVD$$
$$2x \cdot 4x = 45$$
$$8x = 45$$
$$x = \frac{45}{8} = 5.625$$

Score: 0   The student made one conceptual error setting up the equation and a second error when solving the equation.

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

Average right now = 76 + 84 + 69 + 74 + 91 = 394

394 ÷ 5 = 78.8

82 × 5 = 410

410 - 76 - 84 - 74 - 91 = 85

85 points $^{-69}$ = 16

16 points more

Score: 3   The student has a complete and correct response.

35 Noj has the following test scores:

$$76, 84, 69, 74, 91$$

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$$\frac{76 + 84 + 74 + 91 + 69 + X}{5} \geq 82$$

$$\left(\frac{5}{1}\right) \frac{394 + X}{5} \geq 82\left(\frac{5}{1}\right)$$

$$394 + x \geq 410$$
$$-394 \qquad -394$$

$$x \geq 16$$

$$\boxed{\text{least } \# \text{ pts} = 16}$$

(lowest 69+X)

$$\frac{76 + 84 + 74 + 91 + x}{5} \geq 82$$

$$\left(\frac{5}{1}\right) \frac{325 + x}{5} \geq 82\left(\frac{5}{1}\right)$$

$$325 + x \geq 410$$
$$-325 \qquad -325$$

$$x \geq 85 \text{ (new test grade needed)}$$

$$\begin{array}{r} 85 \\ - 69 \\ \hline \boxed{16} \text{ more pts needed} \end{array}$$

Score: 3 The student has a complete and correct response.

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$$76 + 84 + 67 + 74 + 91 = 392$$
$$392 \div 5 = 78.4$$
$$82 \cdot 5 = 410$$
$$76 + 84 + x + 74 + 91 = 410$$
$$x = 85$$
$$85 - 67 = \boxed{18}$$

Score: 2 The student made a transcription error by writing 67 instead of 69.

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$$\frac{76 + 84 + 69 + 74 + 91}{5} = 78.8$$

$$69 = \text{lowest score}$$

$$\frac{76 + 84 + X + 74 + 91}{5} = 82$$

$$X = 85$$

Must score 85 or higher

$$\boxed{85}$$

Score: 2 The student showed work to find the new grade of 85, but did not find the number of additional points needed.

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

69, 76, 74, 84, 91   69 + 76 + 74 + 84 + 91 = 394

394 ÷ 5 = 78.8

82 · 5 = 410

x + 76 + 74 + 84 + 91 = 410

x = 85

410 ÷ 5 = 82

$$\begin{array}{r} 82 \\ -\ 69 \\ \hline 13 \end{array}$$

means that Noj must score at least 13 more point
to get an average of at least 82.

Score: 2   The student showed work to find the new grade of 85, but showed no futher correct work.

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$$\frac{76 + 84 + 69 + 74 + 91}{5} = 78.8$$

$$\begin{array}{r} 82 \\ -\ 78.8 \\ \hline \underline{3.2} \end{array}$$

Score: 1   The student made a conceptual error by subtracting the current average from the target average.

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$$76 + 84 + 69 + 74 + 91 = \frac{394}{5}$$

78.8 average

Score: 0   The student only found the average of the original test scores, which is insufficient to answer the question.

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$$\frac{76 + 84 + 74 + 91 + x}{5} = 82$$

$$\frac{325 + x}{5} = 82$$

$$\begin{array}{c} 65 + x = 82 \\ -65 \quad -65 \end{array}$$

$$\boxed{x = 17}$$

Score: 0   The student made a conceptual error when dividing 325 + *x* by 5. Then made a second conceptual error by using the new test score as the additional points needed.

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$$
\begin{array}{r}
82 \\
-69 \\
\hline
13
\end{array}
$$

13 points

Score: 0 The student showed irrelevant work.

35 Noj has the following test scores:

76, 84, 69, 74, 91

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

$$
\begin{array}{r}
76 \\
+84 \\
+69 \\
+74 \\
+91 \\
\hline
394
\end{array}
$$

Score: 0   The correct work the student showed is insufficient.

36 Graph $y < x$ and $x > 5$ on the axes below.
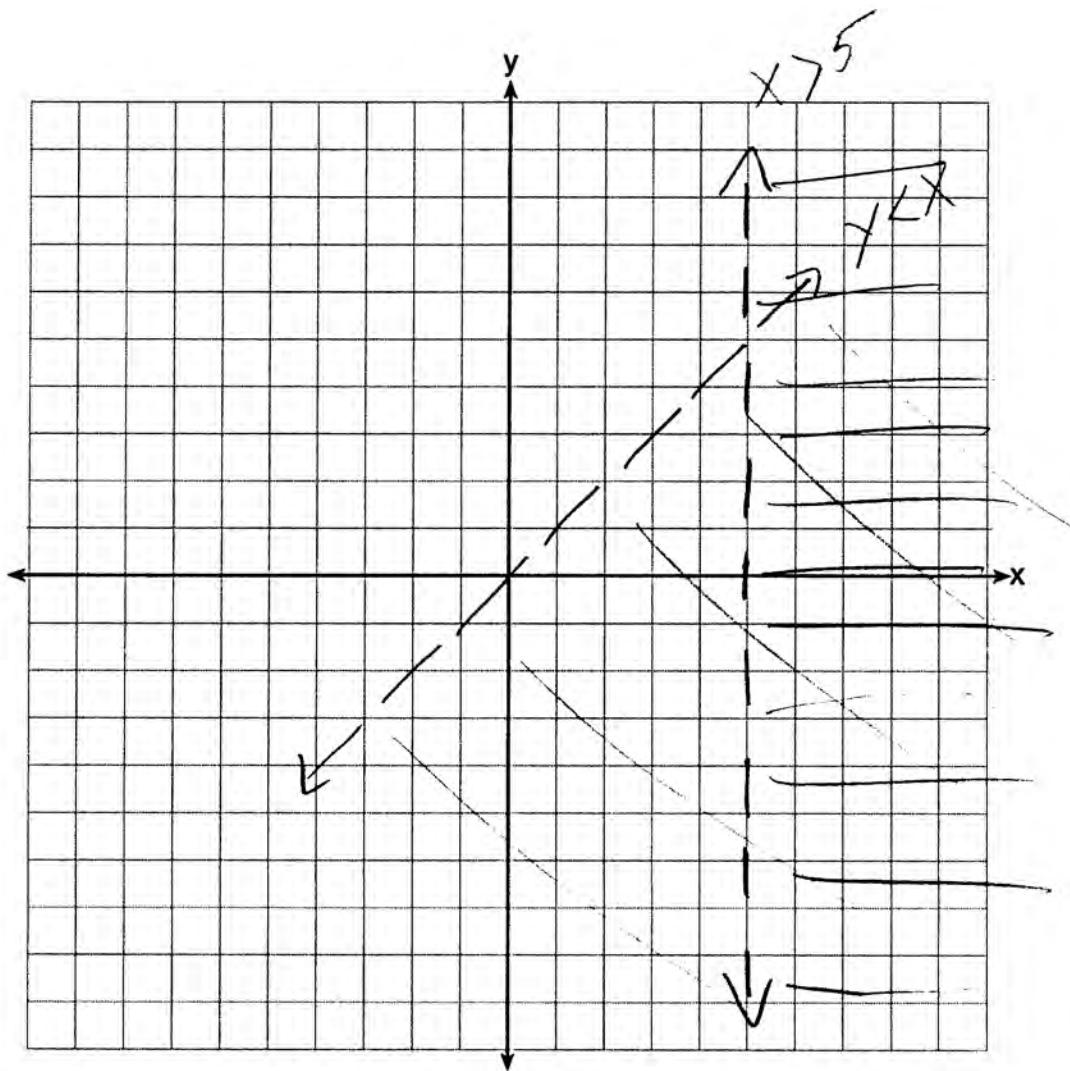
State the coordinates of a point in the solution set.

