The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA 2/TRIGONOMETRY

Tuesday, January 28, 2014 — 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 for 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.

Part I

Answer all 27 questions in this part. Each correct answer will receive 2 credits. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet. [54]

Use this space for computations.

1 What is the common difference in the sequence $2a + 1, 4a + 4, 6a + 7, 8a + 10, \ldots$?

(1) $2a + 3$

(2) $-2a - 3$

(3) $2a + 5$

(4) $-2a + 5$

2 Which expression is equivalent to $\left(3x^2\right)^{-1}$?

(1) $\frac{1}{3x^2}$

(2) $-3x^2$

(3) $\frac{1}{9x^2}$

(4) $-9x^2$

3 If $g(x) = \frac{1}{2}x + 8$ and $h(x) = \frac{1}{2}x - 2$, what is the value of $g(h(-8))$?

(1) 0

(2) 9

(3) 5

(4) 4

4 The expression $\frac{1}{7 - \sqrt{11}}$ is equivalent to

(1) $\frac{7 + \sqrt{11}}{38}$

(2) $\frac{7 - \sqrt{11}}{38}$

(3) $\frac{7 + \sqrt{11}}{60}$

(4) $\frac{7 - \sqrt{11}}{60}$

Use this space for computations.

5 The expression $\dfrac{a + \dfrac{b}{c}}{d - \dfrac{b}{c}}$ is equivalent to

(1) $\dfrac{c + 1}{d - 1}$

(2) $\dfrac{a + b}{d - b}$

(3) $\dfrac{ac + b}{cd - b}$

(4) $\dfrac{ac + 1}{cd - 1}$

6 A school cafeteria has five different lunch periods. The cafeteria staff wants to find out which items on the menu are most popular, so they give every student in the first lunch period a list of questions to answer in order to collect data to represent the school. Which type of study does this represent?

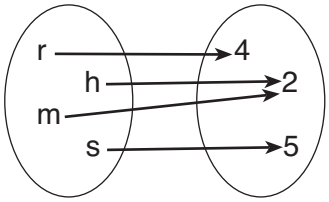
(1) observation

(2) controlled experiment

(3) population survey

(4) sample survey

7 Which relation is both one-to-one and onto?



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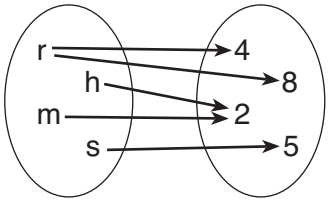

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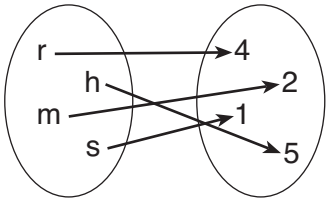

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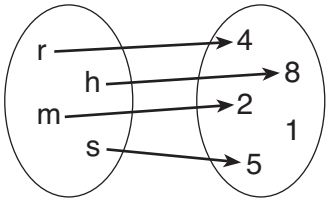


(4)

Use this space for computations.

8 Max solves a quadratic equation by completing the square. He shows a correct step:

$$(x + 2)^2 = -9$$

What are the solutions to his equation?

(1) $2 \pm 3i$

(2) $-2 \pm 3i$

(3) $3 \pm 2i$

(4) $-3 \pm 2i$

9 Which expression represents the total number of different 11-letter arrangements that can be made using the letters in the word "MATHEMATICS"?

(1) $\frac{11!}{3!}$

(2) $\frac{11!}{2! + 2! + 2!}$

(3) $\frac{11!}{8!}$

(4) $\frac{11!}{2! \bullet 2! \bullet 2!}$

10 If \$5000 is invested at a rate of 3% interest compounded quarterly, what is the value of the investment in 5 years? (Use the formula $A = P\left(1 + \frac{r}{n}\right)^{nt}$, where A is the amount accrued, P is the principal, r is the interest rate, n is the number of times per year the money is compounded, and t is the length of time, in years.)

(1) \$5190.33

(2) \$5796.37

(3) \$5805.92

(4) \$5808.08

11 The roots of the equation $2x^2 + 4 = 9x$ are

(1) real, rational, and equal

(2) real, rational, and unequal

(3) real, irrational, and unequal

(4) imaginary

Use this space for computations.

12 If d varies inversely as t, and $d = 20$ when $t = 2$, what is the value of t when $d = -5$?

(1) 8
(2) 2
(3) -8
(4) -2

13 If $\sin A = -\frac{7}{25}$ and $\angle A$ terminates in Quadrant IV, $\tan A$ equals

(1) $-\frac{7}{25}$
(2) $-\frac{7}{24}$
(3) $-\frac{24}{7}$
(4) $-\frac{24}{25}$

14 Which expression is equivalent to $\sum_{n=1}^{4}(a-n)^2$?

(1) $2a^2 + 17$
(2) $4a^2 + 30$
(3) $2a^2 - 10a + 17$
(4) $4a^2 - 20a + 30$

15 What are the coordinates of the center of a circle whose equation is $x^2 + y^2 - 16x + 6y + 53 = 0$?

(1) $(-8,-3)$
(2) $(-8,3)$
(3) $(8,-3)$
(4) $(8,3)$

Use this space for computations.

