The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

INTEGRATED ALGEBRA

Tuesday, January 22, 2013 — 9:15 a.m. to 12:15 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. Record your answers on your separate answer sheet. [60]

Use this space for computations.

1 The number of hours spent on math homework during one week and the math exam grades for eleven students in Ms. Smith's algebra class are plotted below.

Ms. Smith's Class

Based on the plotted data, what is the correlation between the time spent on homework and the exam grade?

(1) positive

(3) no correlation

(2) negative

(4) cannot be determined

2 A car uses one gallon of gasoline for every 20 miles it travels. If a gallon of gasoline costs $3.98, how much will the gas cost, to the *nearest dollar,* to travel 180 miles?

(1) 9

(3) 45

(2) 36

(4) 80

3 If Angelina's weekly allowance is d dollars, which expression represents her allowance, in dollars, for x weeks?

(1) dx (3) $x + 7d$

(2) $7dx$ (4) $\dfrac{d}{x}$

4 What is the solution of the system of equations shown in the graph below?
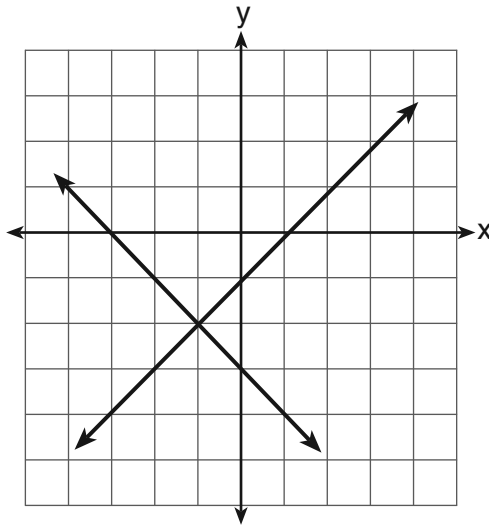
(1) $(1,0)$ and $(-3,0)$ (3) $(-1,-2)$
(2) $(0,-3)$ and $(0,-1)$ (4) $(-2,-1)$

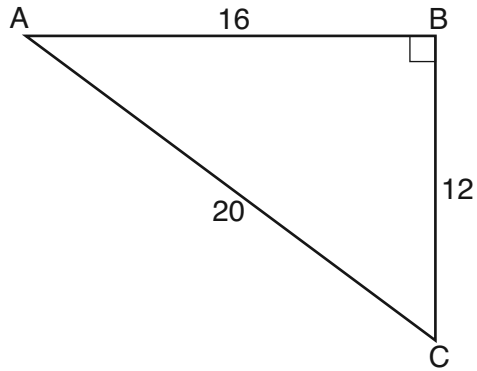**5** The solution of the equation $5 - 2x = -4x - 7$ is

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

6 The expression $100n^2 - 1$ is equivalent to

(1) $(10n + 1)(10n - 1)$ (3) $(50n + 1)(50n - 1)$

(2) $(10n - 1)(10n - 1)$ (4) $(50n - 1)(50n - 1)$

7 In right triangle ABC shown below, what is the value of $\cos A$?

(1) $\dfrac{12}{20}$ (3) $\dfrac{20}{12}$

(2) $\dfrac{16}{20}$ (4) $\dfrac{20}{16}$

8 A bag contains five green gumdrops and six red gumdrops. If Kim pulls a green gumdrop out of the bag and eats it, what is the probability that the next gumdrop she pulls out will be red?

(1) $\dfrac{5}{11}$ (3) $\dfrac{6}{11}$

(2) $\dfrac{5}{10}$ (4) $\dfrac{6}{10}$

9 Which graph represents a function?
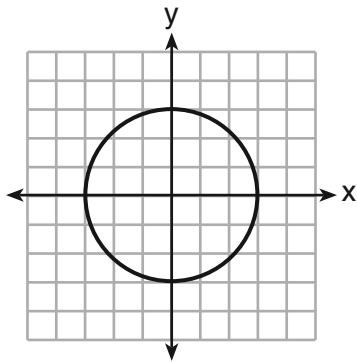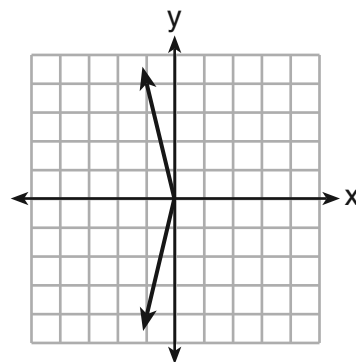

(1)
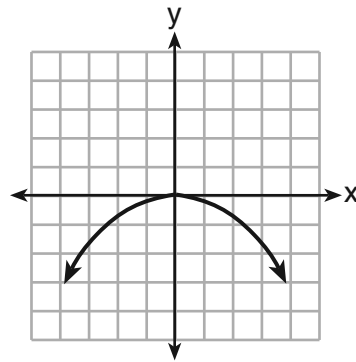
(3)
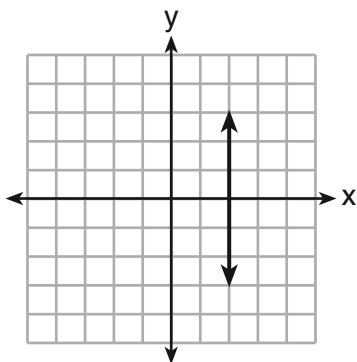
(2)

(4)

10 The current population of a town is 10,000. If the population, P, increases by 20% each year, which equation could be used to find the population after t years?

(1) $P = 10,000(0.2)^t$

(3) $P = 10,000(1.2)^t$

(2) $P = 10,000(0.8)^t$

(4) $P = 10,000(1.8)^t$

11 Which verbal expression is represented by $2(x + 4)$?

   (1) twice the sum of a number and four

   (2) the sum of two times a number and four

   (3) two times the difference of a number and four

   (4) twice the product of a number and four

12 How many cubes with 5-inch sides will completely fill a cube that is 10 inches on a side?

   (1) 50   (3) 8

   (2) 25   (4) 4

13 A school newspaper will survey students about the quality of the school's lunch program. Which method will create the *least* biased results?

   (1) Twenty-five vegetarians are randomly surveyed.

   (2) Twenty-five students are randomly chosen from each grade level.

   (3) Students who dislike the school's lunch program are chosen to complete the survey.

   (4) A booth is set up in the cafeteria for the students to voluntarily complete the survey.

14 The vertex of the parabola $y = x^2 + 8x + 10$ lies in Quadrant

   (1) I   (3) III

   (2) II   (4) IV

15 In the figure below, $ABCD$ is a square and semicircle O has a radius of 6.
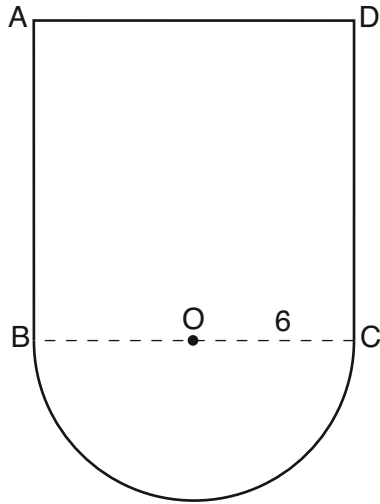
What is the area of the figure?

(1) $36 + 6\pi$ (3) $144 + 18\pi$

(2) $36 + 18\pi$ (4) $144 + 36\pi$

16 What is $24x^2y^6 - 16x^6y^2 + 4xy^2$ divided by $4xy^2$?

(1) $6xy^4 - 4x^5$ (3) $6x^2y^3 - 4x^6y$

(2) $6xy^4 - 4x^5 + 1$ (4) $6x^2y^3 - 4x^6y + 1$

17 Which expression can be used to change 75 kilometers per hour to meters per minute?

(1) $\dfrac{75\,\text{km}}{1\,\text{hr}} \times \dfrac{1\,\text{km}}{1{,}000\,\text{m}} \times \dfrac{1\,\text{hr}}{60\,\text{min}}$

(2) $\dfrac{75\,\text{km}}{1\,\text{hr}} \times \dfrac{1\,\text{km}}{1{,}000\,\text{m}} \times \dfrac{60\,\text{min}}{1\,\text{hr}}$

(3) $\dfrac{75\,\text{km}}{1\,\text{hr}} \times \dfrac{1{,}000\,\text{m}}{1\,\text{km}} \times \dfrac{1\,\text{hr}}{60\,\text{min}}$

(4) $\dfrac{75\,\text{km}}{1\,\text{hr}} \times \dfrac{1{,}000\,\text{m}}{1\,\text{km}} \times \dfrac{60\,\text{min}}{1\,\text{hr}}$

18 The inequality $-2 \le x \le 3$ can be written as

(1) $(-2, 3)$ (3) $(-2, 3]$

(2) $[-2, 3)$ (4) $[-2, 3]$

19 The expression $\dfrac{6 \times 10^{-7}}{3 \times 10^{-3}}$ is equivalent to

(1) 2×10^4 (3) 2×10^{-4}

(2) 2×10^{10} (4) 2×10^{-10}

20 The roots of the equation $x^2 - 14x + 48 = 0$ are

(1) -6 and -8 (3) 6 and -8

(2) -6 and 8 (4) 6 and 8

21 If $x = -3$, what is the value of $|x - 4| - x^2$?

(1) -8 (3) 7

(2) -2 (4) 16

22 Which equation represents a line parallel to the line whose equation is $2x - 3y = 9$?

(1) $y = \dfrac{2}{3}x - 4$ (3) $y = \dfrac{3}{2}x - 4$

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

23 Which ordered pair is in the solution set of the system of inequalities $y \leq 3x + 1$ and $x - y > 1$?

(1) $(-1,-2)$ (3) $(1,2)$

(2) $(2,-1)$ (4) $(-1,2)$

24 Which equation represents the line that passes through the point $(-3,4)$ and is parallel to the x-axis?

(1) $x = 4$ (3) $y = 4$

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

25 A cube with faces numbered 1 through 6 is rolled 75 times, and the results are given in the table below.

Number	Frequency
1	7
2	22
3	14
4	6
5	20
6	6

Based on these results, which statement is true?

(1) $P(\text{odd}) < P(\text{even})$ (3) $P(\text{even}) < P(2 \text{ or } 4)$

(2) $P(3 \text{ or less}) < P(\text{odd})$ (4) $P(2 \text{ or } 4) < P(3 \text{ or less})$

26 Given:

A = {perfect square integers from 4 to 100, inclusive}
B = {16, 36, 49, 64}

The complement of set B in the universal set A is

(1) {9, 25, 81}   (3) {1, 4, 9, 25, 81, 100}

(2) {4, 9, 25, 81, 100}   (4) {4, 16, 36, 49, 64, 100}

27 The expression $\dfrac{2x^2 + 10x - 28}{4x + 28}$ is equivalent to

(1) $\dfrac{x - 2}{2}$　　　　　　　　(3) $\dfrac{x + 2}{2}$

(2) $x - 1$　　　　　　　　(4) $\dfrac{x + 5}{2}$

28 Which value of x is the solution of the equation $\dfrac{1}{7} + \dfrac{2x}{3} = \dfrac{15x - 3}{21}$?

(1) 6　　　　　　　　(3) $\dfrac{4}{13}$

(2) 0　　　　　　　　(4) $\dfrac{6}{29}$

29 Which statement is true about the data set 4, 5, 6, 6, 7, 9, 12?

(1) mean = mode　　　　　(3) mean < median

(2) mode = median　　　　(4) mode > mean

30 How is the graph of $y = x^2 + 4x + 3$ affected when the coefficient of x^2 is changed to a smaller positive number?

(1) The graph becomes wider, and the y-intercept changes.

(2) The graph becomes wider, and the y-intercept stays the same.

(3) The graph becomes narrower, and the y-intercept changes.

(4) The graph becomes narrower, and the y-intercept stays the same.

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 Express $4\sqrt{75}$ in simplest radical form.

32 Factor completely: $5x^3 - 20x^2 - 60x$

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.
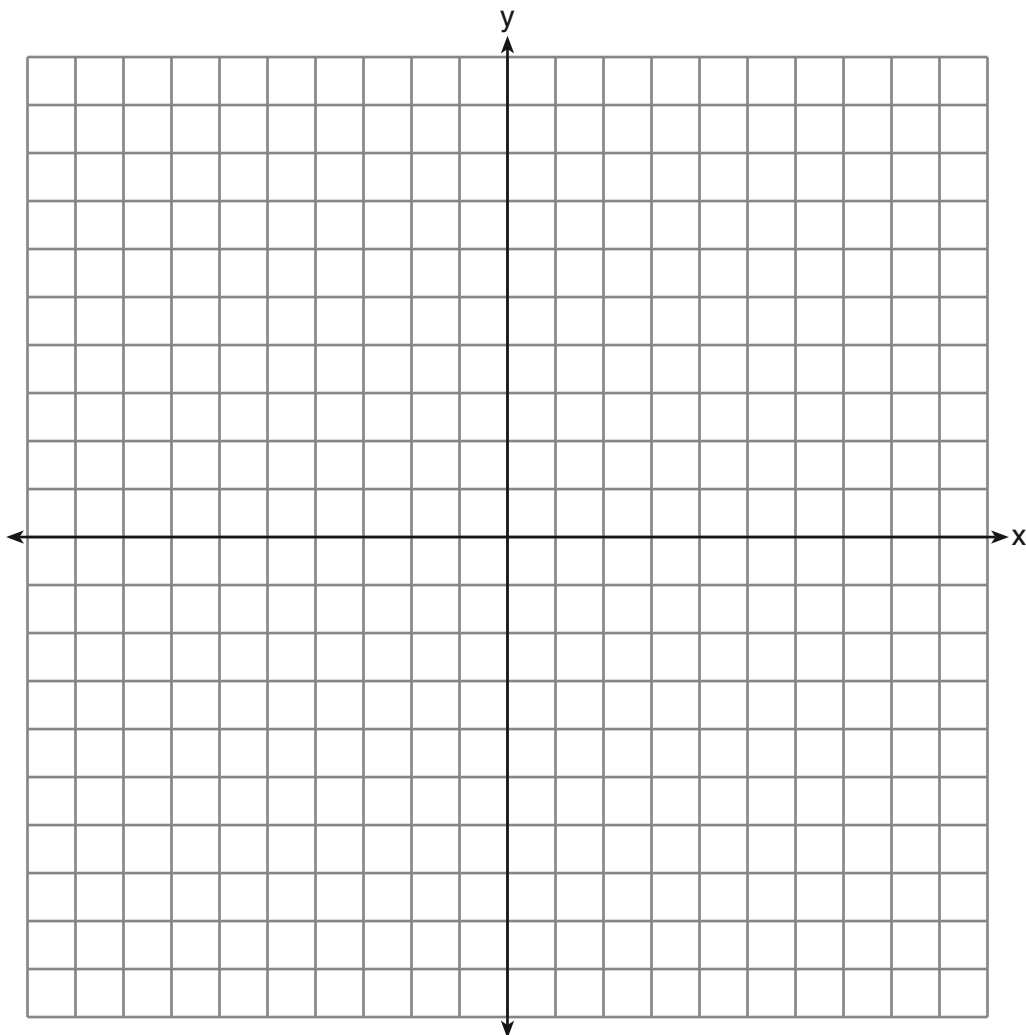
Part III

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 In a game, a player must spin each spinner shown in the diagram below once.
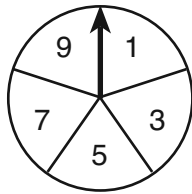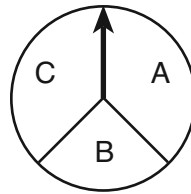
Spinner 1   **Spinner 2**

Draw a tree diagram or list a sample space showing all possible outcomes.

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

35 The cost of three notebooks and four pencils is $8.50. The cost of five notebooks and eight pencils is $14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

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 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10
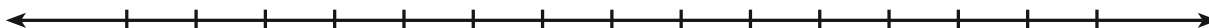
Determine the number of scores that lie above the 75th percentile.