$(7, 1)$

Score: 3 The student has a complete and correct response.

36 Graph $y < x$ and $x > 5$ on the axes below.
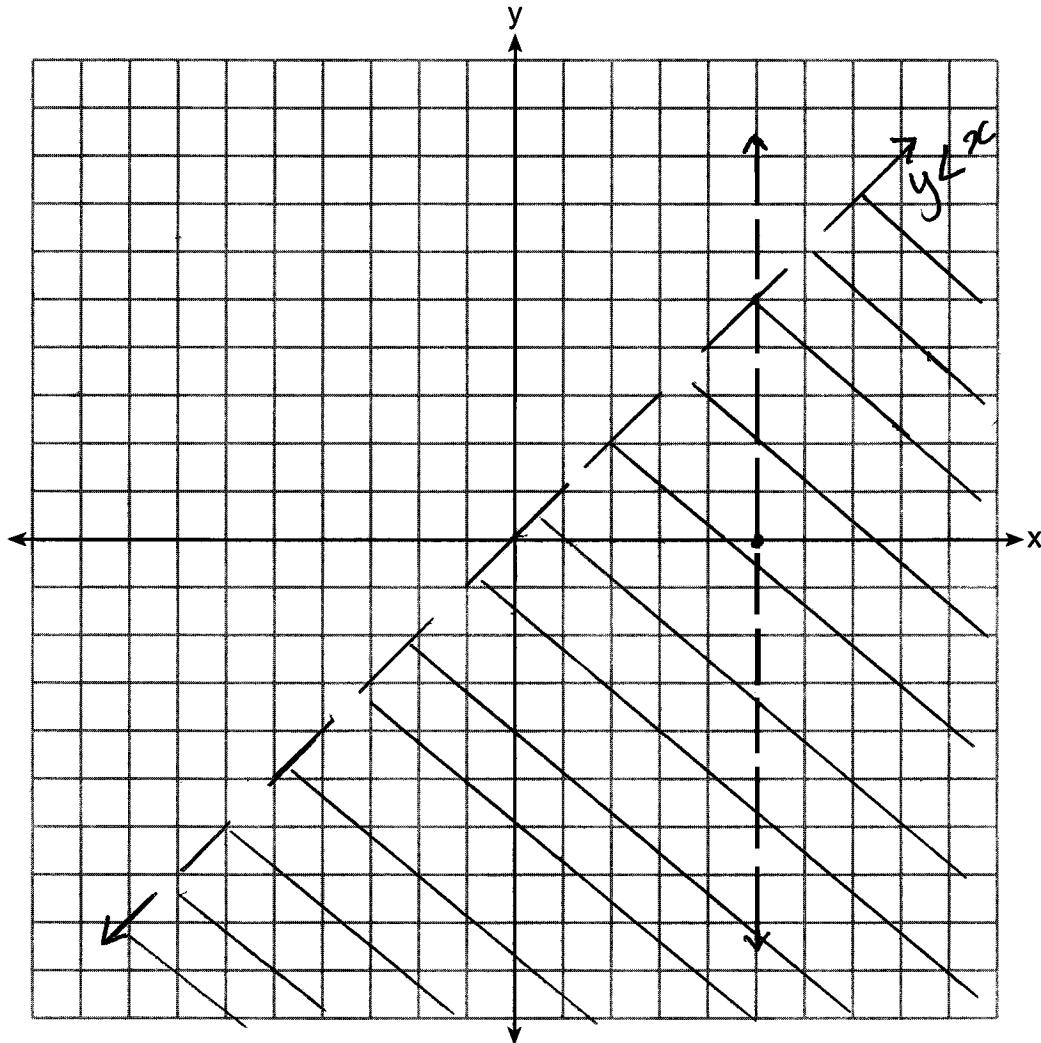
$$\left(7, ^-1\right)$$

State the coordinates of a point in the solution set.

Score: 2   The student made one graphing error by not shading $x > 5$.

36 Graph $y < x$ and $x > 5$ on the axes below.
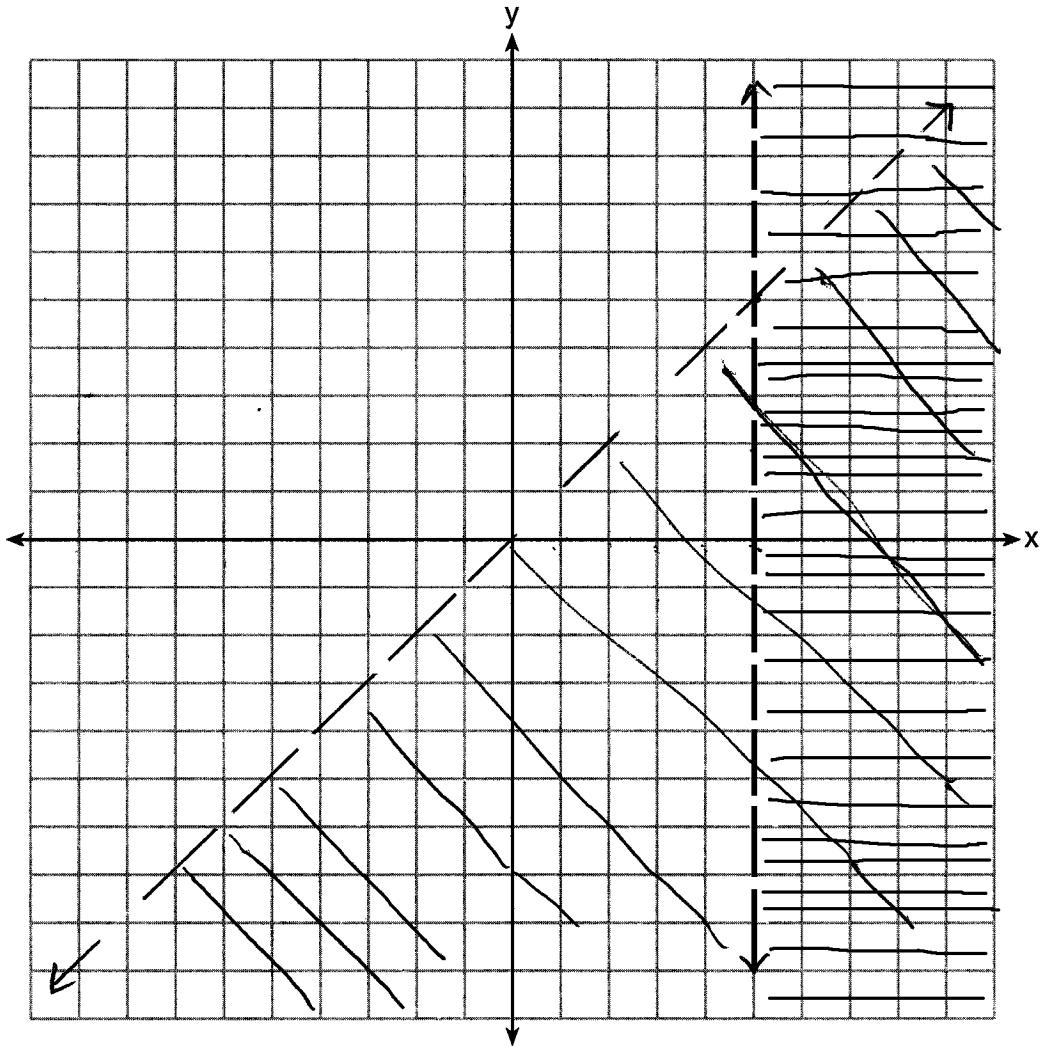
$(6, 3)$

State the coordinates of a point in the solution set.