16 For $y = \frac{3}{\sqrt{x-4}}$, what are the domain and range?

(1) $\{x|x > 4\}$ and $\{y|y > 0\}$
(2) $\{x|x \geq 4\}$ and $\{y|y > 0\}$
(3) $\{x|x > 4\}$ and $\{y|y \geq 0\}$
(4) $\{x|x \geq 4\}$ and $\{y|y \geq 0\}$

17 A math club has 30 boys and 20 girls. Which expression represents the total number of different 5-member teams, consisting of 3 boys and 2 girls, that can be formed?

(1) ${}_{30}P_3 \bullet {}_{20}P_2$
(2) ${}_{30}C_3 \bullet {}_{20}C_2$
(3) ${}_{30}P_3 + {}_{20}P_2$
(4) ${}_{30}C_3 + {}_{20}C_2$

18 What is the product of the roots of $x^2 - 4x + k = 0$ if one of the roots is 7?

(1) 21
(2) -11
(3) -21
(4) -77

19 In $\triangle DEF$, $d = 5$, $e = 8$, and $m\angle D = 32$. How many distinct triangles can be drawn given these measurements?

(1) 1
(2) 2
(3) 3
(4) 0

20 Liz has applied to a college that requires students to score in the top 6.7% on the mathematics portion of an aptitude test. The scores on the test are approximately normally distributed with a mean score of 576 and a standard deviation of 104. What is the minimum score Liz must earn to meet this requirement?

(1) 680
(2) 732
(3) 740
(4) 784

Use this space for computations.

21 The expression $\left(\sqrt[3]{27x^2}\right)\left(\sqrt[3]{16x^4}\right)$ is equivalent to

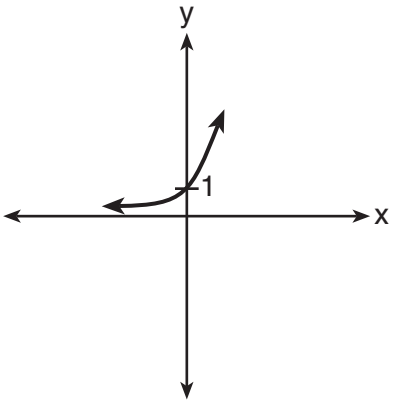
(1) $12x^2\sqrt[3]{2}$

(2) $12x\sqrt[3]{2x}$

(3) $6x\sqrt[3]{2x^2}$

(4) $6x^2\sqrt[3]{2}$

22 Which sketch shows the inverse of $y = a^x$, where $a > 1$?



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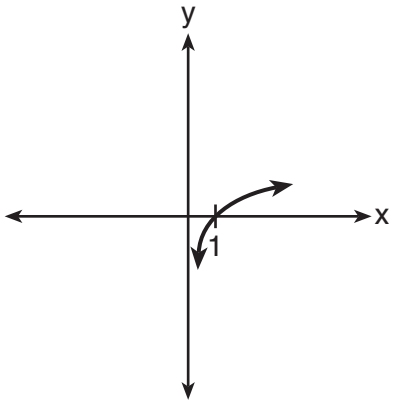

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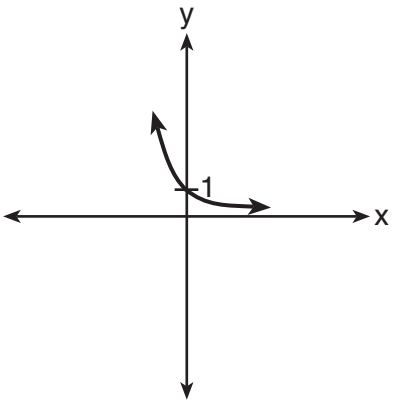

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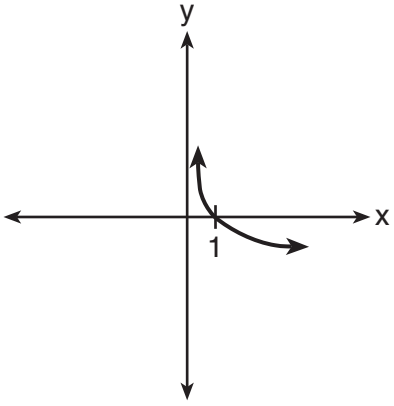


(4)

Use this space for computations.