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.
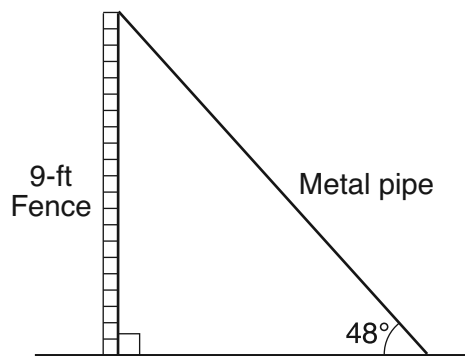
Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

Determine, to the *nearest foot*, the length of the metal pipe.

39 On the set of axes below, graph the following system of equations.

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

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.
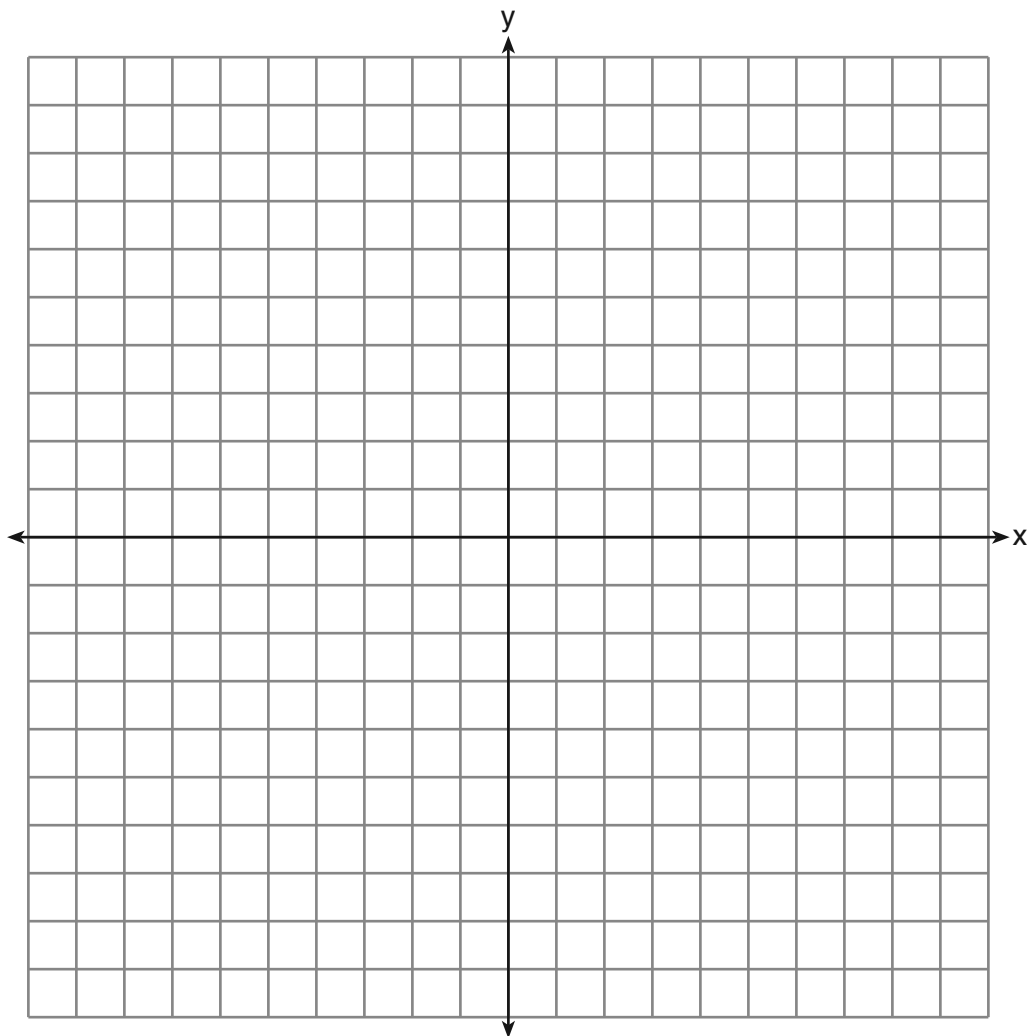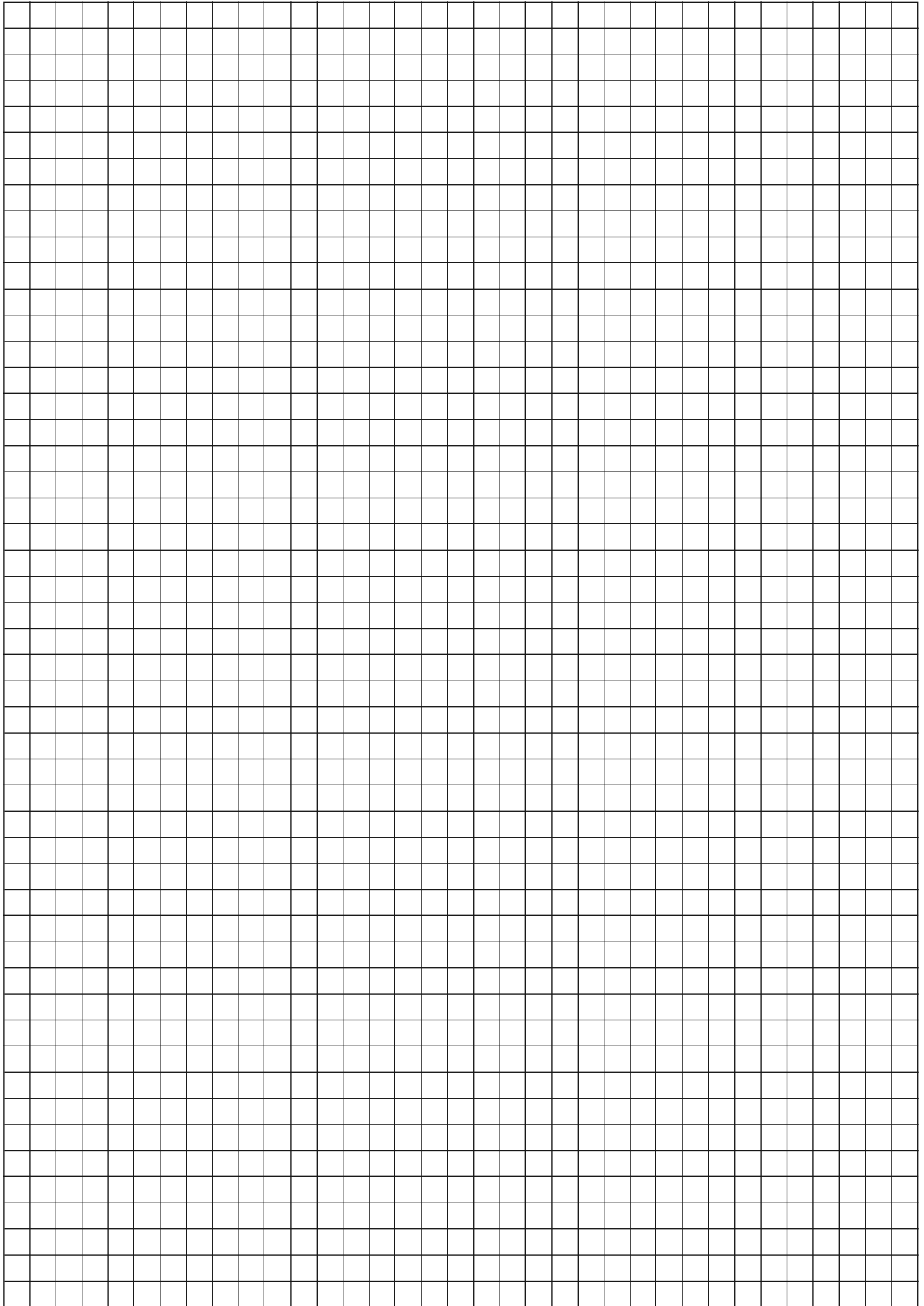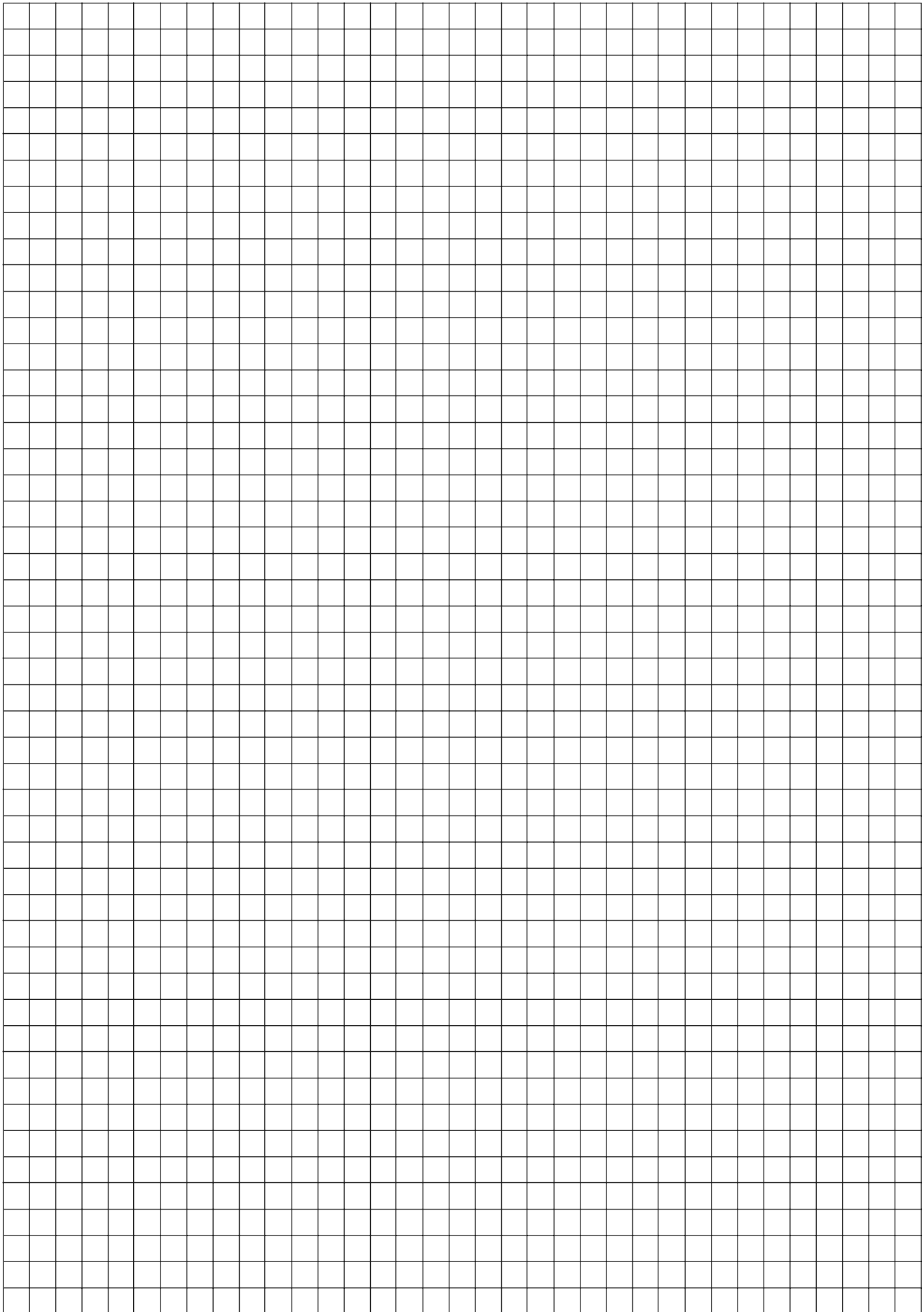
Reference Sheet

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

INTEGRATED ALGEBRA

Printed on Recycled Paper

INTEGRATED ALGEBRA

Tear Here

Tear Here

FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

INTEGRATED ALGEBRA

Tuesday, January 22, 2013 — 9:15 a.m. to 12:15 p.m., only

SCORING KEY AND RATING GUIDE

Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Regents Examination in 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. 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 22, 2013. 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) 1	(11) 1	(21) . . . . . 2 . . . . .
(2) 2	(12) 3	(22) . . . . . 1 . . . . .
(3) 1	(13) 2	(23) . . . . . 2 . . . . .
(4) 3	(14) 3	(24) . . . . . 3 . . . . .
(5) 4	(15) 3	(25) . . . . . 4 . . . . .
(6) 1	(16) 2	(26) . . . . . 2 . . . . .
(7) 2	(17) 3	(27) . . . . . 1 . . . . .
(8) 4	(18) 4	(28) . . . . . 1 . . . . .
(9) 3	(19) 3	(29) . . . . . 2 . . . . .
(10) 3	(20) 4	(30) . . . . . 2 . . . . .

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.p12.nysed.gov/assessment/scoring/home-hs.html.

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]** $20\sqrt{3}$, and appropriate work is shown.

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

or

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

or

[1] Appropriate work is shown to find $20\sqrt{3}$, but the answer is written in decimal form.

or

[1] $20\sqrt{3}$, but no work is shown.

[0] The answer is written in decimal form, 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.

(32) **[2]** $5x(x + 2)(x - 6)$, and appropriate work is shown.

[1] $5x(x^2 - 4x - 12)$, but no further correct answer is shown.

or

[1] Appropriate work is shown, but one computational or factoring error is made, but all appropriate factors are stated.

or

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

or

[1] $5x(x + 2)(x - 6)$, 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.

(33)   **[2]** A correct graph is drawn that includes the given interval.

[1] Appropriate work is shown, but one graphing error is made, but an appropriate graph is drawn that includes the given interval.

or

[1] Appropriate work is shown, but one conceptual error is made, but an appropriate graph is drawn, that includes the given interval.

or

[1] Appropriate work is shown, but a graph is drawn that does not include the entire given interval.

[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]** A correct tree diagram or sample space is shown and 6 is stated.

   [2] A correct tree diagram or sample space is shown, but no further correct work is shown.

or

   [2] An understanding of the concept of a tree diagram or sample space is shown, but some branches or elements are missing, but an appropriate number of outcomes is stated.

   [1] An understanding of the concept of a tree diagram or sample space is shown, but some branches or elements are missing, but an appropriate number of outcomes is not stated.

or

   [1] Appropriate work is shown to find 6, but no tree diagram or sample space is shown.

   [0] 6, but no correct work is shown.

or

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

(35)   **[3]** One notebook = \$2.50 or 2.50 and one pencil = \$0.25 or 25 cents, and appropriate algebraic work is shown.

[2] Appropriate work is shown, but one computational error is made, but the appropriate cost of one notebook and one pencil are found.

or

[2] Appropriate work is shown, but the correct answers are not labeled or are labeled incorrectly.

or

[2] Appropriate work is shown to find 2.50 and 0.25, but only the cost of one notebook or the cost of one pencil is found.

[1] Appropriate work is shown, but two or more computational errors are made, but the appropriate cost of one notebook and the appropriate cost of one pencil are found.

or

[1] Appropriate work is shown, but one conceptual error is made, but the appropriate cost of one notebook and the appropriate cost of one pencil are found.

or

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

or

[1] An incorrect system of equations is written, but appropriate solutions are found and labeled.

or

[1] One notebook = 2.50 and one pencil = 0.25 or 25 cents, but a method other than algebraic is used.

or

[1] One notebook = 2.50 and one pencil = 0.25 or 25 cents, but no work is shown.

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

(36) **[3]** 0.015, and appropriate work is shown.

[2] Appropriate work is shown, but one computational or rounding error is made, but an appropriate solution is found.

or

[2] $\dfrac{|341.22 - 336|}{341.22}$ or an equivalent expression is written, but the relative error is not found or is found incorrectly.