Score: 2 The student graphed both inequalities correctly, but did not label at least one. The coordinates of a point within the solution set are stated.

36 Graph $y < x$ and $x > 5$ on the axes below.
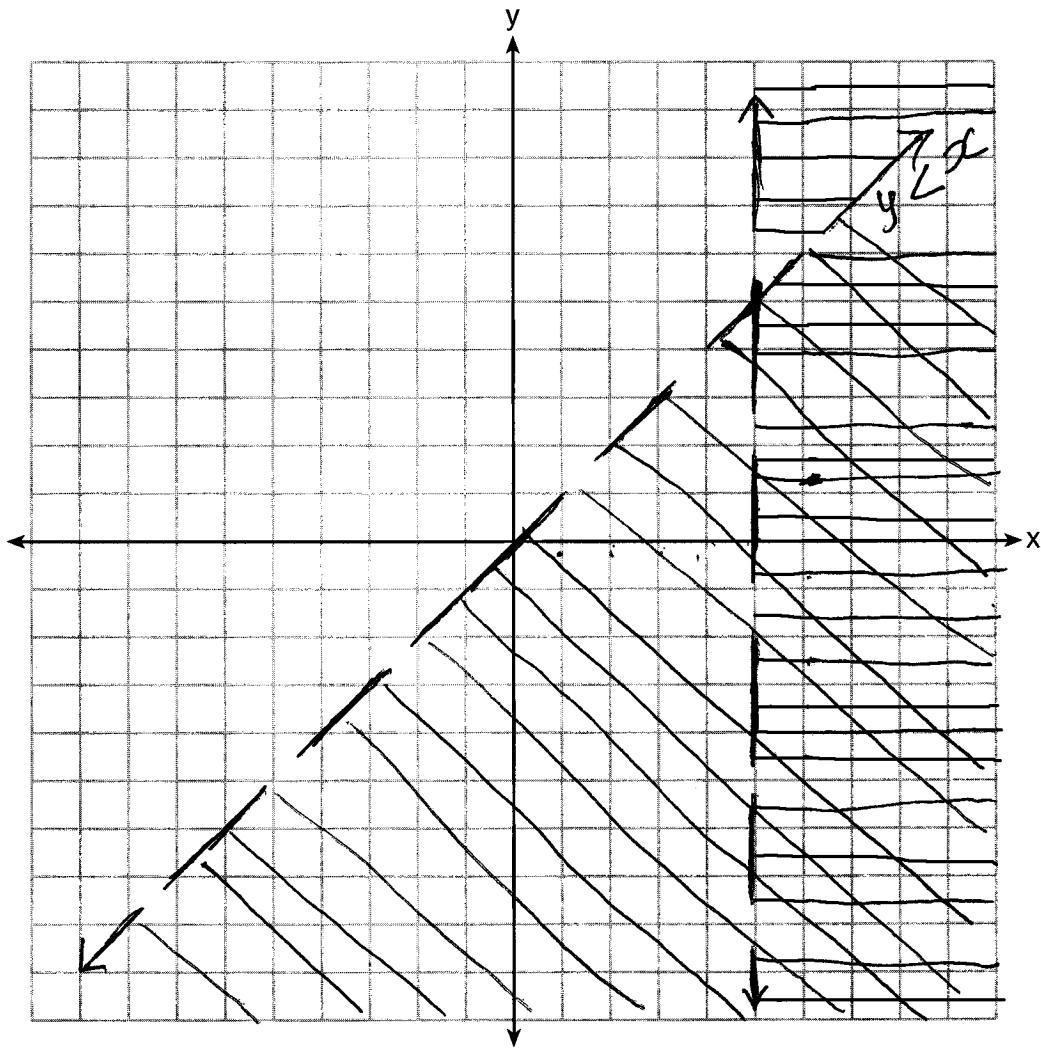
State the coordinates of a point in the solution set.

Score: 2   The student drew both graphs correctly and labeled one, but did not state a point in the solution set.

36 Graph $y < x$ and $x > 5$ on the axes below.
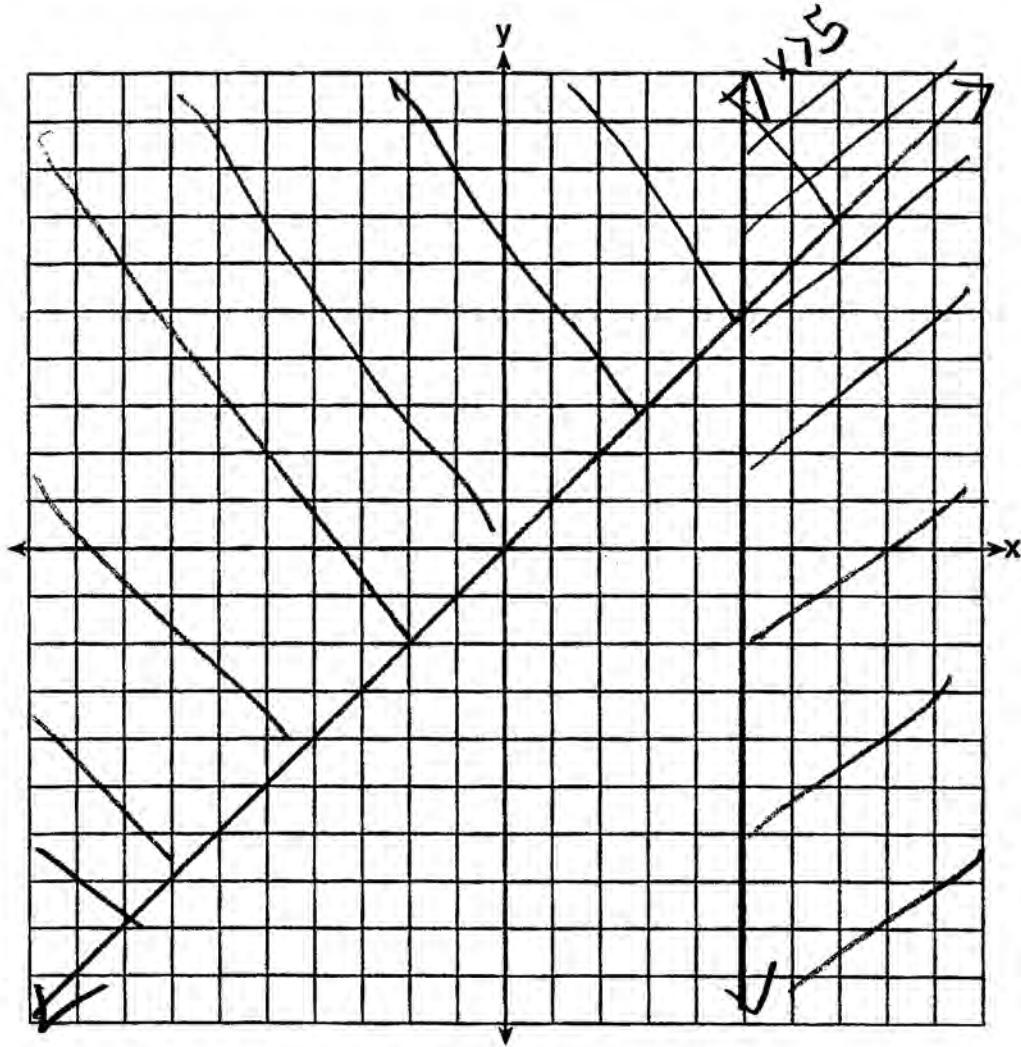
State the coordinates of a point in the solution set.