23 The expression $\frac{x^2 + 9x - 22}{x^2 - 121} \div (2 - x)$ is equivalent to

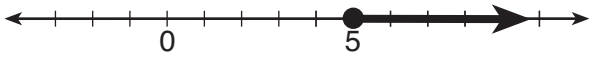
(1) $x - 11$

(2) $\frac{1}{x - 11}$

(3) $11 - x$

(4) $\frac{1}{11 - x}$

24 Which graph represents the solution set of $\frac{x + 16}{x - 2} \leq 7$?

(1) 

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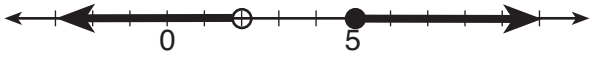
(3) 

(4)

Use this space for computations.

25 Which equation represents a graph that has a period of 4π?

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

(2) $y = 3 \sin 2x$

(3) $y = 3 \sin \frac{1}{4}x$

(4) $y = 3 \sin 4x$

26 The expression $x^2(x + 2) - (x + 2)$ is equivalent to

(1) x^2

(2) $x^2 - 1$

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

(4) $(x + 1)(x - 1)(x + 2)$

27 Approximately how many degrees does five radians equal?

(1) 286

(2) 900

(3) $\frac{\pi}{36}$

(4) 5π

Part II

Answer all 8 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

28 Show that $\sec \theta \sin \theta \cot \theta = 1$ is an identity.

29 Find, to the *nearest tenth of a square foot*, the area of a rhombus that has a side of 6 feet and an angle of 50°.

30 The following is a list of the individual points scored by all twelve members of the Webster High School basketball team at a recent game:

2 2 3 4 6 7 9 10 10 11 12 14

Find the interquartile range for this set of data.

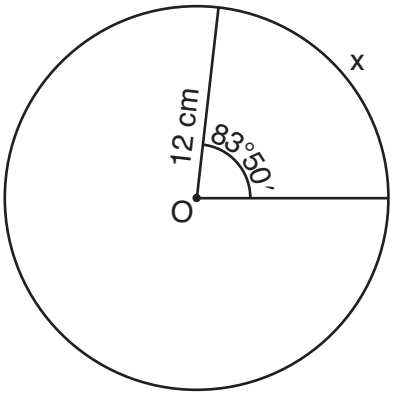
31 Determine algebraically the x-coordinate of all points where the graphs of $xy = 10$ and $y = x + 3$ intersect.

32 Solve $|-4x + 5| < 13$ algebraically for x.

33 Express $4xi + 5yi^8 + 6xi^3 + 2yi^4$ in simplest $a + bi$ form.

34 In an arithmetic sequence, $a_4 = 19$ and $a_7 = 31$. Determine a formula for a_n, the n^{th} term of this sequence.

35 Circle O shown below has a radius of 12 centimeters. To the *nearest tenth of a centimeter*, determine the length of the arc, x, subtended by an angle of $83°50'$.



Part III

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]

36 Solve algebraically for all exact values of x in the interval $0 \leq x < 2\pi$:

$$2 \sin^2 x + 5 \sin x = 3$$

37 Because Sam's backyard gets very little sunlight, the probability that a geranium planted there will flower is 0.28. Sam planted five geraniums. Determine the probability, to the *nearest thousandth*, that *at least* four geraniums will flower.

38 Two sides of a parallelogram measure 27 cm and 32 cm. The included angle measures 48°. Find the length of the longer diagonal of the parallelogram, to the *nearest centimeter*.

Part IV

Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. A correct numerical answer with no work shown will receive only 1 credit. The answer should be written in pen. [6]

39 Solve algebraically for all values of x:

$$\log_{(x+3)}(2x + 3) + \log_{(x+3)}(x + 5) = 2$$

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Reference Sheet

Area of a Triangle

$$K = \frac{1}{2}ab \sin C$$

Functions of the Sum of Two Angles

$$\sin (A + B) = \sin A \cos B + \cos A \sin B$$
$$\cos (A + B) = \cos A \cos B - \sin A \sin B$$
$$\tan (A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

Functions of the Difference of Two Angles

$$\sin (A - B) = \sin A \cos B - \cos A \sin B$$
$$\cos (A - B) = \cos A \cos B + \sin A \sin B$$
$$\tan (A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Sum of a Finite Arithmetic Series

$$S_n = \frac{n(a_1 + a_n)}{2}$$

Binomial Theorem

$$(a + b)^n = {}_nC_0a^nb^0 + {}_nC_1a^{n-1}b^1 + {}_nC_2a^{n-2}b^2 + \ldots + {}_nC_na^0b^n$$
$$(a + b)^n = \sum_{r=0}^{n} {}_nC_r a^{n-r}b^r$$