[1] Appropriate work is shown, but two or more computational or rounding errors are made, but an appropriate solution is found.

or

[1] Appropriate work is shown, but one conceptual error is made, such as dividing by 336, but an appropriate solution is found.

or

[1] Appropriate work is shown to find 336 and 341.22.

or

[1] 0.015, 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 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]** A box-and-whisker plot is constructed correctly, where the minimum = 10, first quartile = 20, second quartile = 30, third quartile = 41, and maximum = 65, and 3 is stated.

[3] A box-and-whisker plot is constructed, but one computational or graphing error is made, but an appropriate number is stated.

or

[3] A box-and-whisker plot is constructed correctly, but no further correct work is shown.

[2] A box-and-whisker plot is constructed, but two or more computational or graphing errors are made, but an appropriate number is stated.

or

[2] A box-and-whisker plot is constructed, but one conceptual error is made and an appropriate number is stated.

or

[2] Minimum = 10, first quartile = 20, second quartile = 30, third quartile = 41, and maximum = 65 are found and 3 is stated, but no box-and-whisker plot is constructed.

[1] A box-and-whisker plot is constructed, but two or more computational or graphing errors are made, but an appropriate number is not stated.

or

[1] A box-and-whisker plot is constructed, but one conceptual error and one computational or graphing error are made but an appropriate number is stated.

or

[1] Minimum = 10, first quartile = 20, second quartile = 30, third quartile = 41, and maximum = 65 are found, but no further correct work is shown.

or

[1] Appropriate work is shown to find 3, but no box-and-whisker plot is constructed.

[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]** 8 and 12, and appropriate work is shown.

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

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

or

[2] Appropriate work is shown, but one conceptual error is made, such using an incorrect trigonometric function but appropriate answers are found.

or

[2] $\tan 48 = \dfrac{9}{x}$ and $\sin 48 = \dfrac{9}{y}$ or an alternate method are written, but no further correct work is shown.

or

[2] Appropriate work is shown to find either 8 or 12, but no further correct work is shown.

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

or

[1] $\tan 48 = \dfrac{9}{x}$ or $\sin 48 = \dfrac{9}{y}$ or an alternate method is written, but no further correct work is shown.

or

[1] 8 and 12, 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.

(39)   **[4]** Both equations are graphed correctly, and (0,4) and (3,7) are stated.

[3] Appropriate work is shown, but one computational or graphing error is made, but all appropriate solutions are stated.

or

[3] Both equations are graphed correctly, but only one solution is stated correctly.

[2] Appropriate work is shown, but two or more computational or graphing errors are made, but all appropriate solutions are stated.

or

[2] Appropriate work is shown, but one conceptual error is made, but all appropriate solutions are stated.

or

[2] Both equations are graphed correctly, but the solutions are not stated or are stated incorrectly.

or

[2] (0, 4) and (3, 7), but a method other than graphic is used.

[1] Appropriate work is shown, but one conceptual error and one computational or graphing error are made, but all appropriate solutions are stated.

or

[1] One of the equations is graphed correctly, but no further correct work is shown.

or

[1] (0,4) and (3,7) are 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.

Map to Core Curriculum

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

Regents Examination in Integrated Algebra

January 2013

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

The *Chart for Determining the Final Examination Score for the January 2013 Regents Examination in Integrated Algebra* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Tuesday, January 22, 2013. 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 22, 2013 — 9:15 a.m.

SAMPLE RESPONSE SET

Table of Contents

Revisions have been made to pages 5, 6, 26, 29, and 46.
Please print and replace these pages.

Thank you for your cooperation.

31 Express $4\sqrt{75}$ in simplest radical form.

$$4\sqrt{75}$$

$$4 \cdot \sqrt{25}\sqrt{3}$$

$$4 \cdot 5 \quad \sqrt{3}$$

$$\boxed{20\sqrt{3}}$$

Score: 2

The student has a complete and correct response.

The student shows a breakdown of $\sqrt{75}$ in this work.

31 Express $4\sqrt{75}$ in simplest radical form.

$$4\sqrt{25} \quad \sqrt{3}$$
$$20\sqrt{3}$$

Score: 2

The student has a complete and correct response.

It is not necessary for the student to show that $\sqrt{25} = 5$.

31 Express $4\sqrt{75}$ in simplest radical form.

$4 \cdot \sqrt{75}$

$\overset{\wedge}{25 \ \ 3}$

$\overset{\wedge}{5 \ \ 5}$

$4 \cdot 5 \ \sqrt{5} \ \sqrt{3}$

$20 \ \sqrt{15}$

Score: 1

The student makes one conceptual error by writing $\sqrt{25}$ as $5\sqrt{5}$.

31 Express $4\sqrt{75}$ in simplest radical form.

$$4\sqrt{75}$$

$$4 \quad \sqrt{3} \quad \sqrt{25}$$

$$5\sqrt{3}$$

$$\boxed{9\sqrt{3}}$$

Score: 1

The student makes one conceptual error by adding 4 and 5 instead of multiplying them.

31 Express $4\sqrt{75}$ in simplest radical form.

$$4 \cdot \sqrt{3}\sqrt{25}$$
$$4 \cdot 3\sqrt{25}$$
$$12\sqrt{25}$$
$$\boxed{12\sqrt{5}}$$

Score: 0

The student makes two conceptual errors by writing $\sqrt{3} = 3$ and $\sqrt{25} = \sqrt{5}$.

31 Express $4\sqrt{75}$ in simplest radical form.

$$4\sqrt{75} = 34.641$$

Score: 0

The student writes the answer as a decimal.

32 Factor completely: $5x^3 - 20x^2 - 60x$

$$x(5x^2 - 20x - 60)$$

$$5x(x^2 - 4x - 12)$$

$$5x(x - 6)(x + 2)$$

Score: 2

The student has a complete and correct response.

32 Factor completely: $5x^3 - 20x^2 - 60x$

$$X(5x^2 - 20x - 60)$$

$$5x(x^2 - 4x - 12)$$

$$\frac{-12}{-6 \diagup 2}$$

$$(x^2 + 2x - 6x - 12)$$

$$(x(x+2x) + 6(x+2))$$

$$5x(x-6)(x+2)$$

Score: 2

The student has a complete and correct response.

The student factors the trinomial by grouping.

32 Factor completely: $5x^3 - 20x^2 - 60x$

$$5x(x^2 - 4x - 12)$$

Score: 1

The student takes out the greatest common factor, but no further correct work is shown.

32 Factor completely: $5x^3 - 20x^2 - 60x$

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

Score: 1

The student takes out the greatest common factor correctly, but then attempts to solve for roots.

32 Factor completely: $5x^3 - 20x^2 - 60x$

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

$$5x\left(x^2 - 4x - 12\right)$$

$$5x\left(x - 4\right)\left(x + 3\right)$$

Score: 1

The student takes out greatest factor correctly, but then makes a factoring error.

32 Factor completely: $5x^3 - 20x^2 - 60x$

$$5x(\cancel{5}-4x-60) \qquad \begin{array}{c} -60 \\ 10 \ -6 \end{array}$$

$$5x\left(x+10x \,\middle|\, -6x-60\right)$$

$$5x\left((x+10)x \,\middle|\, -6(x+10)\right)$$

$$5x(x+10)(x-6)$$

Score: 0

The student makes an error in taking out the greatest common factor and makes an error in factoring the trinomial.

32 Factor completely: $5x^3 - 20x^2 - 60x$

$$25x - 60x$$
$$85x$$

Score: 0

No correct work is shown.
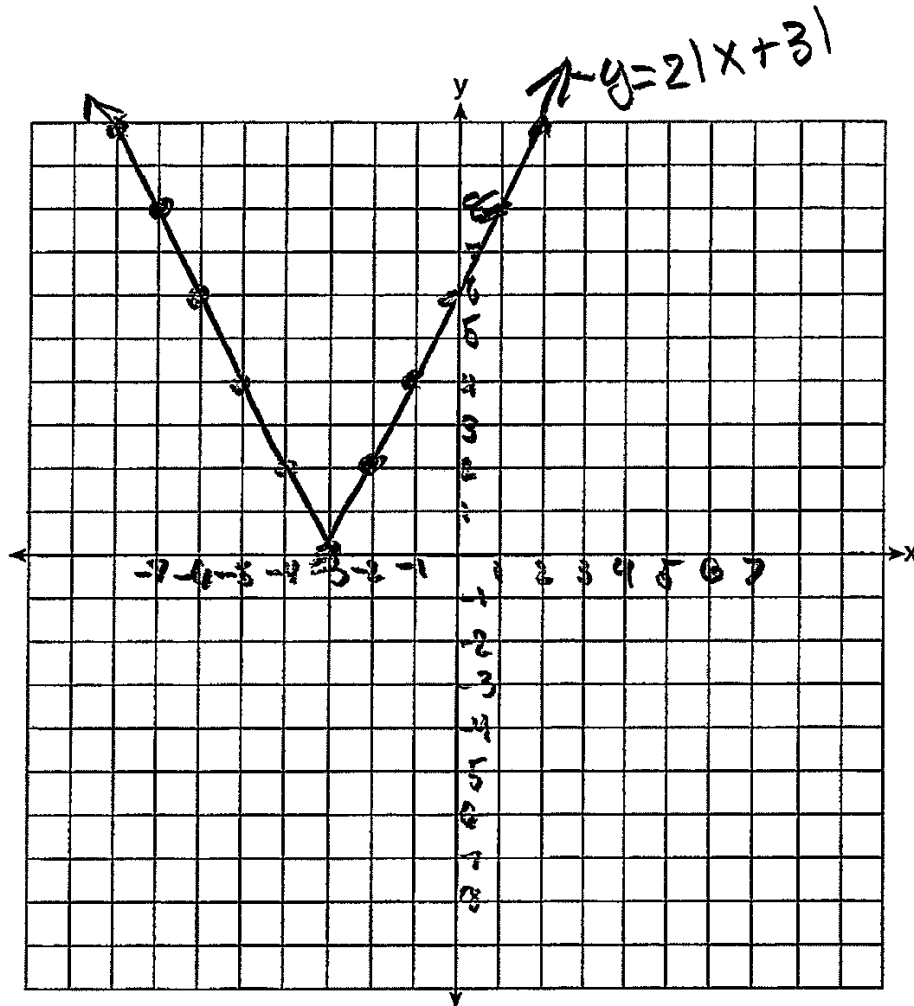
33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \le x \le 1$.

Score: 2

The student has a complete and correct response.

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \le x \le 1$.

X	Y
-7	8
-6	6
-5	4
-4	2
-3	0
-2	2
-1	4
0	6
1	8
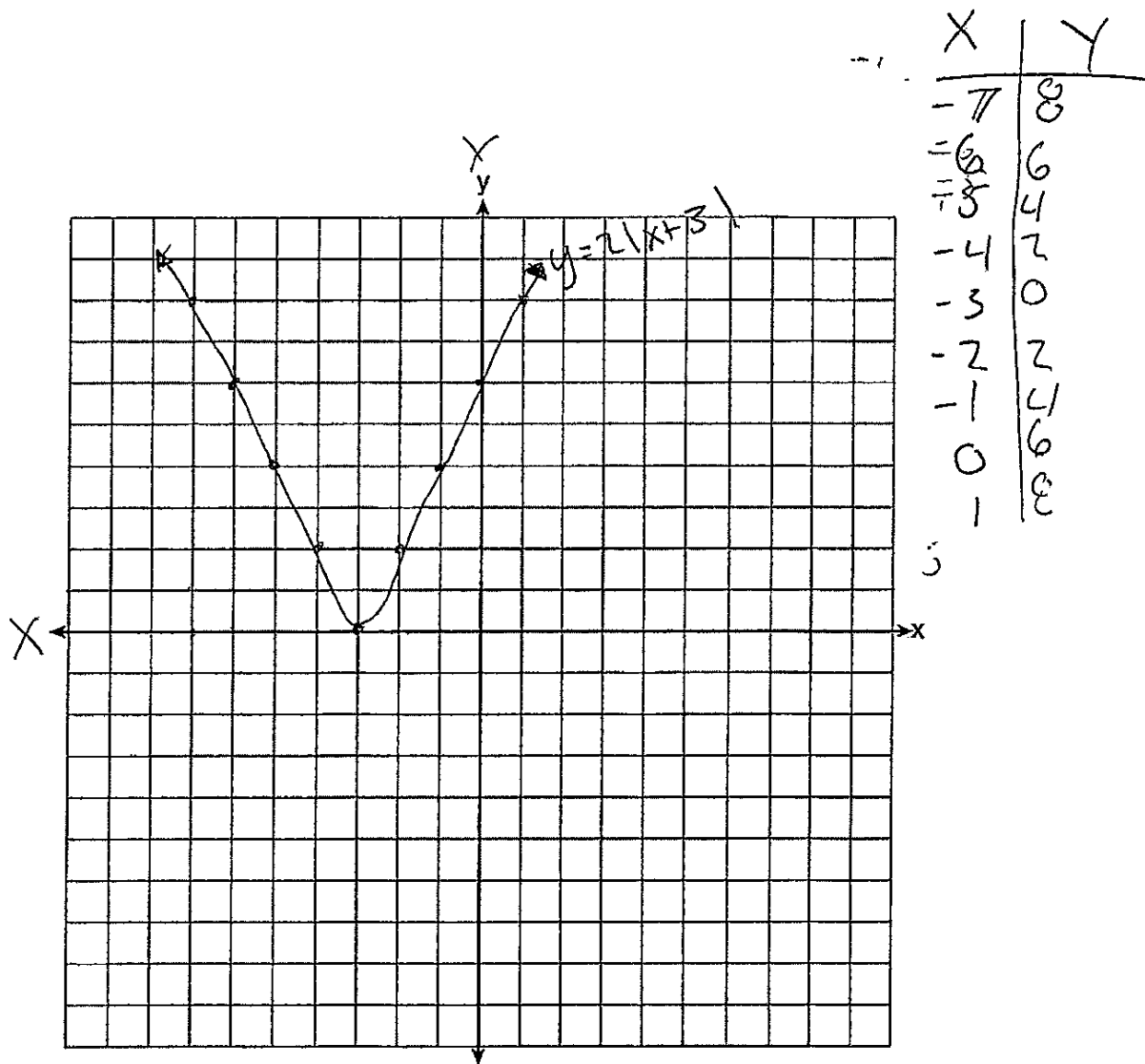
Score: 2

The student has a complete and correct response.

Since a table of values is given, it is not necessary to deduct credit for lines that are not straight.

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.

$-7 \leq x \leq 1$

-7 TO 1

$2|x+3|$

Y	X
20	$2|7+3|$
18	$2|6-3|$
16	$2|5+3|$
14	$2|4+3|$
12	$2|3+3|$
10	$2|2+3|$
8	$2|1+3|$
6	$2|0+3|$
8	$2|1+3|$
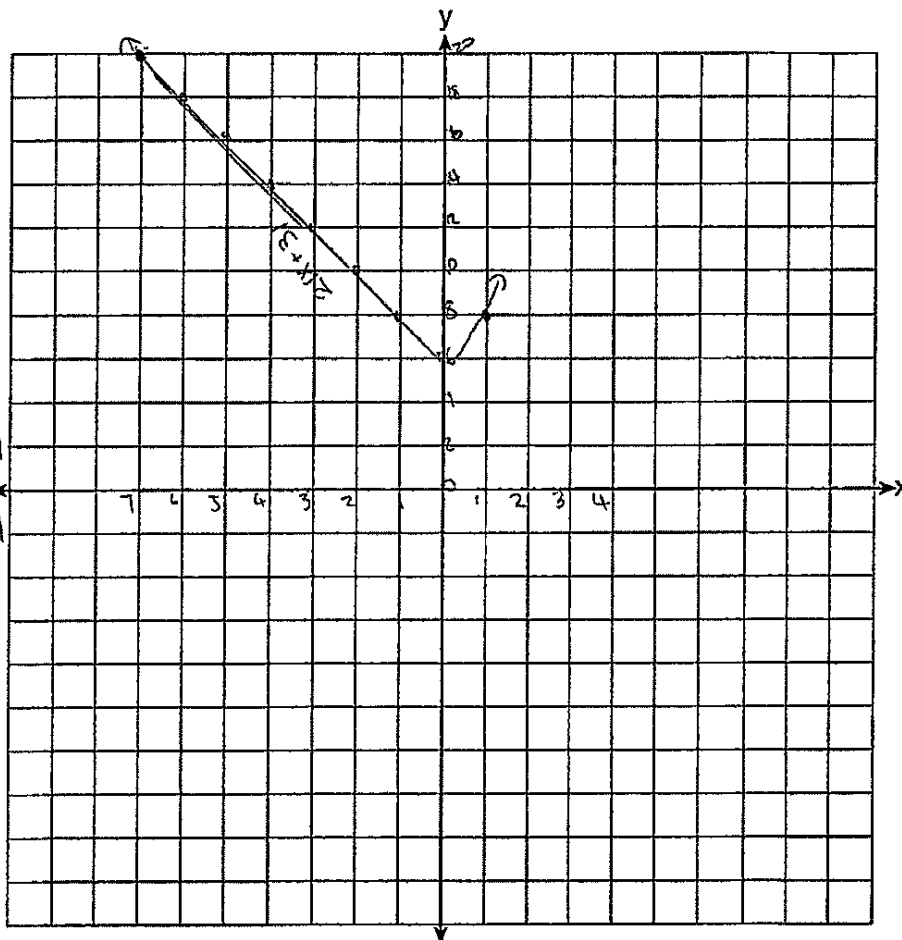
Score: 1

The student makes a conceptual error by taking the absolute value of each number in the absolute value symbol instead of combining them first.