$(7, 9)$

Score: 1   The student made two graphing errors, graphing solid boundary lines and shading $y < x$ incorrectly, but stated appropriate coordinates.

36 Graph $y < x$ and $x > 5$ on the axes below.

X>5
BD: X=5
not included
dotted
slope: 0

X>5

y<x
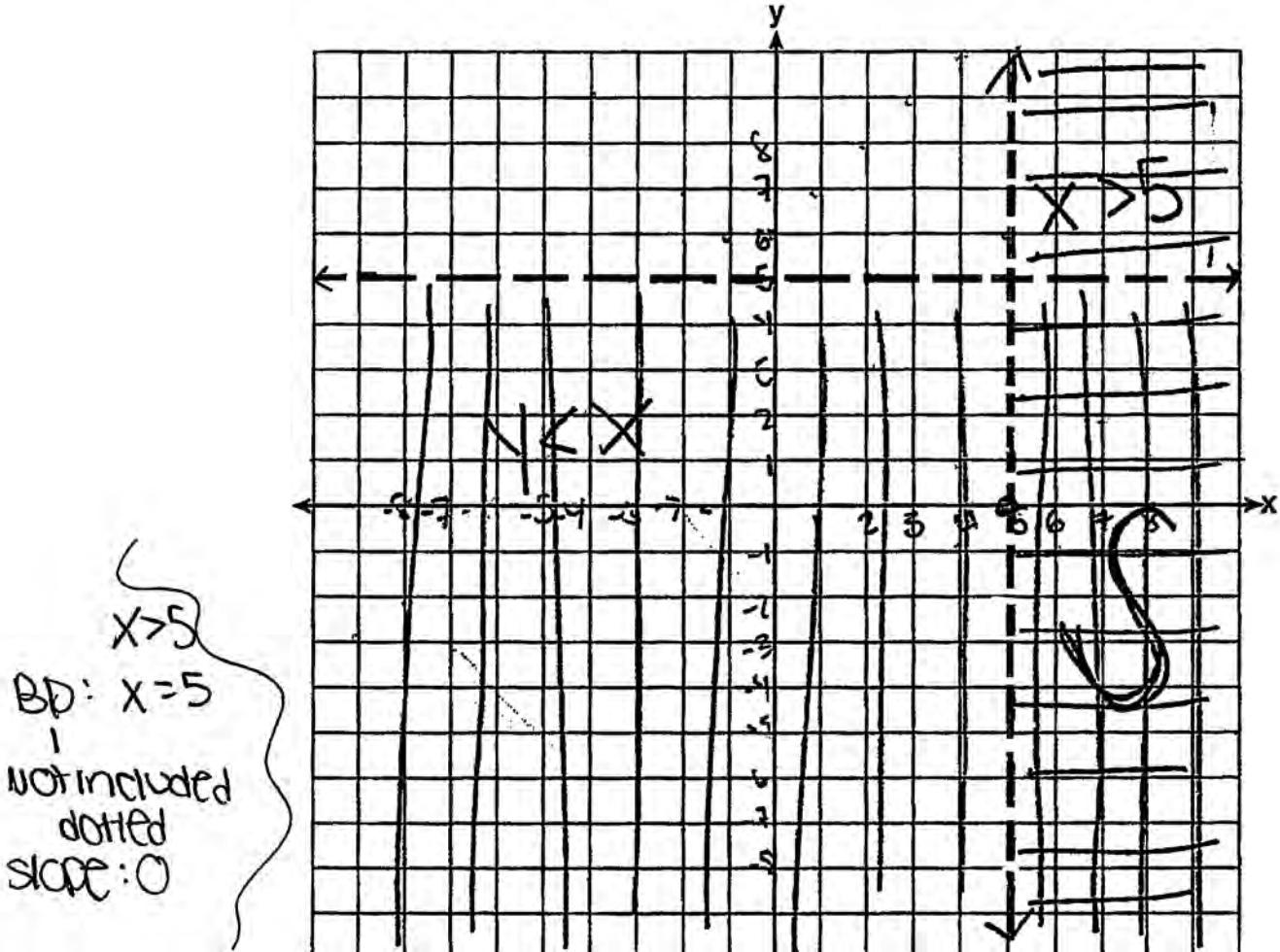
State the coordinates of a point in the solution set.

$(7, 1)$ is in the solution set.

Score: 1 The student made one conceptual error by graphing $y < 5$ instead of $y < x$.