Law of Cosines

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Functions of the Double Angle

$$\sin 2A = 2 \sin A \cos A$$
$$\cos 2A = \cos^2 A - \sin^2 A$$
$$\cos 2A = 2 \cos^2 A - 1$$
$$\cos 2A = 1 - 2 \sin^2 A$$
$$\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

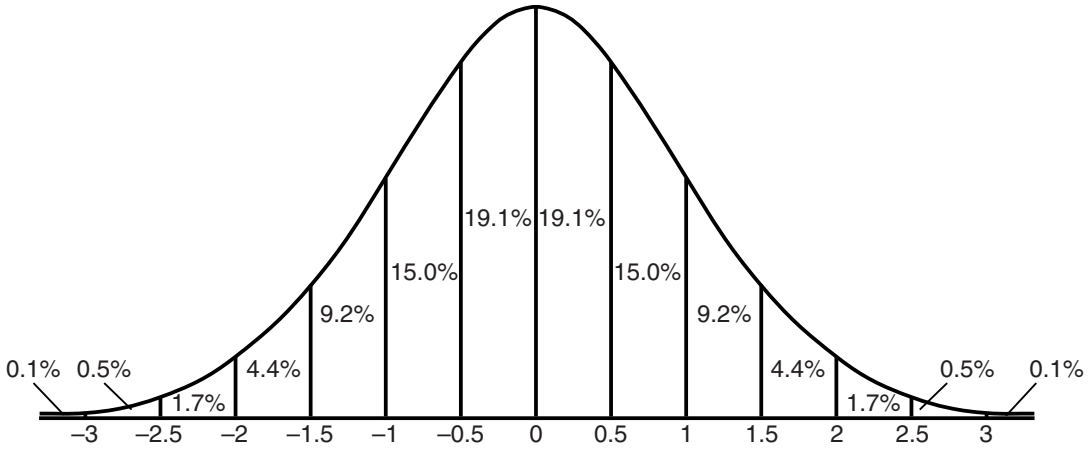
Functions of the Half Angle

$$\sin \frac{1}{2}A = \pm\sqrt{\frac{1 - \cos A}{2}}$$
$$\cos \frac{1}{2}A = \pm\sqrt{\frac{1 + \cos A}{2}}$$
$$\tan \frac{1}{2}A = \pm\sqrt{\frac{1 - \cos A}{1 + \cos A}}$$

Sum of a Finite Geometric Series

$$S_n = \frac{a_1(1 - r^n)}{1 - r}$$

Normal Curve
Standard Deviation



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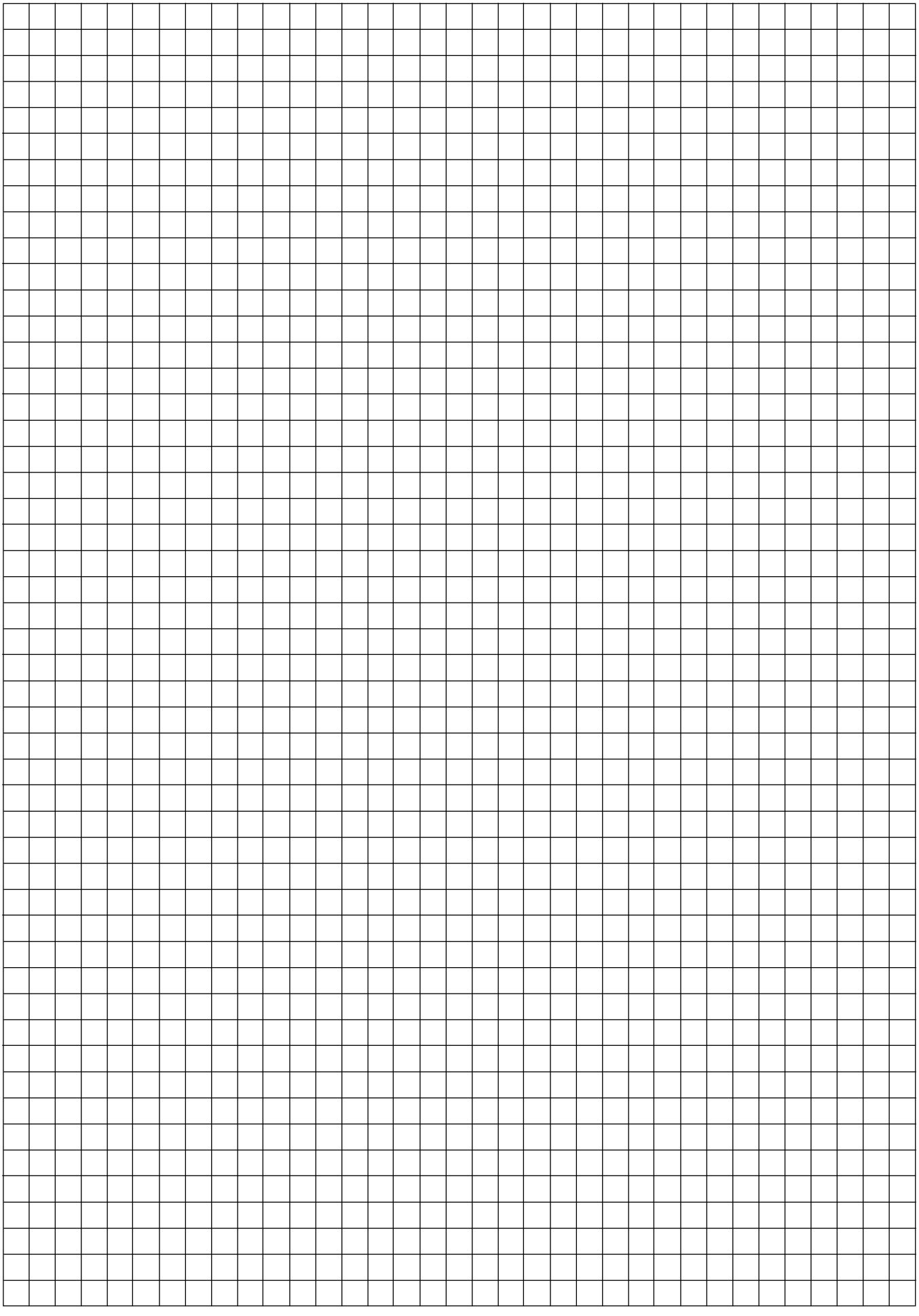