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.

$y = 2x + 6$
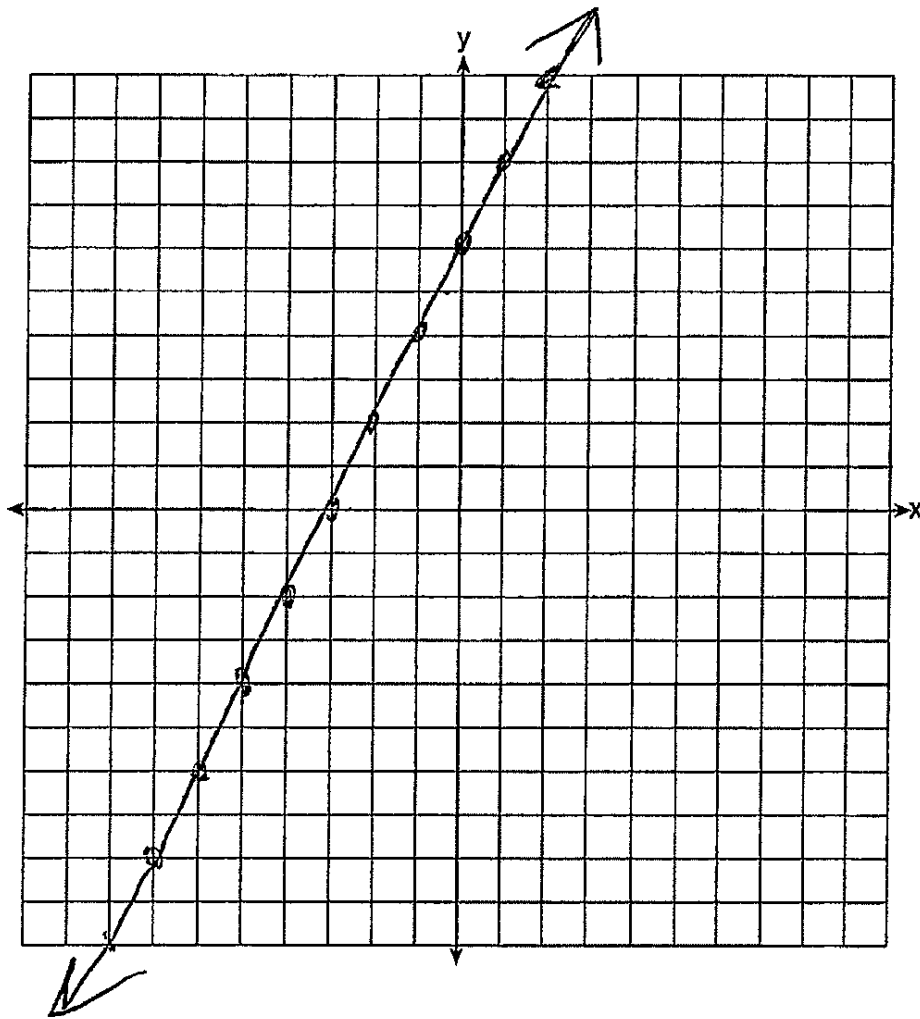
Score: 1

The student makes a conceptual error by treating the absolute value symbol as parentheses.

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.

$-2 -1\ 0\ 1\ 2$

$2|x+3|$

$2|1+3|(1,8)$

$2|0+3(0,2)$

$2|2+3(1,10)$

$2|-1+3(-1,4)$

$2|0+3(0,6)$
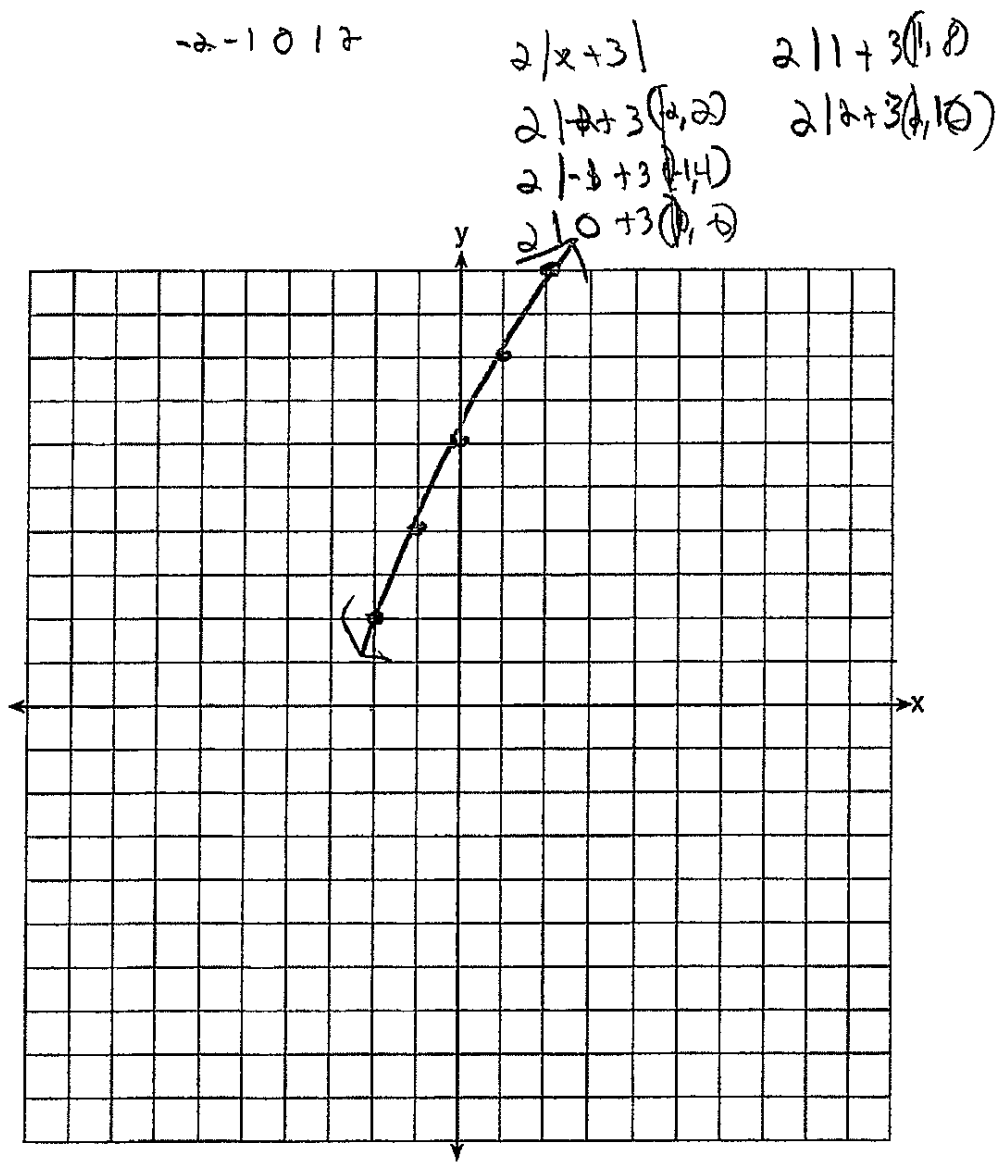
Score: 1

The student makes one conceptual error. The student uses an incorrect interval in the table, but calculates those points correctly.

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.
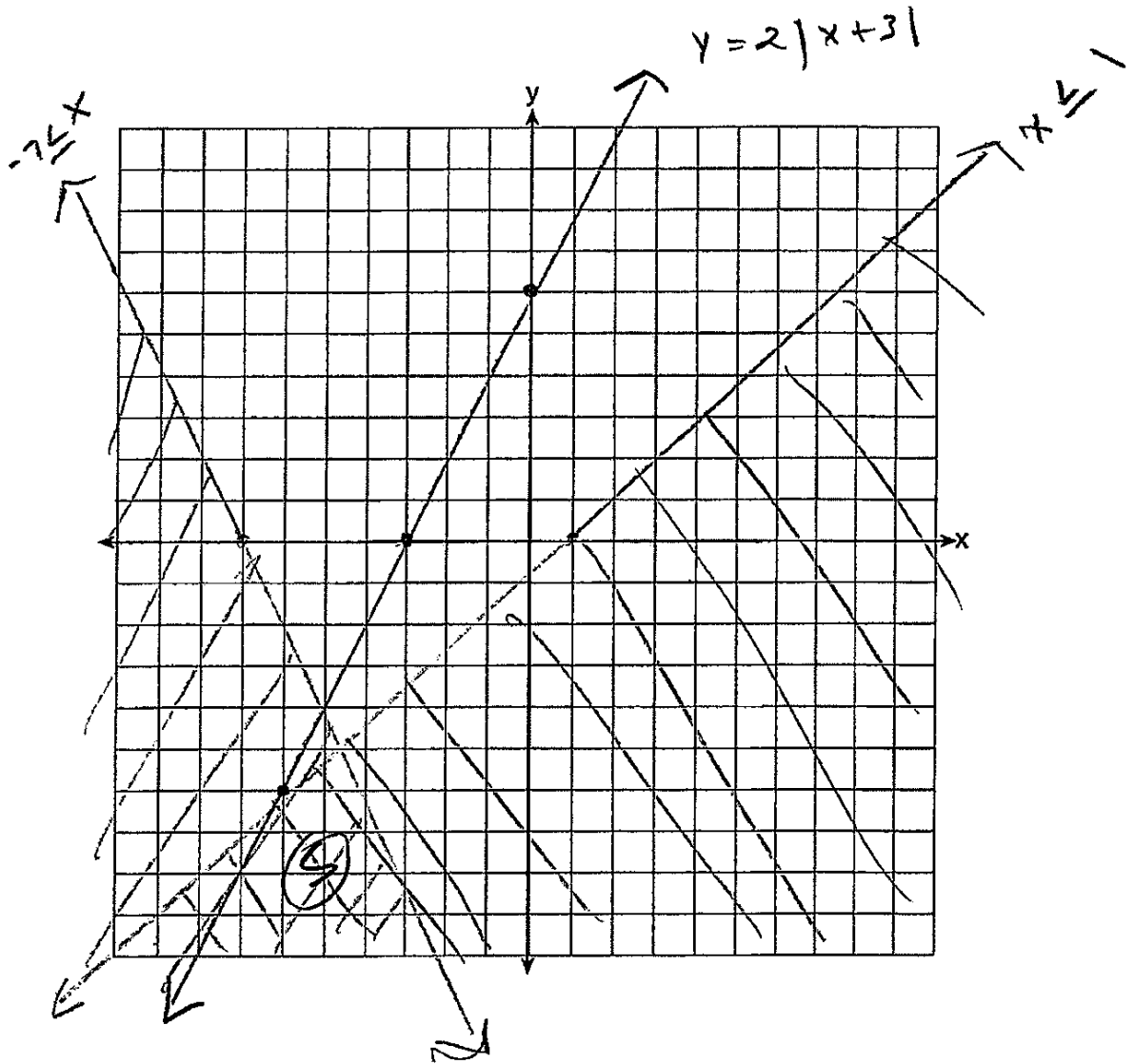
Score: 0

The student makes two conceptual errors.

34 In a game, a player must spin each spinner shown in the diagram below once.
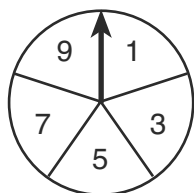
Spinner 1   **Spinner 2**

Draw a tree diagram or list a sample space showing all possible outcomes.

C,1   A,1   B,1   3.5 = 15 outcomes

C,3   A,3   B,3

C,5   A,5   B,5
C,7
C,9   A,7   B,7

         A,9   B,9

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

C or A   1

                    3   6

3,5,7

Score: 3

The student has a complete and correct response.

34 In a game, a player must spin each spinner shown in the diagram below once.
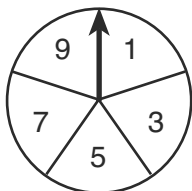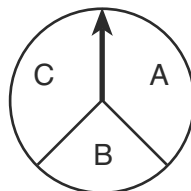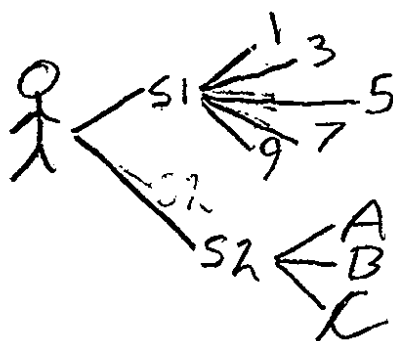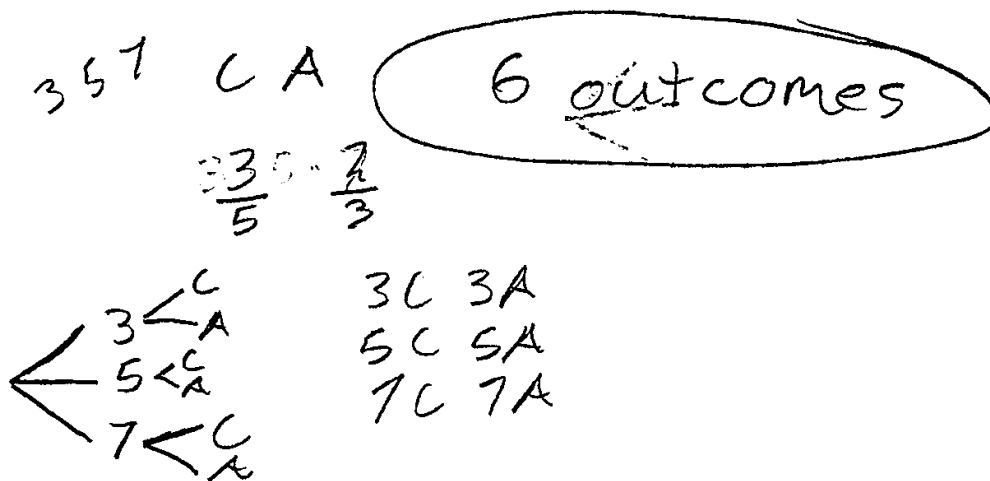

Spinner 1   **Spinner 2**

Draw a tree diagram or list a sample space showing all possible outcomes.
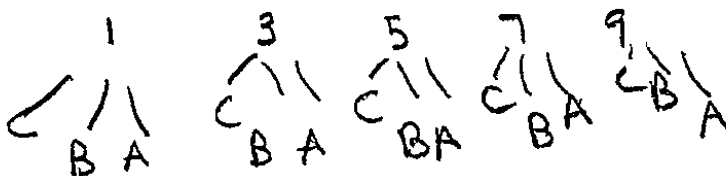
Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."
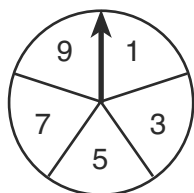

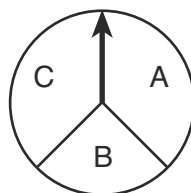6 outcomes

Score: 3

The student has a complete and correct response.