36 Graph $y < x$ and $x > 5$ on the axes below.
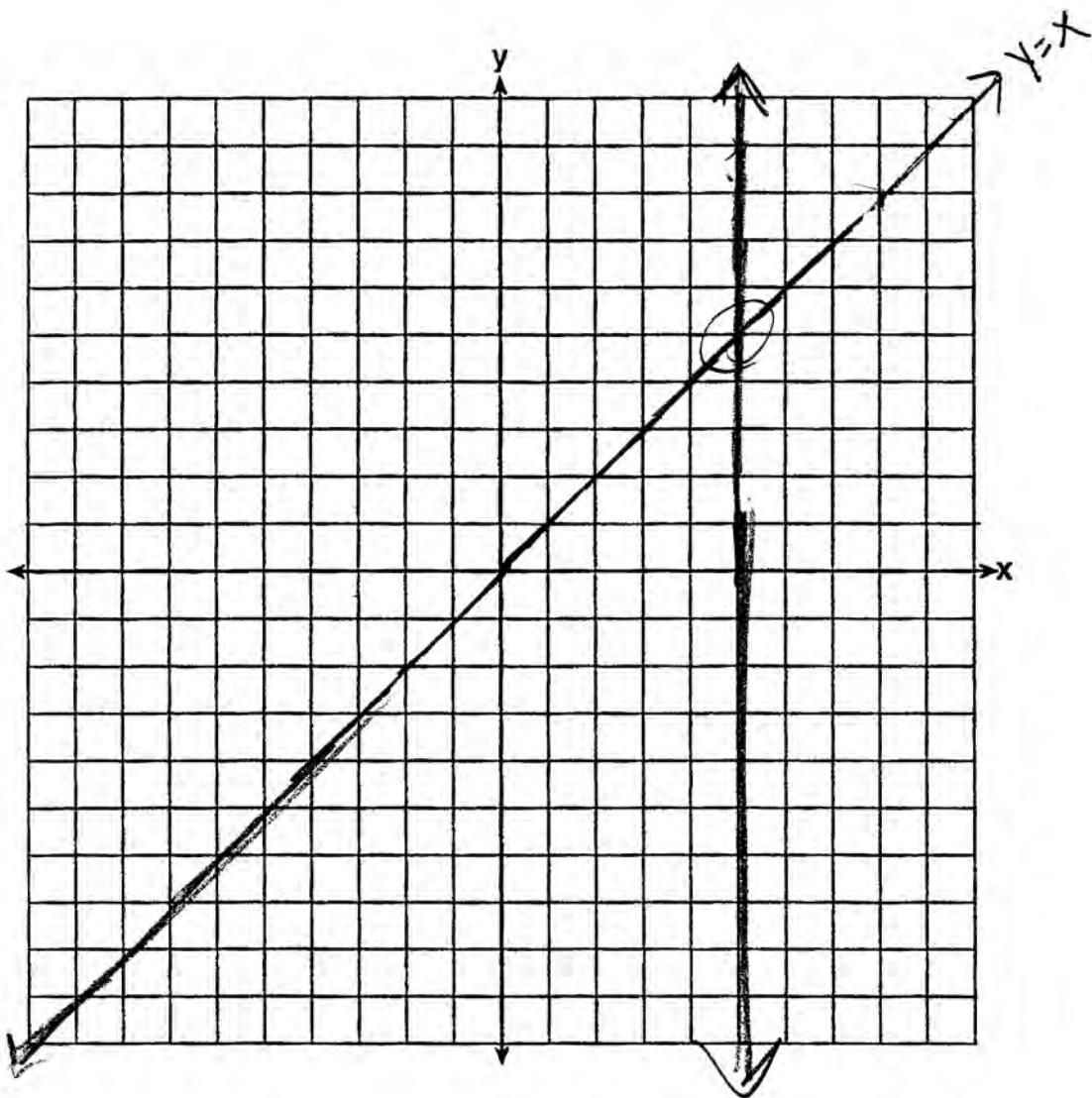
State the coordinates of a point in the solution set. $(5,5)$

Score: 1 The student made a conceptual error by graphing equations instead of inequalities. The correct point of intersection was stated.

36 Graph $y < x$ and $x > 5$ on the axes below.
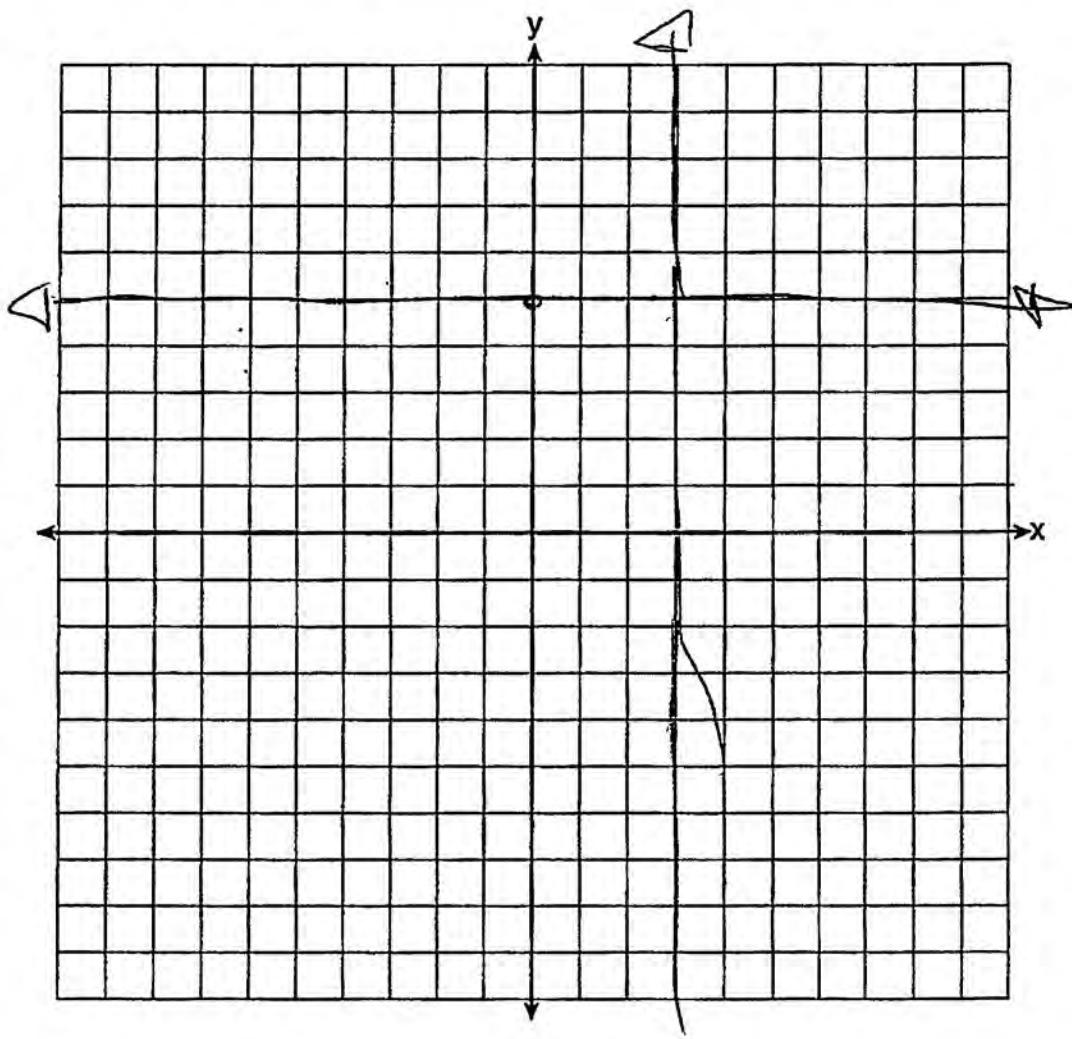

State the coordinates of a point in the solution set.

$(3,5)$

Score: 0 The student has a completely incorrect response.