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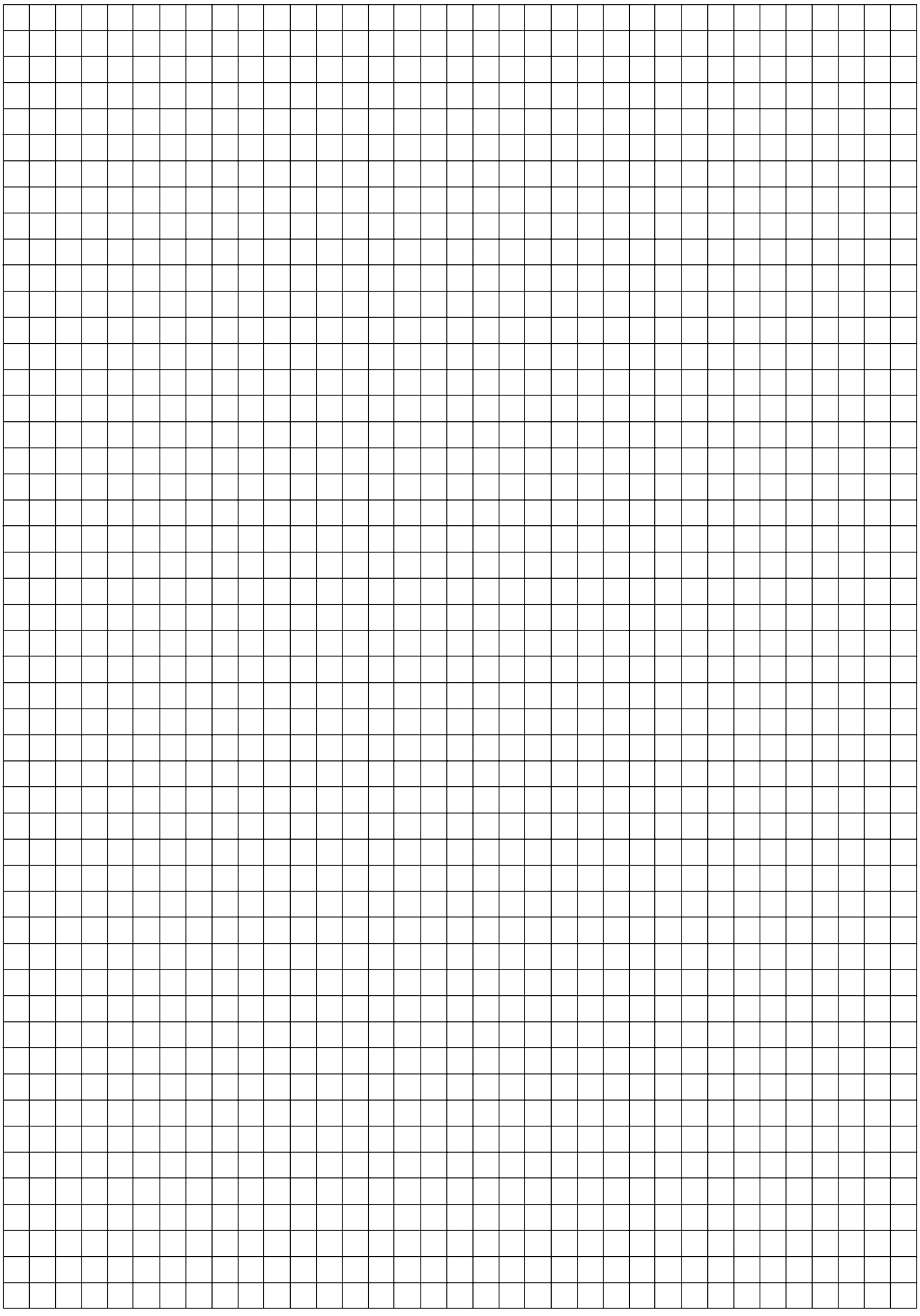