34 In a game, a player must spin each spinner shown in the diagram below once.

Spinner 1   **Spinner 2**

Draw a tree diagram or list a sample space showing all possible outcomes.

$$1 \begin{array}{l} -C \\ -B \\ \backslash A \end{array}$$

$$3 \begin{array}{l} -C \\ -B \\ \backslash A \end{array}$$

$$5 \begin{array}{l} -C \\ -B \\ \backslash A \end{array}$$

$$7 \begin{array}{l} -C \\ -B \\ \backslash A \end{array}$$

$$9 \begin{array}{l} -C \\ -B \\ \backslash A \end{array}$$

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

$$9$$

$$1 \begin{array}{l} -C \\ -B \\ A \end{array}$$

$$3 \begin{array}{l} -C \\ -B \\ \end{array}$$

$$5$$

$$7$$

$$\frac{8}{15} + \frac{4}{5}$$

$$9 \begin{array}{l} -C \\ A \\ \backslash B \end{array}$$
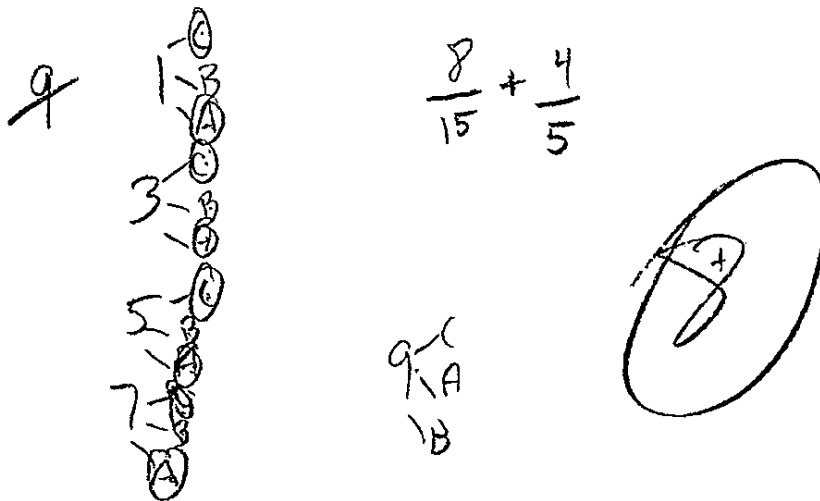
Score: 2

The student has a correct tree diagram, but the number of outcomes is incorrect.

34 In a game, a player must spin each spinner shown in the diagram below once.
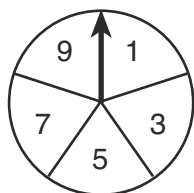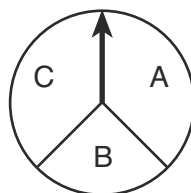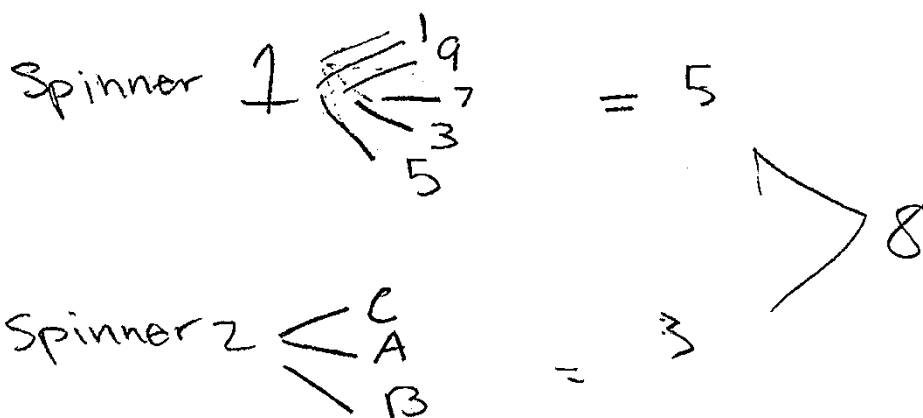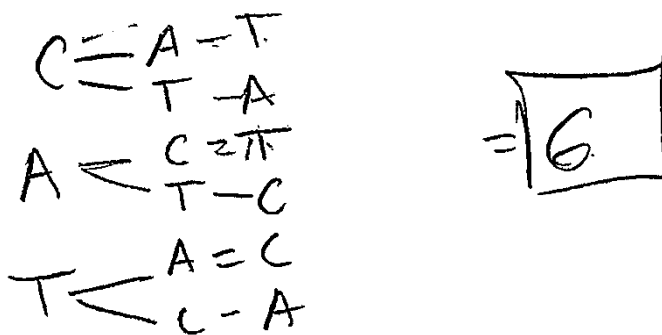

Spinner 1   **Spinner 2**

Draw a tree diagram or list a sample space showing all possible outcomes.
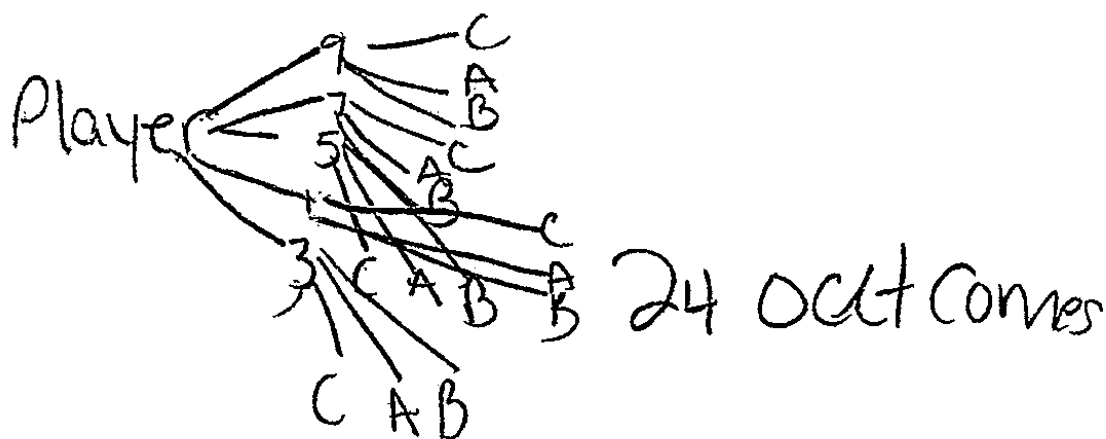
Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."
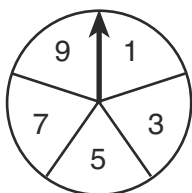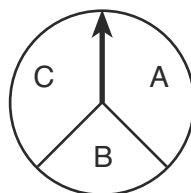
Score: 2

　　Although sloppy, the student's tree diagram is correct, but no further correct work is shown.

34 In a game, a player must spin each spinner shown in the diagram below once.
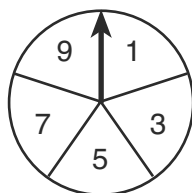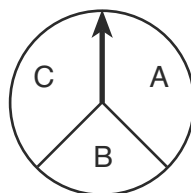
Spinner 1   **Spinner 2**

Draw a tree diagram or list a sample space showing all possible outcomes.

$(A, 1), (A, 3), (A, 5), (A, 7), (A, 9)$
$(B, 1), (B, 3), (B, 5), (B, 7), (B, 9)$
$(C, 1), (C, 3), (C, 5), (C, 7), (C, 9)$

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

Score: 2

　　The student has a correct sample space with no further correct work.

34 In a game, a player must spin each spinner shown in the diagram below once.
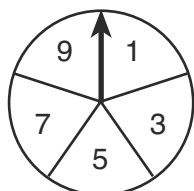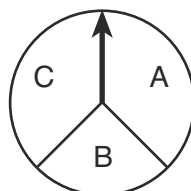
Spinner 1   **Spinner 2**

Draw a tree diagram or list a sample space showing all possible outcomes.

1. 1-A   Spinner 1
   1-B   1-3, 1-5, 1-7, 1-9
   1-C   3-1, 3-5, 3-7, 3-9
   3-A   5-1, 5-3, 5-7, 5-9
   3-B   7-1, 7-3, 7-5, 7-9
   3-C   9-1, 9-3, 9-5, 9-7
   3-A
   5-B
   5-
   7-
   7-B
   7-C

   Spinner 2
   A-B, A-C
   B-A, B-C
   C-A, C-B

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

Prime number - $\frac{3}{5}$

cat - $\frac{2}{3}$

Score: 1

The student has a partially correct sample space (9A, 9B, and 9C are missing), but no further correct work is shown.

34 In a game, a player must spin each spinner shown in the diagram below once.
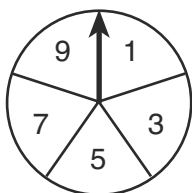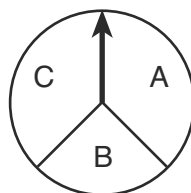
Spinner 1   **Spinner 2**

Draw a tree diagram or list a sample space showing all possible outcomes.

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

Score: 1

    The student shows appropriate work to find 6.

34 In a game, a player must spin each spinner shown in the diagram below once.

Spinner 1   **Spinner 2**

Draw a tree diagram or list a sample space showing all possible outcomes.

Spinner 1 — 9, 7, 3, 5 = 5

> 8

Spinner 2 — C, A, B = 3

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

C = A — T
    T — A

A = C = 2π
    T — C

T = A = C
    C — A

= 6

Score: 0

The student has an incorrect tree diagram and incorrect work to find 6.

34 In a game, a player must spin each spinner shown in the diagram below once.

Spinner 1   **Spinner 2**

Draw a tree diagram or list a sample space showing all possible outcomes.

Spinner 1:

1, 3, 5, 7, 9

15

Spinner 2

A, B, C

15

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

CAT

$\dfrac{2}{3}$

Score: 0

The student has no correct tree diagram and no correct work to find the answer.

35 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$n =$ notebook

$P =$ pencil

$3n + 4p = 8.50$ $3n + 4(.25) = 8.50$

$5n + 8p = 14.50$ $3n + 1 = 8.50$

$\dfrac{3n}{3} = \dfrac{7.50}{3}$

$15n + 20p = 42.50$ $\boxed{n = 2.50}$

$-15n - 24p = -43.50$

$-4p = -1$

$\boxed{P = .25}$

$P = .25$

$n = 2.50$

Score: 3

The student has a complete and correct response.

35 The cost of three notebooks and four pencils is $8.50. The cost of five notebooks and eight pencils is $14.50. Determine the cost of one notebook and the cost of one pencil.

$$3n + 4p = 8.50$$

$$5n + 8p = 14.50$$

[Only an algebraic solution can receive full credit.]

n = notebook
p = pencils

$$3n + 4p = 8.50$$
$$5n + 8p = 14.50$$

$$5(2.50) + 8(.25) = 14.50$$
$$12.5 + 2 = 14.50$$
$$14.50 = 14.50 \checkmark$$

$$-6n - 8p = -17$$
$$+ \quad 5n + 8p = 14.50$$
$$\frac{-1n}{-1} = \frac{-2.5}{-1}$$
$$n = 2.50$$

notebook = $2.50
pencil = $.25

$$3(2.5) + 4p = 8.50$$
$$7.5 + 4p = 8.50$$
$$-7.5 \qquad -7.5$$
$$\frac{4p}{4} = \frac{1}{4}$$
$$p = .25$$

Score: 3

   The student has a complete and correct response.

35 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$$2(\overset{-}{}\overset{5n+8p=14.50}{3n+4p=8.50})$$

$$6n+8p=17.00$$
$$-5n+8p=14.50$$
$$\overline{1n=2.50}$$
$$\frac{1}{1} \quad \frac{1}{1}$$

$$n=2.50$$

1 notebook costs 2.50

$$5n+8p=14.50$$
$$3n+4p=8.50$$

Score: 2

The student shows correct work to find only the cost of a notebook.

35 The cost of three notebooks and four pencils is $8.50. The cost of five notebooks and eight pencils is $14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$5\left(3n + 4p = \$8.50\right)$

$3\left(5n + 8p = 14.50\right)$ $.29$

$1n + 1p$

$n = $ notebook

$p = $ pencil.

$15n + 20p = 42.5$

$+ -15n \mp 24p = 43.5$

_____

$-4p = -1$

$1n + 1p =$

$1n = .29$

$1p = \$.25$

Score: 2

The student shows correct work to find only the cost of a pencil.

35 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$-2(3n + 4p = 8.50)$ $3(3.50) + 4p = 8.50$
$5n + 8p = 14.50$ $10.50 + 4p = 8.50$
                         $-10.50 \quad -10.50$

$-6n + 8p = -17.00$ $-4p = 2.00$
$\times 5n + 8p = 14.50$ $\overline{-4 \quad\quad -4}$

$-n = -3.50$ Pencil = $^{\$}.50$
$\overline{-1 \quad\quad -1}$

notebook = $^{\$}3.50$

Score: 1

   The student makes two computational errors.

35 The cost of three notebooks and four pencils is $8.50. The cost of five notebooks and eight pencils is $14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$3n + 4p = 8.50$ $5n + 8p = 14.50$

$5n + 8p = 14.50$
$(3n + 4p = 8.50)$
――――――――――――――
$2n + 4p = 6.00$
$-2n$ $-2n$

$2n + 4p = 6.000$
$2n + 4p$ $6 - 4p$

$\frac{4p}{4} = \frac{6}{4} - \frac{2n}{4}$

$\frac{2n}{2} = \frac{6}{2} - \frac{4p}{2}$

$p = 1.50$.

A Pencil, is $1.50,
A Notebook is $3.00

Score: 1

The student writes a correct system of equations, but no further correct work is shown.

35 The cost of three notebooks and four pencils is $8.50. The cost of five notebooks and eight pencils is $14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$$2.5 \times .3 = 7.50$$
$$.25 \times .4 = 1.00$$
$$\overline{250}$$

$$2.50 \times 5 = 12.5$$
$$.25 \times 8 = 2.00$$
$$\overline{14.00}$$

Score: 0

     No correct work is shown.

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

$$25 \cdot 14 = 336 ft$$

$$24.2 \cdot 14.1 = 341.22$$

$$\frac{341.22 - 336}{341.22}$$

$$\boxed{.015}$$

Score: 3

The student has a complete and correct response.

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.
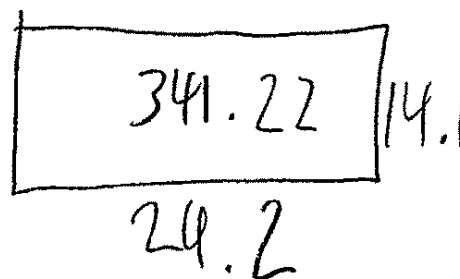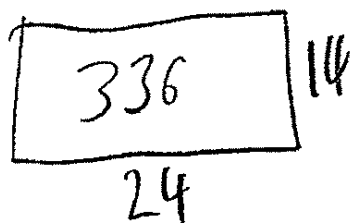
$$\text{Error} = \frac{\text{Wrong} - \text{Real}}{\text{Real Answer}} = E = \frac{336 - 341.22}{341.22}$$

$$\boxed{\text{Error} = 0.015}$$

Score: 3

The student has a complete and correct response.

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

$$a_4 \left| \frac{336 - 341.22}{341.22} \right|$$

$$\text{.0155}$$

$$\boxed{.02}$$

Score: 2

The student makes a rounding error.