36 Graph $y < x$ and $x > 5$ on the axes below.
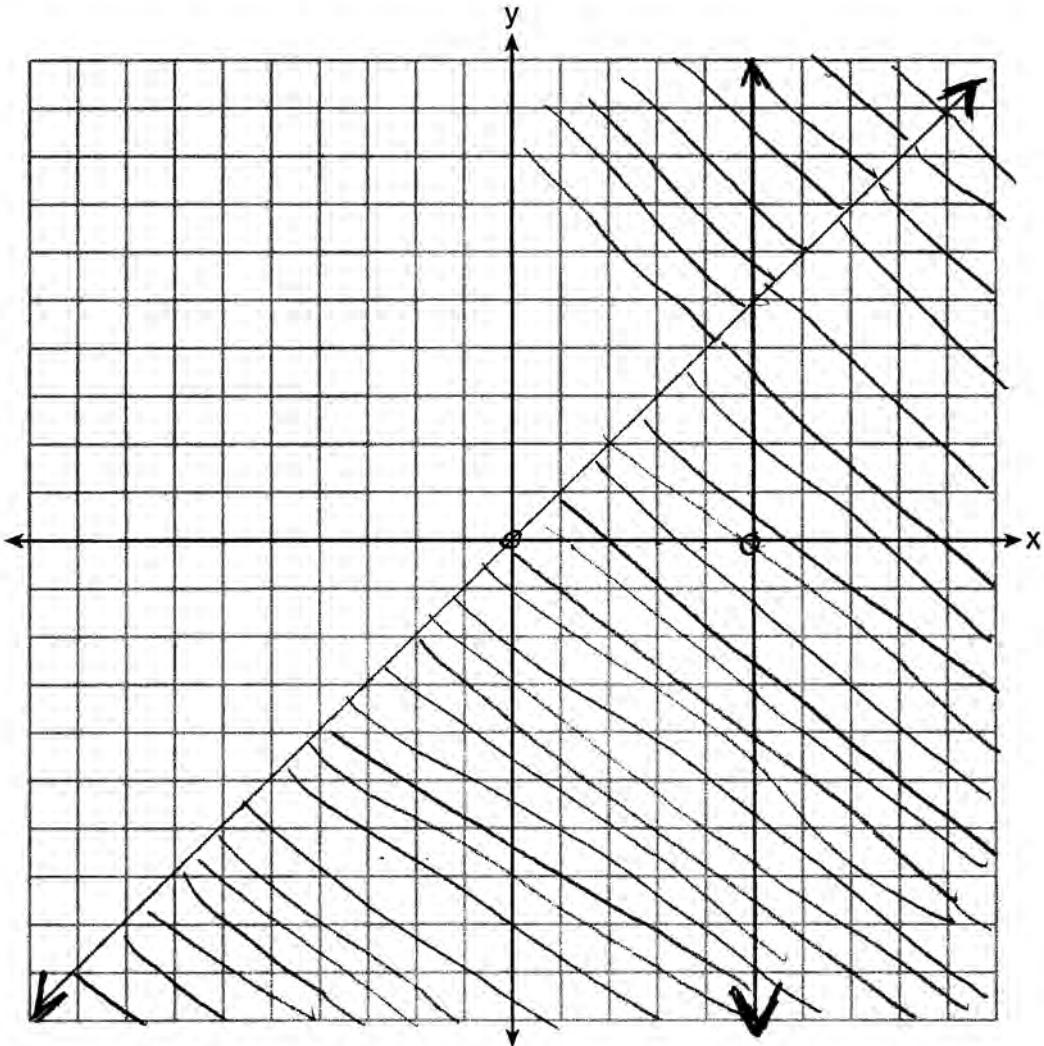
State the coordinates of a point in the solution set.

$(2, -5)$

Score: 0 The student made a conceptional error graphing $y < x$ and graphed $x=5$.

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.

15 ft

~~8ft~~
~~Fountain~~

36 ft
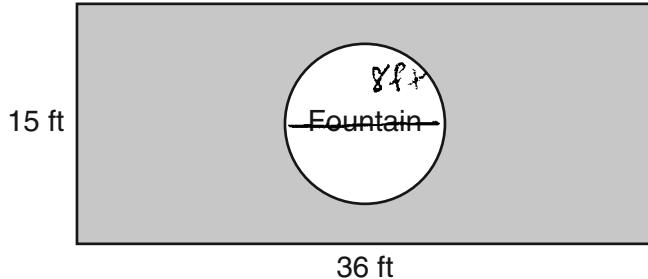
Find the area, to the *nearest square foot*, that must be paved.

$A = l \cdot w$
$A = 36 \cdot 15$
$A = 540$

$A = \pi r^2$
$A = \pi (4)^2$
$A = 50.26548$

$540 - 16\pi$

$A = 489.734$
$A = 489.8$
$A = 490 \text{ sq. ft}$

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$$\frac{\begin{array}{r} 490 \\ \times 8.95 \end{array}}{\$4385.5}$$

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

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.

15 ft | Fountain

36 ft
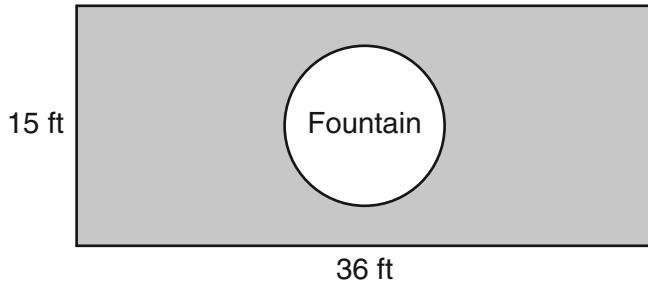
Find the area, to the *nearest square foot*, that must be paved.

rectangle – fountain

36·15 – 16π   = 489.7345175

Area = 490

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

490 · $8.95 = $4385.50

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

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.

15 ft

Fountain
8 ft

36 ft
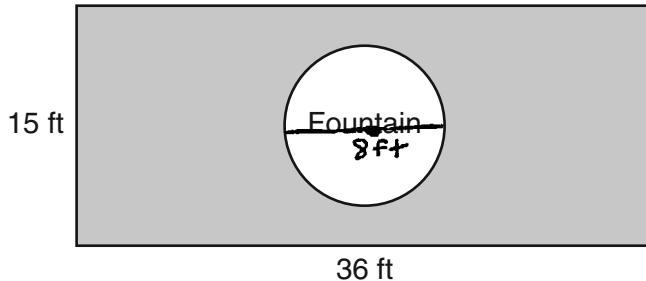
Find the area, to the *nearest square foot*, that must be paved.

$$A = lw$$
$$= 36 \cdot 15$$
$$= 540 \, ft^2$$

$$A = \pi r^2$$
$$r = \pi(4^2)$$
$$= 16 \pi \, ft$$
$$= 50.26548246$$

$$540 - 50.26548246$$
$$489.7345175$$

$$\boxed{490 \, ft^2}$$

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$$490 \, (8.95) = \boxed{\$4386}$$

Score: 3   The student rounded the cost to the nearest dollar.

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.

15 ft

8ft

Fountain

36 ft
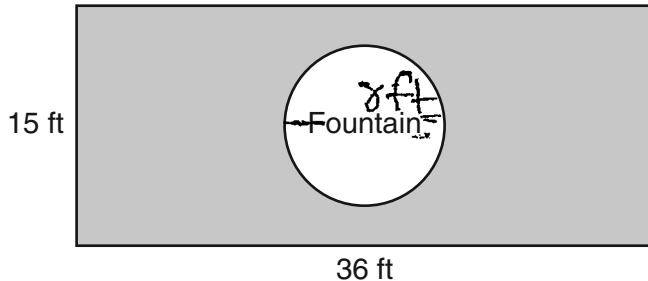
Find the area, to the *nearest square foot*, that must be paved.

$(15)(36) = 540$

$A = \pi r^2$

$A = \pi 4^2$

$A = \pi 16$

$A = 50.26$

$540 - 50.26 = 489.74 ft^2$

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges \$8.95 per square foot.

$(\$8.95)(489.74) = \$4383.173 = \$4383.17$

Score: 3 The student did not round to the nearest square foot.

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.