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FOR TEACHERS ONLY

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ALGEBRA 2/TRIGONOMETRY

Tuesday, January 28, 2014 — 1:15 to 4:15 p.m., only

SCORING KEY AND RATING GUIDE

Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Regents Examination in Algebra 2/Trigonometry. 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 28, 2014. 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 54 credits, 2 credits for each of the following.

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

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site at: http://www.p12.nysed.gov/assessment/ and select the link "Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents Examination period.

Beginning in June 2013, the Department is providing supplemental scoring guidance, the "Sample Response Set," for the Regents Examination in Algebra 2/Trigonometry. 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/a2trig/home.html.

General Rules for Applying Mathematics Rubrics

I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents Examination in Algebra 2/Trigonometry 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.

(28) **[2]** Correct work is shown to prove the identity.

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

or

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

or

[1] All trigonometric functions are correctly written in terms of sin θ and cos θ, but no further correct work is shown.

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

(29) **[2]** 27.6, and correct work is shown.

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

or

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

or

[1] 27.6, 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.

(30) **[2]** 7, 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, such as expressing the interquartile range as 3.5–10.5.

or

[1] 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.

(31) **[2]** 2 and -5, and correct algebraic work is shown.

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

or

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

or

[1] Correct work is shown to find either 2 or -5, but no further correct work is shown.

or

[1] $x^2 + 3x - 10 = 0$ is written, but no further correct work is shown.

or

[1] 2 and -5, but a method other than algebraic is used.

or

[1] 2 and -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.

(32) **[2]** $-2 < x < 4.5$ or an equivalent interval notation, and correct algebraic work is shown.

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

or

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

or

[1] Appropriate work is shown, but the answer is not represented as a conjunction.

or

[1] $-2 < x < 4.5$, but a method other than algebraic is used.

or

[1] $-2 < x < 4.5$, 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.

(33) **[2]** $7y - 2xi$, and correct 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, but the answer is not expressed in $a + bi$ form.

or

[1] $7y - 2xi$, but no work is shown.

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

(34) **[2]** $a_n = 7 + (n - 1)4$ or an equivalent equation, 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] The expression $7 + (n - 1)4$ or an equivalent expression is written, and appropriate work is shown.

or

[1] Correct work is shown to find the common difference, 4, and the first term, 7. No further correct work is shown.

or

[1] $a_n = 7 + (n - 1)4$, but no work is shown.

[0] The expression $7 + (n - 1)4$ is written, 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.

(35) **[2]** 17.6, and correct work is shown.

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

or

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

or

[1] 17.6, 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.

Part III

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

(36) **[4]** $\frac{\pi}{6}$ and $\frac{5\pi}{6}$, and correct algebraic work is shown.

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

or

[3] Correct work is shown to find $\frac{\pi}{6}$ or $\frac{5\pi}{6}$, but no further correct work is shown.

or

[3] 30 and 150, and correct algebraic work is shown.

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

or

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

or

[2] Correct work is shown to find $\sin x = \frac{1}{2}$ and $\sin x = -3$, but no further correct work is shown.

or

[2] $\frac{\pi}{6}$ and $\frac{5\pi}{6}$, but a method other than algebraic is used.

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

or

[1] $(2 \sin x - 1)(\sin x + 3) = 0$ is written, but no further correct work is shown.

or

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

or

[1] $\frac{\pi}{6}$ and $\frac{5\pi}{6}$, but no work is shown.

[0] 30 and 150, 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.

(37) **[4]** 0.024, and correct work is shown.

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

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

or

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

or

[2] ${}_5C_4(0.28)^4(0.72) + {}_5C_5(0.28)^5(0.72)^0$ or an equivalent expression is written, but no further correct work is shown.

or

[2] Appropriate work is shown to find 0.022, exactly four out of five flowers, but no further correct work is shown.

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

or

[1] 0.024, 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.

(38) **[4]** 54, and correct work is shown.