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

24

$336 ft^2$ 14

24.2

$341.22 ft^2$ 14.1

1.5 %
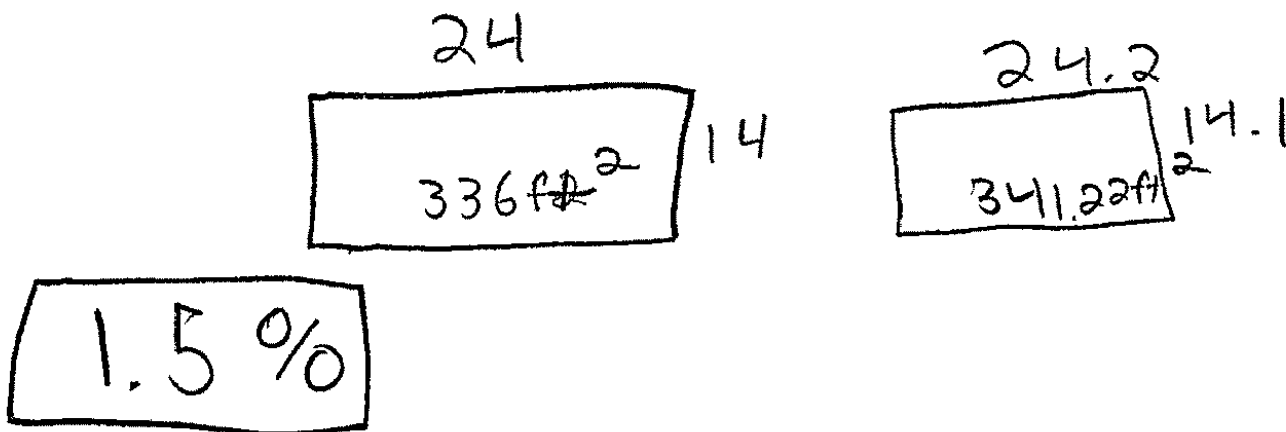
$\%E = \dfrac{A - m}{A}$

$\dfrac{341.22 - 336}{341.22}$

Score: 2

The student does not express the answer as a decimal to the nearest thousandth.

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

$$\frac{(24)(24.2)}{(24)} =$$

$$\frac{(24.2)(14.1)}{(24.2)(14.1)-(24)(14)} = \frac{341.22}{341.22-336}$$

$$\frac{341.22}{5.22} = 65.3678$$

$$\approx 65.368$$

Score: 1

The student makes a conceptual error in writing the fraction.

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

24

14
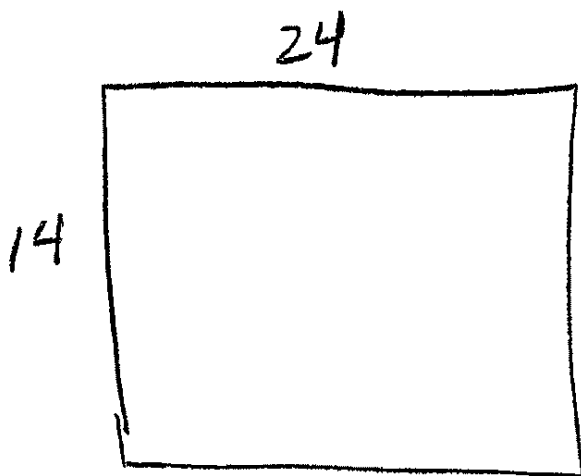
$24 \times 14 = 336$

$24.2 \times 14.1 = 341.22$

$$\frac{|336 - 341.22|}{341}$$

$$\frac{5.22}{341}$$

$.01$

Score: 1

The student makes multiple rounding errors.

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

$$24 \times 12 \qquad\qquad 24.2 \times 14.1$$

$$288 \qquad\qquad\qquad 341.22$$

$$\begin{array}{r} 341.22 \\ -288.00 \\ \hline \end{array}$$

Difference in Error   53.22

Score: 0

The student finds only one area correctly.

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

14 ft.

24 ft
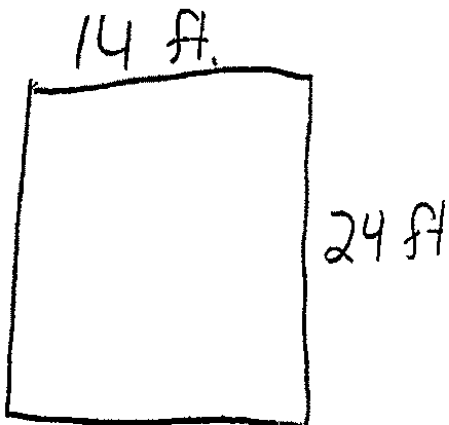
$$\frac{24.2-24}{24} + \frac{14.1-14}{14}$$

$$0.0083 + 0.0071$$

$$0.015$$

Score: 0

The student obtains a correct answer by a completely incorrect method.

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

10, 16, 19, 21, 26, 28, 32, 38, 40, 42, 57, 65

min

20
lower
quartile

median
30

UL
upper

max

Determine the number of scores that lie above the 75th percentile.

42, 57, 65

Score: 4

The student has a correct response. The five statistics are correct and the box-and-whisker plot is correct. The student lists the three scores above the 75th percentile.

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

10, 16, 19, 21, 26, 28, (32), 38, 40, 42, 57, 65
26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

Max: 65

Min: 10

median: 30
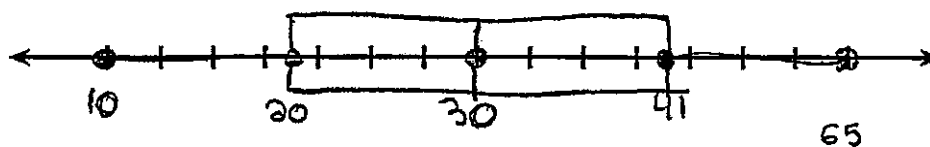
Determine the number of scores that lie above the 75th percentile.

3 numbers

Score: 3

The student's scale is incorrect.

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

10 16, 19, 21, 26, 28, 32, 38, 40, 42, 57, 65

20   30   41

65
41
——
24
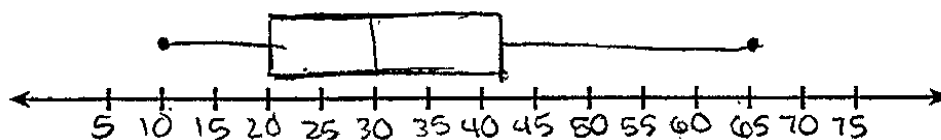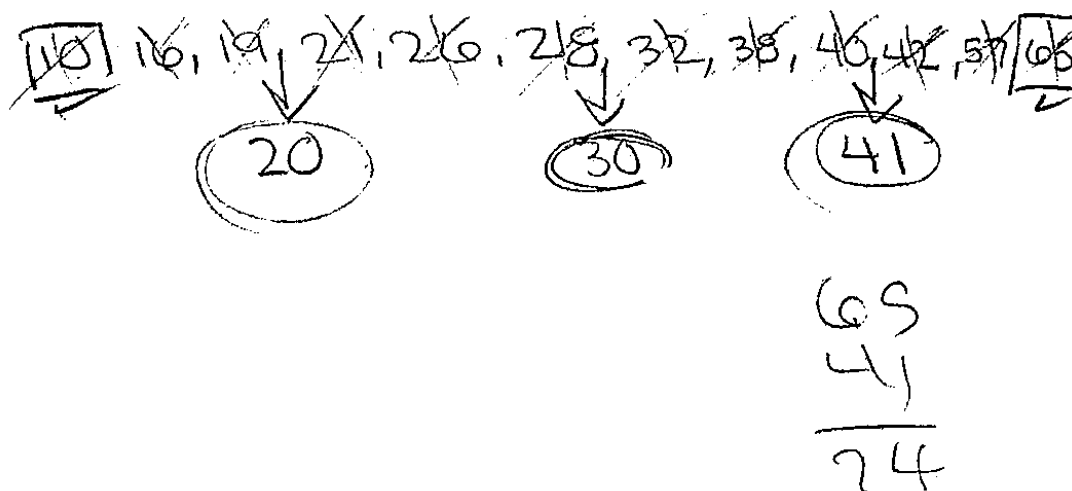
Determine the number of scores that lie above the 75th percentile.

24 scores

Score: 3

The student constructs a correct box-and-whisker plot, but states an incorrect number of scores.

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

10, 16, 19, 21, 26, 28 | 32, 38, 40, 42, 57, 65
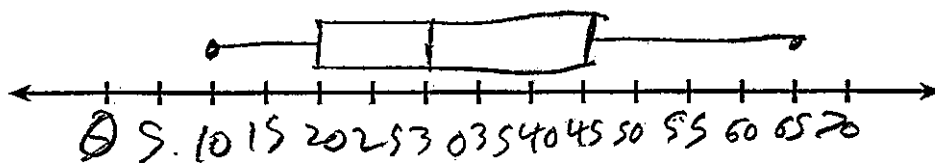
Determine the number of scores that lie above the 75th percentile.

2 scores above the
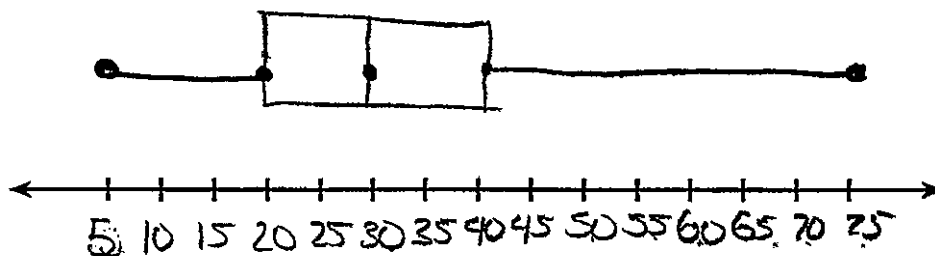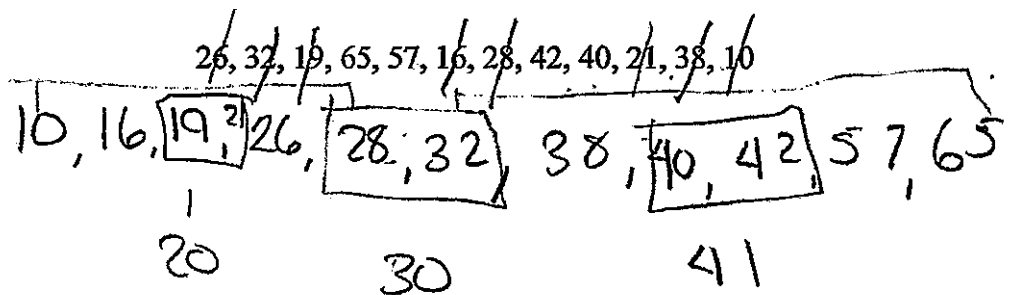75th percentile

Score: 3

The student makes a computational error in finding the 3rd quartile, but the rest of the work is appropriate based upon the error.

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

(handwritten work)

$\frac{28}{+32}$ = 60

$2\overline{)65}$ = 30

$\frac{19}{+21}$ = 40

$2\overline{)40}$ = 20

$\frac{40}{+42}$ = 82

$2\overline{)82}$ = 41

25% = 20   meadian = 30   75% = 40

25% = 20   50% = 30   75% = 41
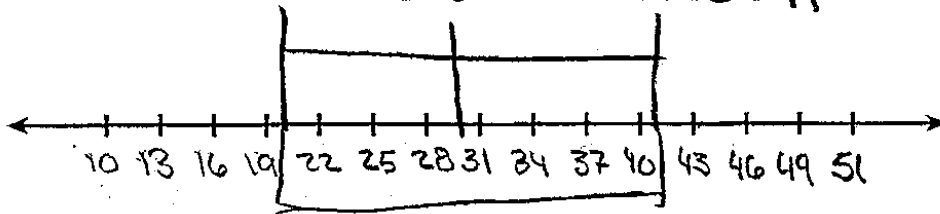
(handwritten number line with box plot marked 10 13 16 19 22 25 28 31 34 37 40 43 46 49 51)

Determine the number of scores that lie above the 75th percentile.

3 scores lie above the 75th percentile

Score: 2

The student makes two or more graphing errors (max and min are missing and the number line passes through the box), but an appropriate number is stated.

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

10, 16, 19, 21, 26, 28, 32, 38, 40, 42, 57, 65

26   30   41

20   30   41

10   65

Determine the number of scores that lie above the 75th percentile.
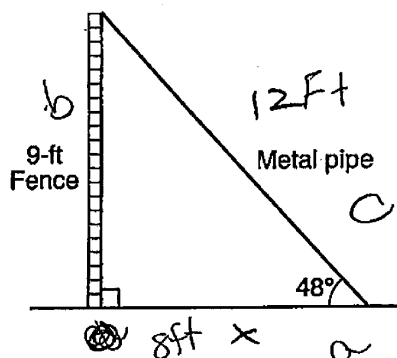
3 scores lie above the 75th percentile

42, 57, and 65

Score: 2

The student does not draw in the line to indicate the median and incorrectly graphs 65 on the number line.

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10
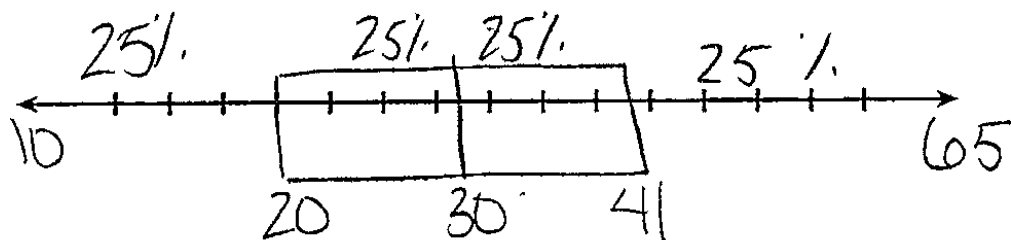
Determine the number of scores that lie above the 75th percentile.

41 – 65

Score: 1

The student finds the five statistical measures correctly, but no further correct work is shown.

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

10, 16, 19, 21, 26, 28, 32, 38, 40, 42, 57, 65.
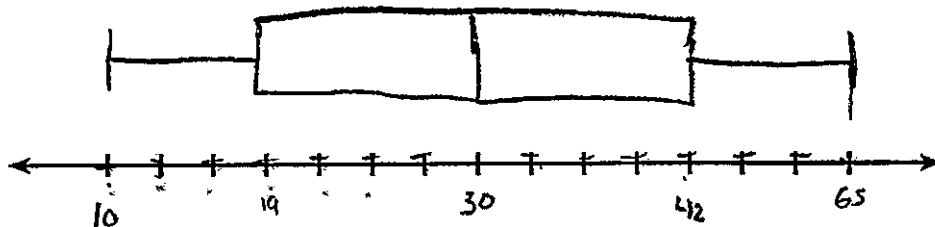
Determine the number of scores that lie above the 75th percentile.

There are 2 Scores that lies above
the 75th Pecentile.

Score: 1

The student finds the first and third quartile incorrectly and has an incorrect scale on the number line, but an appropriate number of scores is found.

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

10, 16, 19, 21, 26, 28, 32, 38, 40, 42, 57, 65,

20   30   41

Determine the number of scores that lie above the 75th percentile.

50

Score: 1

The student identifies the five statistical measures correctly but makes a conceptual error in making the graph, and the number of scores is incorrect.

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

10, 16, 19, 21, 26, 28, 32, 38, 40, 42

mean

m ·
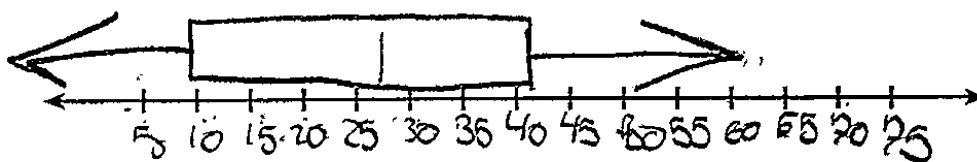
Determine the number of scores that lie above the 75th percentile.