15 ft | Fountain | = 8ft

36 ft

$Square (A) = 540 ft^2$
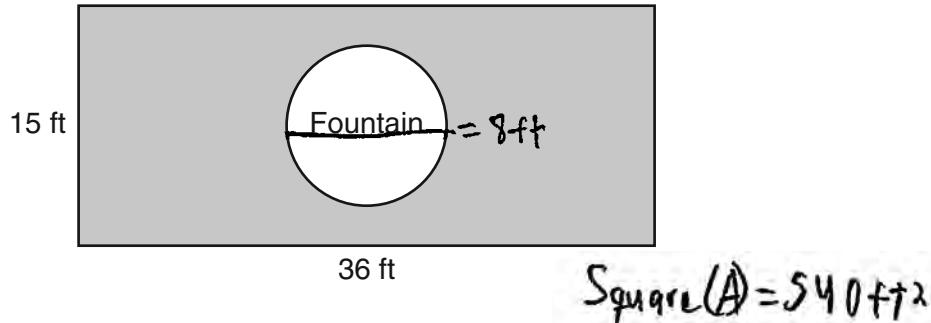
Find the area, to the *nearest square foot*, that must be paved.

$490 ft^2$

$A_O = \pi (y)^2$

$A_6 = 16\pi$

$A_s = 50$

$540 - 50 = 490$

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$8.95 = 1ft$

$\dfrac{490}{8.95} = \$54.75$

Score: 3 The student correctly found 490, but showed no further correct work.

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.

15 ft

8
Fountain

36 ft

Find the area, to the *nearest square foot*, that must be paved.

$$A = \pi \cdot 8^2$$
$$A = 201$$

$$A = 15 \cdot 36$$
$$A = 540$$

$$540$$
$$- 201$$
$$\overline{339}$$
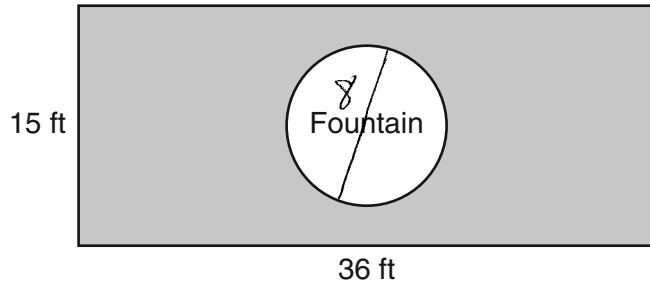
Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$$339 \cdot 8.95 = \$3034.05$$

Score: 2 The student made a conceptual error by using 8, the diameter, for the radius.

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.

15 ft

Fountain

36 ft

Find the area, to the *nearest square foot*, that must be paved.

36×15
540
5

$4^2\pi$
50.3

540
$- \ 50.3$
490.3
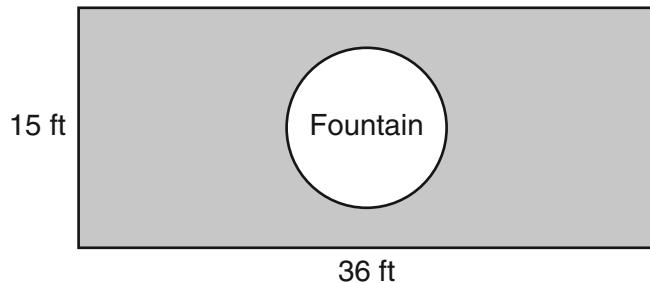
Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

490.3×8.95

4388.185

$\$ 4388.19$

Score: 2   The student made a rounding error and a computational error.

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.

15 ft

8

Fountain

36 ft

Find the area, to the *nearest square foot*, that must be paved.

$$A = \ell \cdot w$$
$$A = 36 ft \cdot 15 ft$$
$$\boxed{A = 540}$$

$$A = 5.15$$
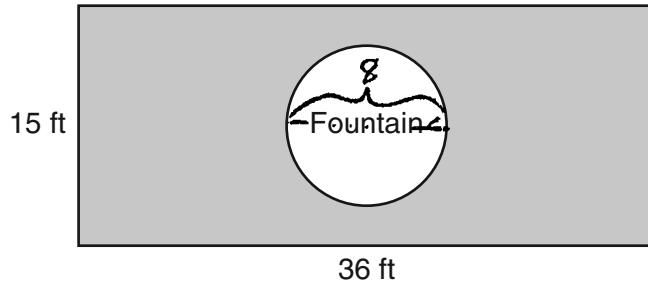
$$A = \frac{\pi r^2}{2} \quad A = \frac{\pi (4)^2}{2} \quad A = \left(\frac{16\pi}{2}\right) A = 8\pi = \boxed{25}$$

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$$\begin{array}{r} .515 \\ \times\ 8.95 \\ \hline \boxed{\$ 4609} \end{array}$$

Score: 1 The student made a conceptual error by using the wrong formula for the area of a circle. The student rounded the cost to the nearest dollar.

37 The Rock Solid Concrete Company has been asked to pave a rectangular area surrounding a circular fountain with a diameter of 8 feet, as shown in the diagram.

15 ft

Fountain

36 ft
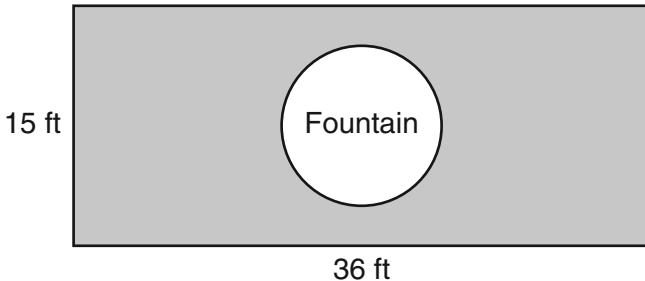
Find the area, to the *nearest square foot*, that must be paved.

$$\text{Area shaded} = A\square - A\bigcirc$$
$$= 36 \times 15 - \frac{\pi r^2}{2}$$
$$= 540 - \frac{\pi (4)^2}{2}$$
$$\text{Area shaded} = 540 - 8\pi$$
$$= 540 - 8(3.14)$$
$$= 540 - 25.12$$
$$\doteq 514.88$$

Nearest square foot = (514.90)

Find the cost, *in dollars*, of paving the area if the Rock Solid Concrete Company charges $8.95 per square foot.

$$36 \times 15 = 540$$
$$540 \times 8.95 = 4833$$

Answer: $4,833.00

Score: 0 The student used an incorrect formula to find the area of the circle, and did not round to the nearest square foot. The student used the area of the rectangle to find the cost.