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

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

or

[2] Appropriate work is shown, but one conceptual error is made, such as finding 24, the shorter diagonal.

or

[2] A correct substitution is made into the Law of Cosines, but no further correct work is shown.

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

or

[1] A correctly labeled diagram (including the longer diagonal) is drawn, but no further correct work is shown.

or

[1] 54, 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 this question, use the specific criteria to award a maximum of 6 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(39) **[6]** -1, and correct algebraic work is shown.

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

or

[5] Correct work is shown, but -6 is not rejected.

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

or

[4] Correct work is shown to find $(x + 1)(x + 6) = 0$, but no further correct work is shown.

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

or

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

or

[3] Correct work is shown to find $x^2 + 7x + 6 = 0$, but no further correct work is shown.

or

[3] -1, but a method other than algebraic is used.

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

or

[2] Correct work is shown to find $(2x + 3)(x + 5) = (x + 3)^2$, but no further correct work is shown.

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

or

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

or

[1] $\log_{(x+3)}\left[(2x + 3)(x + 5)\right] = 2$ is written, but no further correct work is shown.

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

Map to Core Curriculum

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

Regents Examination in Algebra 2/Trigonometry
January 2014
Chart for Converting Total Test Raw Scores to Final Examination Scores (Scale Scores)

The *Chart for Determining the Final Examination Score for the January 2014 Regents Examination in Algebra 2/Trigonometry* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Tuesday, January 28, 2014. Conversion charts provided for previous administrations of the Regents Examination in Algebra 2/Trigonometry must NOT be used to determine students' final scores for this administration.

Online Submission of Teacher Evaluations of the Test to the Department

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

1. Go to http://www.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm.

2. Select the test title.

3. Complete the required demographic fields.

4. Complete each evaluation question and provide comments in the space provided.

5. Click the SUBMIT button at the bottom of the page to submit the completed form.

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA 2/ TRIGONOMETRY

Tuesday, January 28, 2014 — 1:15 – 4:15 p.m.

SAMPLE RESPONSE SET

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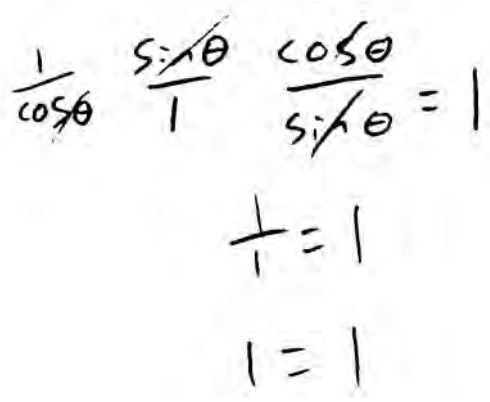
Question 28

28 Show that sec θ sin θ cot θ = 1 is an identity.



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

Question 28

28 Show that sec θ sin θ cot θ = 1 is an identity.

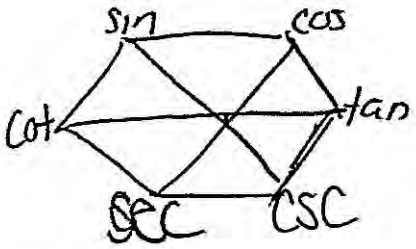
$\frac{1}{\cos\theta} \quad \frac{\sin\theta}{1} \quad \frac{1}{\tan\theta}$

$\frac{1}{\cos\theta} \quad \frac{\sin\theta}{1} \quad \frac{\sin\theta}{\cos\theta} = \frac{\sin^2\theta}{\cos^2\theta}$

Score 1: The student made a substitution error by replacing $\frac{1}{\tan\theta}$ with $\frac{\sin\theta}{\cos\theta}$.

Question 28

28 Show that sec θ sin θ cot θ = 1 is an identity.



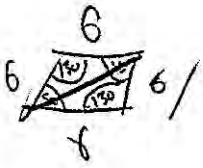
$\frac{\cos\theta}{1}\ \frac{\csc}{1}\ \frac{\cos\theta}{\sin\theta} = 1$

$\sec\theta \cdot \sin\theta \cdot \cot\theta = 1$

Score 0: The student made multiple errors when substituting for sec θ and sin θ.

Question 29

29 Find, to the *nearest tenth of a square foot*, the area of a rhombus that has a side of 6 feet and an angle of 50°.



$ab \sin C$

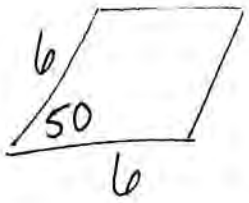
$36 \sin 130$

27.6

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

Question 29

29 Find, to the *nearest tenth of a square foot*, the area of a rhombus that has a side of 6 feet and an angle of 50°.



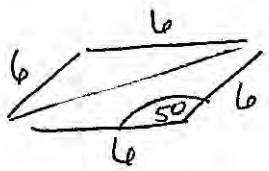
Area = 6 · 6 sin 50

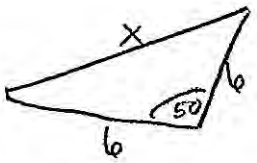
Area = 27.6 feet

Score 1: The student stated the wrong units.