Score: 0

No correct work is shown.

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.

Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\text{Tan } 48 = \frac{o}{a}$$

$$\text{Tan } 48 = \frac{9}{x}$$

$$\frac{9}{\text{Tan } 48} = \frac{\text{Tan } 48 \, x}{\text{Tan } 48}$$

$$x = 8 \text{ feet}$$

Determine, to the *nearest foot*, the length of the metal pipe.

$$a^2 + b^2 = c^2$$

$$8^2 + 9^2 = c^2$$

$$64 + 81 = c^2$$

$$\sqrt{145} = \sqrt{c^2}$$

$$c = 12 \text{ feet}$$

Score: 4

The student uses trigonometric function/formula to find the solution and the Pythagoras Theorem to find the other.

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.

Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\tan 48 = \frac{9}{x}$$

$$|0|1| = \frac{9}{x}$$

$$\frac{1x}{1} = \frac{9}{1} \quad x = 9$$

Determine, to the *nearest foot*, the length of the metal pipe.

$$\sqrt{9^2 + 9^2} = \sqrt{162} = 12.727\cdots$$

$$2\sqrt{13}$$
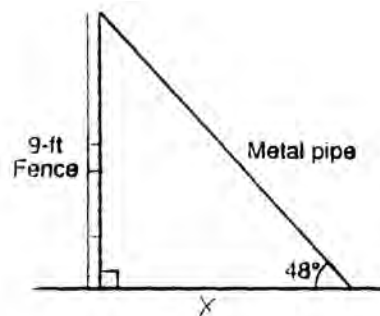
Score: 3

The student writes a correct equation for the first part, but rounds the tangent to the nearest integer. The solutions are appropriate based on this error.

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.
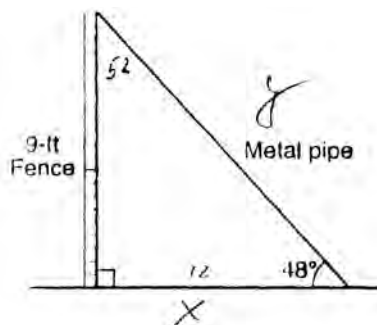
Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$Tan\ 52 = \frac{x}{9}$$

$$x = 11.5$$

$$\boxed{x = 12}$$

Determine, to the *nearest foot*, the length of the metal pipe.

$$9^2 + 12^2 = y^2$$

$$81 + 144 = y^2$$

$$225 = y^2$$

$$\boxed{15 = y}$$

Score: 3

The student makes a computational error in finding the third angle of the triangle. The solutions are appropriate based on this error.

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.

Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\text{Tan } \Theta = \frac{o}{A}$$

$$\text{Tan } 48 = \frac{9}{x}$$
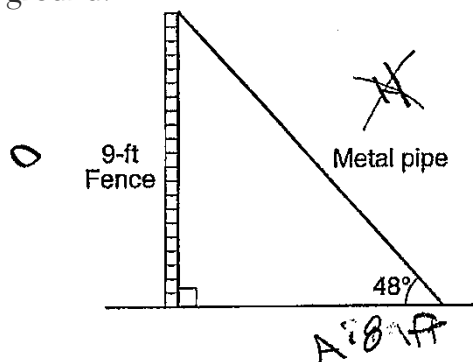
$$x\text{Tan } 48 = 9$$

$$1.11 x = 9$$

$$-1.11 \quad -1.11$$

$$\boxed{x = 7.89\text{ft}}$$

$$\boxed{x = 8\text{ft}}$$

Determine, to the *nearest foot*, the length of the metal pipe.

$$\text{Cos } \Theta = \frac{A}{H}$$

$$\text{Cos } 48 = \frac{8}{x}$$

$$8\text{Cos } 48 = x$$

$$\boxed{x = 5.35\text{ft}}$$

$$\boxed{x = 5\text{ft}}$$

Score: 2

The student writes a correct formula in each part but makes errors in the solution of the equations in each part.

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.

9-ft Fence

Metal pipe

48°
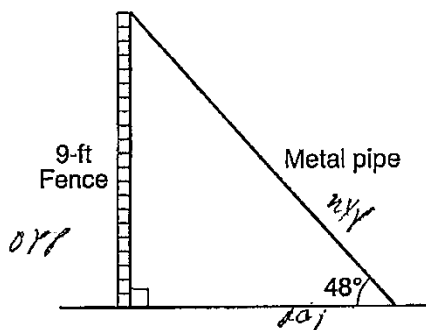
Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

SOH CAH TOA

$(x) Tan(48) \frac{9}{x} (x)$

$Tan(1.11) \, 9$

10' Ft

Determine, to the *nearest foot*, the length of the metal pipe.

$a^2 + b^2 = c^2$

$9^2 + 10^2 = c^2$

$81 + 100 = c^2$

$\sqrt{181} = c^2$

13.45

13Ft

Score: 2

The student's work in the first part is completely incorrect, but the student uses a correct method in the second part to find an appropriate solution.

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.

9-ft Fence Metal pipe

O

48°

x a

Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\text{Tan}48 = \frac{9}{x}$$
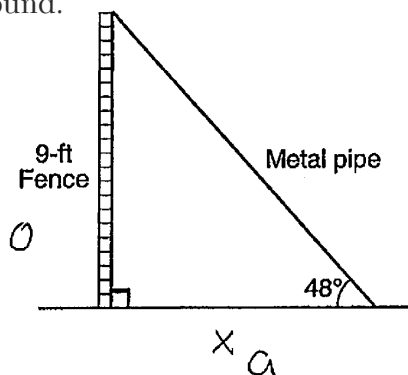
$$\frac{\text{Tan}48x = 9}{48}$$

. 1875

Determine, to the *nearest foot*, the length of the metal pipe.

$$\frac{\text{Tan}48}{9} = 5.$$

Score: 1

The student writes one correct trigonometric equation for the first part, but no further correct work is shown.

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.

Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$Tan =$$

$$TON = 1 . 11$$
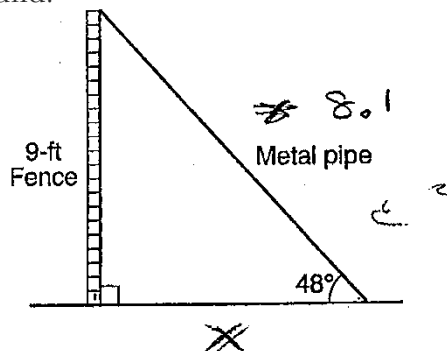
$$Tan 48 = \frac{9}{x}$$

$$\frac{1.11}{1} \times \frac{9}{x}$$

$$\frac{1.11x}{1.11} = \frac{9}{1.11} = x = 8.1$$

Determine, to the *nearest foot*, the length of the metal pipe.

$$A^2 + b^2 = C^2$$

$$9^2 + b^2 = 8.1^2$$

$$81 + b^2 = 65.61$$

$$-81 \qquad -81$$

$$\overline{1 \ b^2 \quad \sqrt{-15.89}}$$

$$b = 3.9$$

$$or \ 4$$

Score: 1

The student has one correct equation.

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.
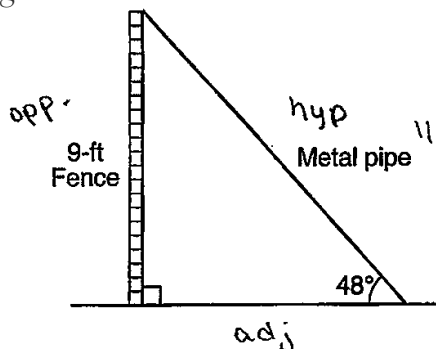
Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\tan 48 = \frac{\cdot}{\cdot}$$
$$(a)\ 1.2001 = \frac{9\,(a)}{x}$$
$$x = 10.8$$
$$\boxed{x = 11 \text{ feet}}$$

Determine, to the *nearest foot*, the length of the metal pipe.

$$\sin 48 = \frac{9}{11}$$
$$-.7682 = \overline{.8181}$$
$$+.7682 \qquad +.7682$$
$$\overline{1.5863}$$
$$\boxed{x = 2 \text{ft}}$$

Score: 1

In the first part, the student indicates that $\tan 48 = \dfrac{9}{x}$.

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.
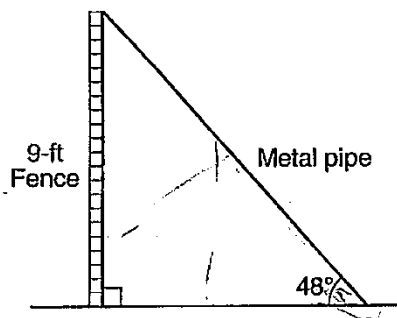
Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$9/48$

.18 feet

Determine, to the *nearest foot*, the length of the metal pipe.

12 feet

Score: 0

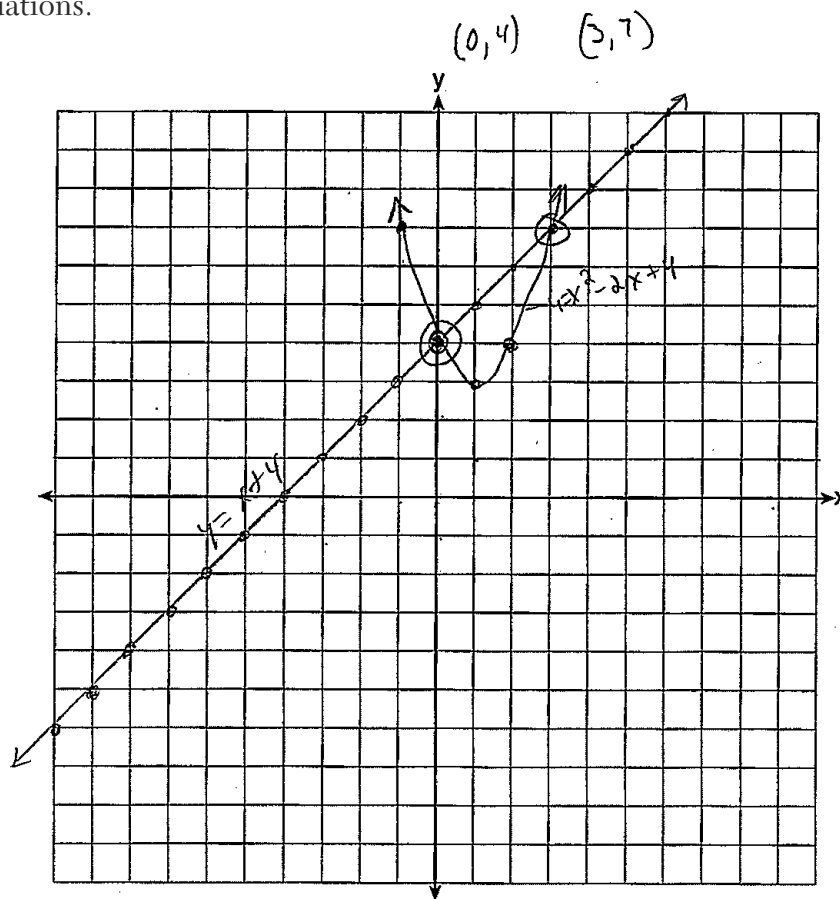The students work is incorrect. In order to receive 1 point, the student would need both correct answers with no work.

39 On the set of axes below, graph the following system of equations.

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

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

X	4
-2	12
-1	7
0	4
1	3
2	4
3	7
4	12

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.
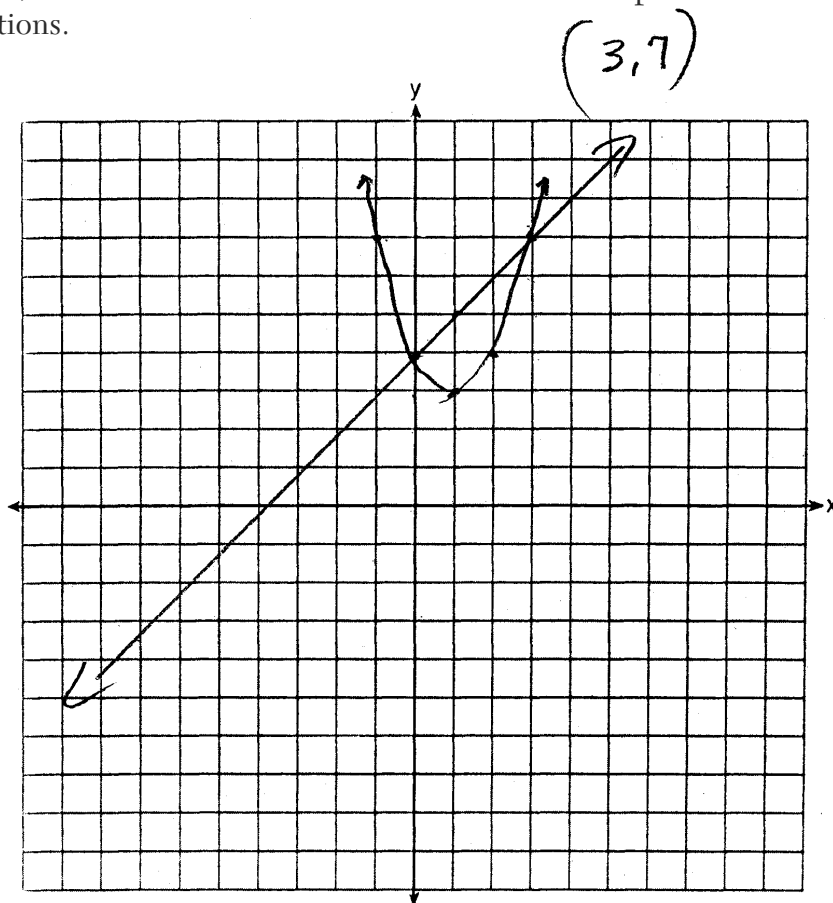
$(0,4)$ $(3,7)$

Score: 4

The student has a complete and correct response.

39 On the set of axes below, graph the following system of equations.

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

$Y = x^2 - 2x + 4$

$Y = x + 4$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.
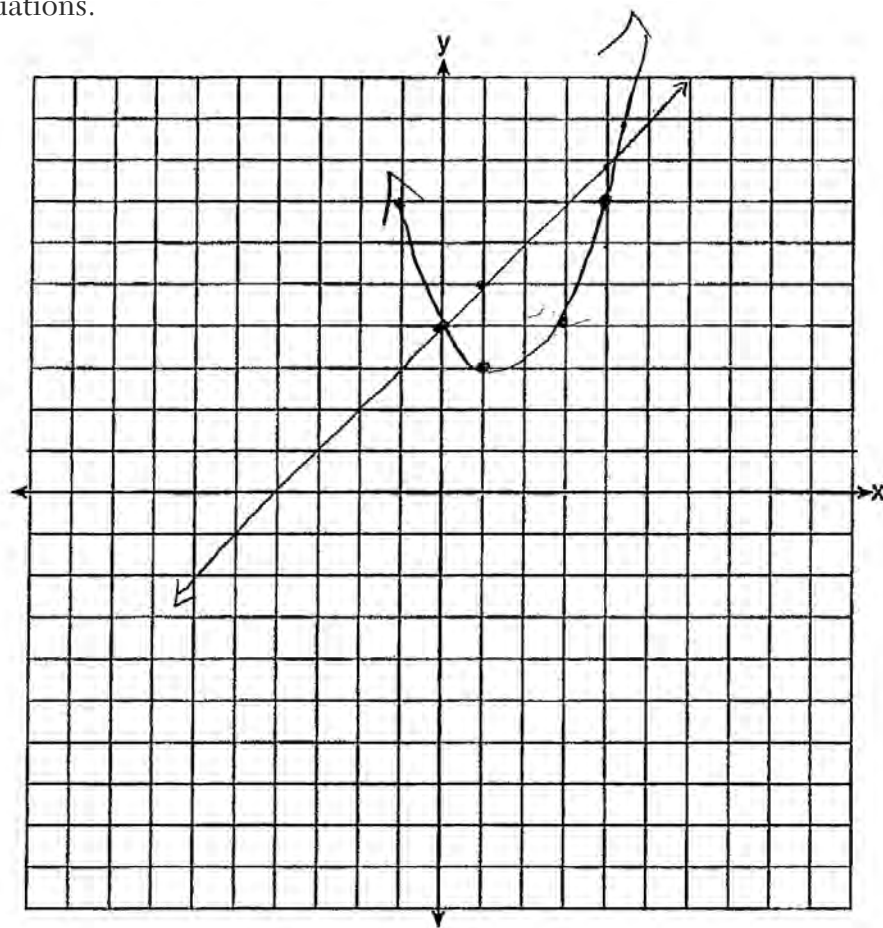

Score: 4

The student has a complete and correct response.