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$$x - 5 = x^2 + 5x - 17$$
$$0 = x^2 + 4x - 12$$
$$0 = (x+6)(x-2)$$
$$x = -6$$
$$x = 2$$

$$y = x - 5$$
$$y = -6 - 5 = -11$$
$$(-6, -11)$$

$$y = 2 - 5 = -3$$
$$(2, -3)$$

$$(2, -3) \text{ and } (-6, -11)$$

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

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$$x - 5 = x^2 + 5x - 17$$
$$\underline{-x} \qquad \underline{-x}$$
$$-5 = x^2 + 4x - 17$$
$$\underline{+5} \qquad \underline{+5}$$
$$0 = x^2 + 4x - 12$$

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

$$x = 1$$
$$b = 4$$
$$c = -12$$

$$x = \frac{-4 \pm \sqrt{(4)^2 - 4(1)(-12)}}{2(1)}$$

$$x = \frac{-4 \pm \sqrt{16 + 48}}{2}$$

$$x = \frac{-4 \pm \sqrt{64}}{2}$$

$$x = \frac{-4 \pm 8}{2}$$

$$x = \frac{4}{2} = 2 \qquad\qquad x = \frac{-12}{2} = -6$$

$$y = x - 5 \qquad\qquad y = x - 5$$
$$y = 2 - 5 \qquad\qquad y = -6 - 5$$
$$y = -3 \qquad\qquad y = -11$$

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

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$$x^2 + 5x - 17 = x - 5$$
$$-x \qquad\qquad +17$$

$$x^2 + 4x = 12$$

$$x^2 + 4y + 4 = 12 + 4$$

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

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

$$x + 2 = \sqrt{16} = \pm 4$$

$$y = x - 5$$

$$x = 4 - 2 = 2 \qquad y = 2 - 5 = -3$$

$$x = -4 - 2 = -6 \qquad y = -6 - 5 = -11$$

$$(2, -3) \quad \text{and} \quad (-6, -11)$$

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

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$$x - 5 = x^2 + 5x - 17$$
$$-x + 5 \qquad -x \qquad +5$$
$$0 = x^2 + 4x - 12$$
$$0 = (x + 6)(x - 2)$$
$$x = -6 \qquad x = 2$$

Score: 3 The student showed correct work, but only found the correct values of x.

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$$x^2 + 5x - 17 = x - 5$$

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

$$(x + 6)(x - 2) = 0$$

$$x = -6$$

$$x = 2$$

$$y = x + 5$$
$$y = -6 + 5 = -1$$
$$y = 2 + 5 = 7$$

So $x = -6$, $y = -1$
or
$x = 2$, $y = 7$

Score: 3   The student found correct values of x, but used an incorrect equation to find the values of y.

---

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$$x - 5 = x^2 + 5x - 17$$
$$-x \quad -5$$

$$0 = x^2 + 4x - 21$$

$$0 = (x+7)(x-3)$$

$x = -7$	$x = 3$
$y = x - 5$	$y = 3 - 5$
$-7 - 5$	-2
-12	

$$\left(-\frac{7}{7}, -12\right) \qquad (3, -2)$$

Score: 2   The student added -5 instead of $+5$ to both sides, and added -17 and -5 incorrectly.

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$(2, -3)$ $(-6, -11)$

I used my calculator.

X	Y_1	Y_2
−6	−11	−11
2	−3	−3

Score: 2   The student used a method other than algebraic.

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$(2, -3)$ $(-6, -11)$

Score: 1   The student wrote correct points, but showed no work.

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$$x - 5 = x^2 + 5x - 17$$
$$+ 5$$
$$- x$$
$$x^2 - x - 12 = 0$$
$$(x + 3)(x - 4) = 0$$
$$x = -3$$
$$x = -4$$

Score: 1   The student wrote $x^2 + 5x - 17 = x - 5$, but showed no further correct work.

38 Solve the following system of equations algebraically:

$$y = x^2 + 5x - 17$$
$$y = x - 5$$

$$\chi = -6$$

Score: 0   The student showed only one correct value of x, but showed no further correct work.

39 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2+xy}\right) \cdot \left(\frac{(x+y)^2}{2x}\right) \div \left(\frac{x^2-y^2}{5y^2}\right)$$

$$\frac{\overset{5}{\cancel{10}}\overset{1}{\cancel{x}}^{\cancel{2}}y}{\cancel{x}\,(\cancel{x+y})} \cdot \frac{(x+y)\overset{1}{\cancel{(x+y)}}}{\cancel{2}x} \cdot \frac{5y^2}{(x-y)\cancel{(x+y)}}$$

$$\frac{5 \cdot 1 \cdot y \cdot 1 \cdot 5 \cdot y^2}{1 \cdot 1 \cdot (x-y)} = \frac{25y^3}{(x-y)}$$

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

39 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2 + xy}\right) \cdot \left(\frac{(x + y)^2}{2x}\right) \div \left(\frac{x^2 - y^2}{5y^2}\right)$$

$$\frac{\overset{5 \cdot 1 \cdot 1}{\cancel{10x^2 y}} \cdot \overset{1 \cdot 1}{(x+y)(x+y)} \cdot 5y^{\cancel{2}}}{\cancel{x}(x+y) \cdot \cancel{2x} \cdot (x-y)(x+y)} = \frac{25y}{x-y}$$

$$\underset{1 \cdot 1}{\quad} \quad \underset{1 \cdot 1}{\quad} \underset{(x+y) \cdot 1}{\quad}$$

Score: 3   The student made a simplification error in the numerator.

Question 39

39 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2+xy}\right) \bullet \left(\frac{(x+y)^2}{2x}\right) \div \left(\frac{x^2-y^2}{5y^2}\right)$$

$$\frac{\cancel{10}^1 \cdot \overset{1 \cdot y}{\cancel{x}} \cancel{y}}{\cancel{x}(x+y)} \bullet \frac{(x+y)^{\cancel{2}} \overset{(x+y)}{}}{\cancel{2x}} \bullet \frac{\overset{x^2-y^2}{x^2-y^2}}{\cancel{5} \cdot y^{\cancel{2}}} = \frac{(x+y) \cdot (x^2-y^2)}{\cancel{y}}$$

Score: 2   The student made one conceptual error by not multiplying by the reciprical.

39 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2+xy}\right)\bullet\left(\frac{(x+y)^2}{2x}\right)\div\left(\frac{x^2-y^2}{5y^2}\right)$$

$$\frac{\cancel{10}\cancel{x}^{\,2}\cancel{y}}{\cancel{x}(\cancel{x+y})}\bullet\frac{(x+y)(x+y)}{\cancel{2x}}\bullet\frac{(x-y)(x+y)}{\cancel{5y^2}}=\frac{x-y}{y}$$

Score: 1   The student made one conceptual error (didn't multiply by the recriprocal) and one simplification error in the numerator.

39 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2 + xy}\right) \cdot \left(\frac{(x + y)^2}{2x}\right) \div \left(\frac{x^2 - y^2}{5y^2}\right)$$

X

$$\frac{5xy}{x} \cdot (x+y) \cdot \frac{x^2 - 1}{1} = y(x+y)(x^2 - 1)$$

1

Score: 0 The student has a completely incorrect response.

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

Regents Examination in Integrated Algebra – January 2015

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

Raw Score	Scale Score	Raw Score	Scale Score	Raw Score	Scale Score	Raw Score	Scale Score
87	100	65	85	43	76	21	53
86	99	64	84	42	75	20	51
85	97	63	84	41	74	19	49
84	96	62	83	40	74	18	48
83	95	61	83	39	73	17	46
82	94	60	83	38	72	16	44
81	93	59	82	37	72	15	42
80	93	58	82	36	71	14	40
79	92	57	82	35	70	13	38
78	91	56	81	34	69	12	36
77	91	55	81	33	68	11	33
76	90	54	81	32	67	10	31
75	89	53	80	31	66	9	28
74	89	52	80	30	65	8	26
73	88	51	80	29	64	7	23
72	88	50	79	28	62	6	20
71	87	49	79	27	61	5	17
70	87	48	78	26	60	4	14
69	86	47	78	25	59	3	11
68	86	46	77	24	57	2	8
67	86	45	77	23	56	1	4
66	86	44	76	22	54	0	0

To determine the student's final examination 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 Integrated Algebra.