39 On the set of axes below, graph the following system of equations.

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

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.

$(3, 7)$
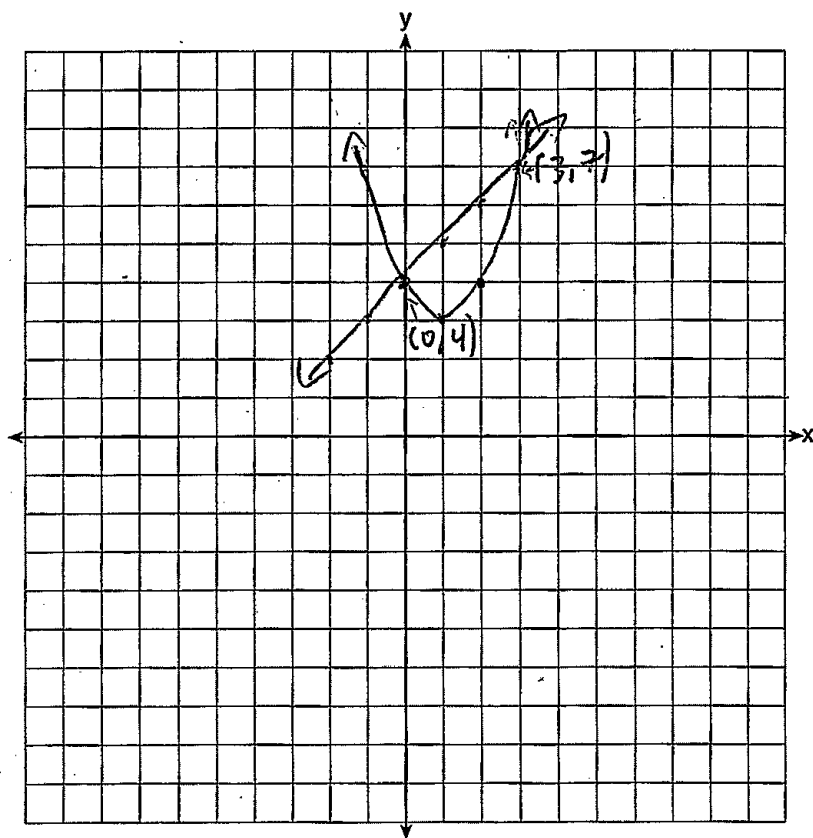
Score: 3

The student graphs both equations correctly, but only states one solution.

39 On the set of axes below, graph the following system of equations.

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

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.

Score: 2

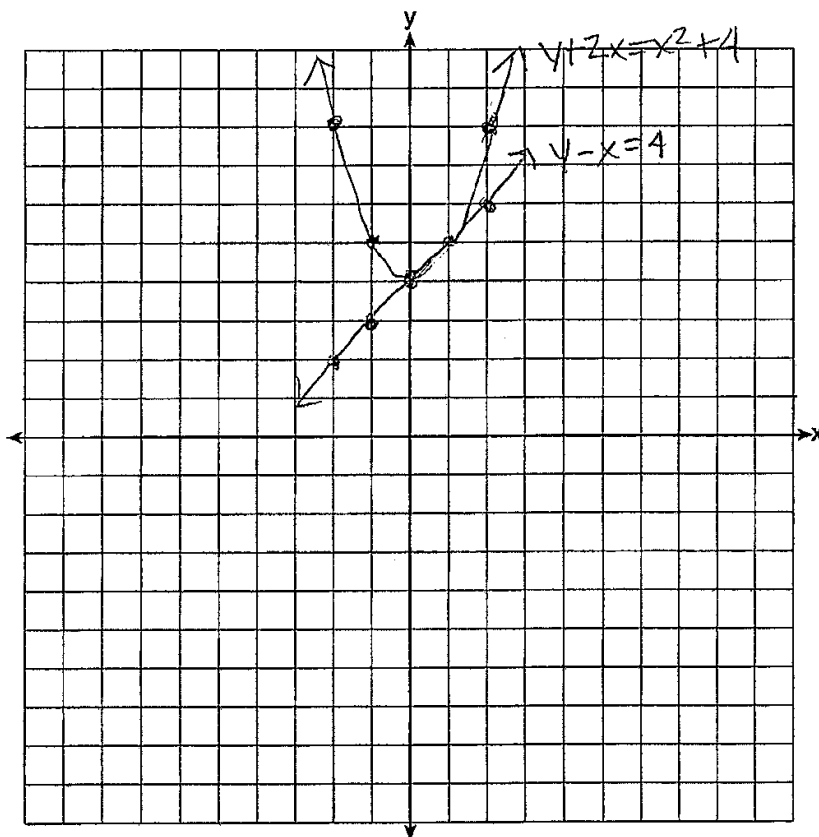The student makes an error graphing the parabola and only states one solution correctly.

39 On the set of axes below, graph the following system of equations.

$$y + 2x = x^2 + 4 - 2x$$
$$\quad -2x$$
$$y - x = 4 + x$$
$$\quad + x$$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.

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

$$y - x = 4$$

$$(0,4) + (1,5)$$

Score: 2

The student makes a conceptual error when graphing the parabola, but appropriate solutions are found.

39 On the set of axes below, graph the following system of equations.

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

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.
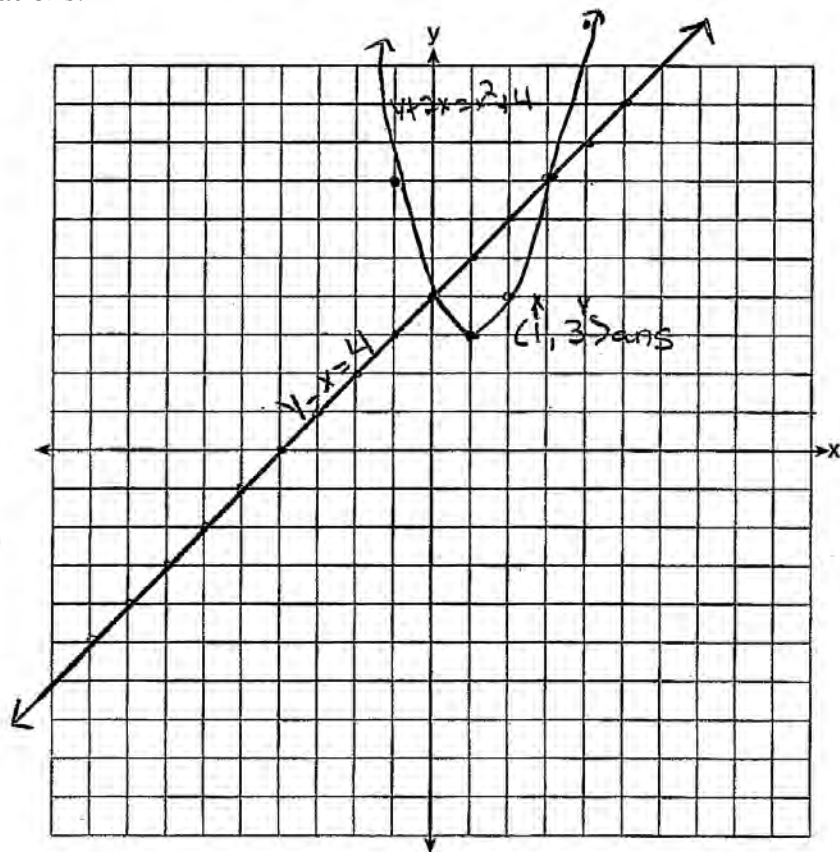
Score: 2

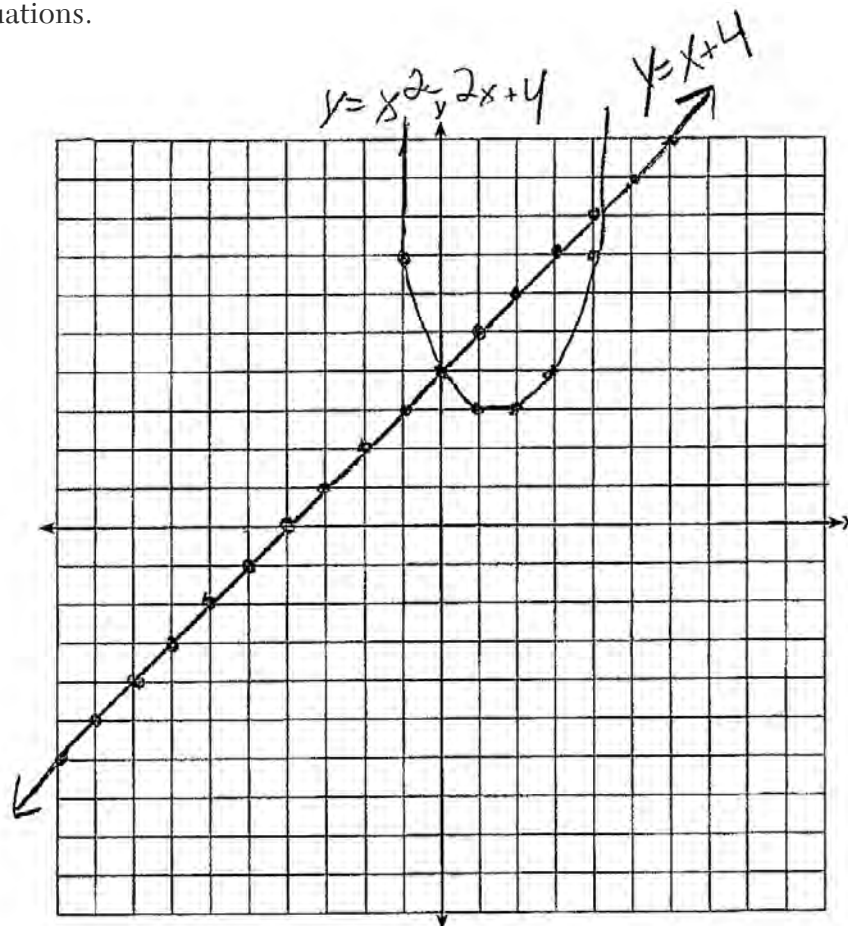The student graphs both equations correctly, but the solutions are not stated.

39 On the set of axes below, graph the following system of equations.

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

$Y = x^2 - 2x + 4$

$y + 2x = x^2 + 4$
$-2x \quad -2x$
$y - x = 4$
$+ X$

$Y = X + 4$

$(x \qquad) (\qquad)$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.

$Y = x^2 - 2x + 4$ $Y = X + 4$

Score: 1

The student graphs one equation correctly.

39 On the set of axes below, graph the following system of equations.

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

$y = x + 4$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.
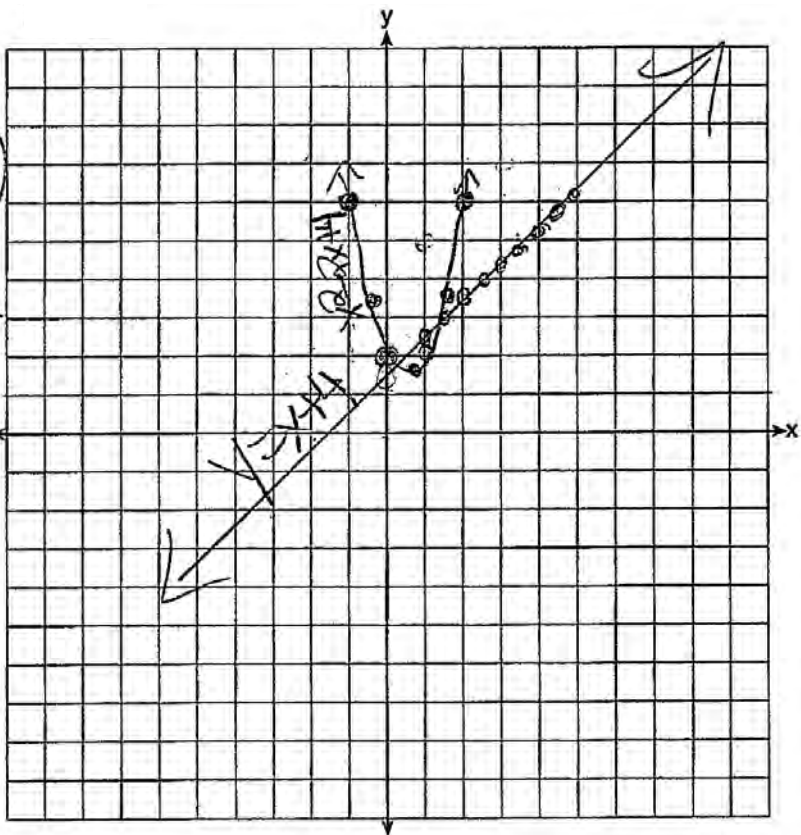
Score: 1

The student graphs the parabola correctly.

39 On the set of axes below, graph the following system of equations.

$$y + 2x = x^2 + 4$$
$$y - x = 4 \quad (0,4)$$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.

Score: 0

No correct work is shown.
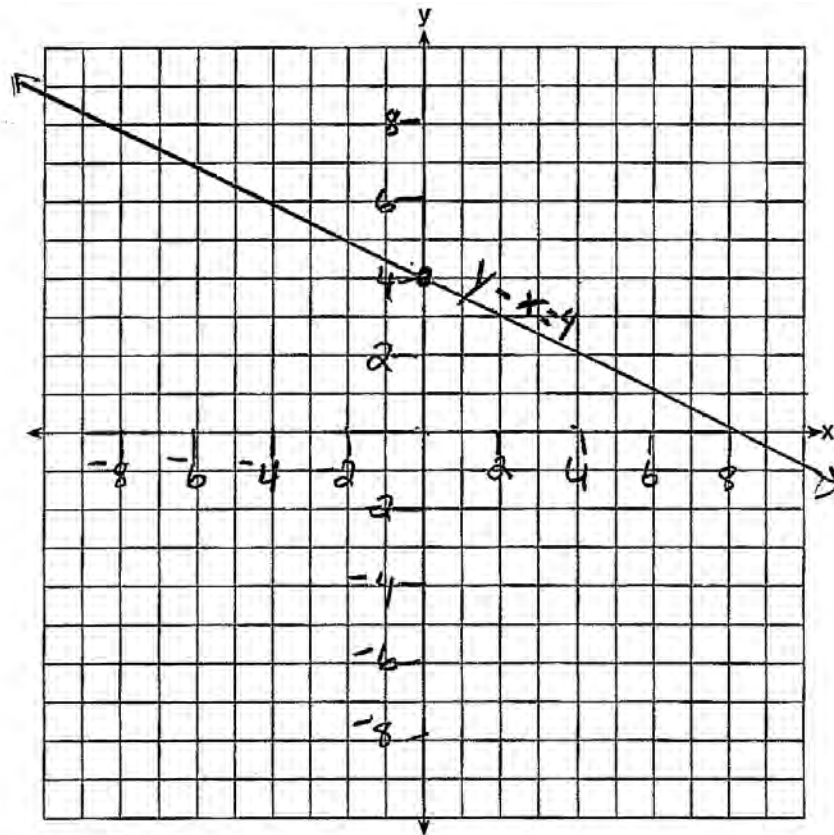
The State Education Department / The University of the State of New York

Regents Examination in Integrated Algebra – January 2013

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