Question 29

29 Find, to the *nearest tenth of a square foot*, the area of a rhombus that has a side of 6 feet and an angle of 50°.





$K = \frac{1}{2}(6)(6)(\sin 50)$

$K = 3(6)(\sin 50)$

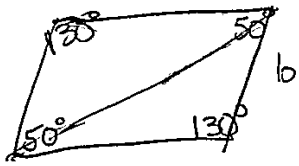
$K = 18 \cdot \sin 50$

$K = 13.8\ ft^2$

Score 1: The student made a conceptual error by not doubling the area of the triangle.

Question 29

29 Find, to the *nearest tenth of a square foot*, the area of a rhombus that has a side of 6 feet and an angle of 50°.



b = 6.000000476

6 = a

2 sets of parallel lines

Supplementary consecutive angles

diagonals are = equal sides

$\frac{a}{\sin A} = \frac{b}{\sin B}$

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

$6^2+6^2=c^2$

$36+36$

$72=c^2$

$c \approx 8.4853$

$\frac{6}{\sin 50^\circ} = \frac{b}{\sin 130^\circ}$

$A=\frac{1}{2}bh$

$A=\frac{1}{2}(6)(6)$

$A=\frac{1}{2}(36)$

$A=18$

$18(2)=36$

A = 36 ft

$\frac{4.596267}{\sin 50^\circ} = \frac{\sin 50^\circ b}{\sin 50^\circ}$

$\frac{4.596267}{.766044443} = b$

b = 6.000000476

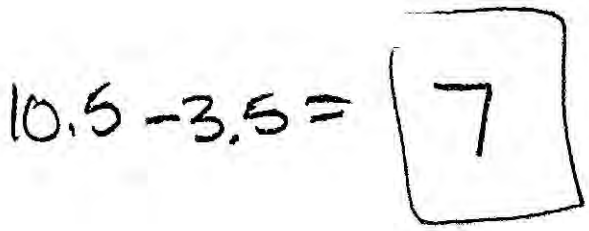
Score 0: The student made multiple conceptual errors, including the use of the Pythagorean Theorem and the incorrect use of the Law of Sines.

Question 30

30 The following is a list of the individual points scored by all twelve members of the Webster High School basketball team at a recent game:

2 2 3 4 6 7 9 10 10 11 12 14

Find the interquartile range for this set of data.



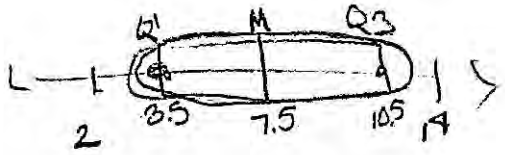
Score 2: The student has a complete and correct response.

Question 30

30 The following is a list of the individual points scored by all twelve members of the Webster High School basketball team at a recent game:

2 2 3 4 6 7 9 10 10 11 12 14

Find the interquartile range for this set of data.



$3.5 \leq x \leq 10.5$

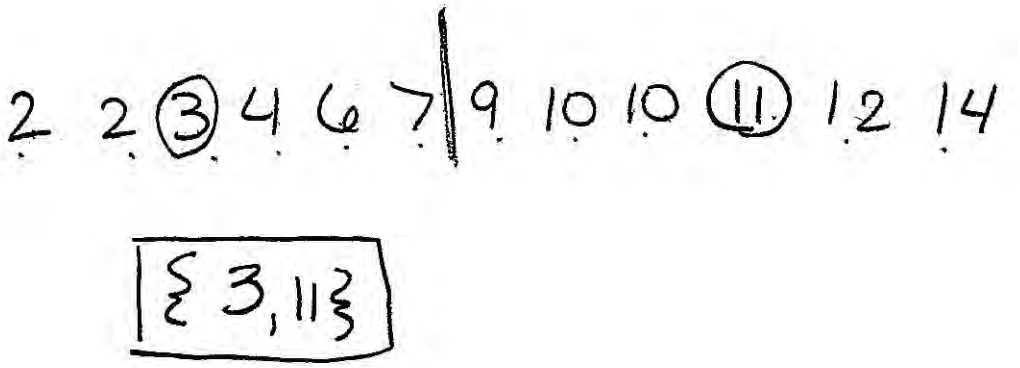
Score 1: The student made a conceptual error by expressing the interquartile range as an interval.

Question 30

30 The following is a list of the individual points scored by all twelve members of the Webster High School basketball team at a recent game:

2 2 3 4 6 7 9 10 10 11 12 14

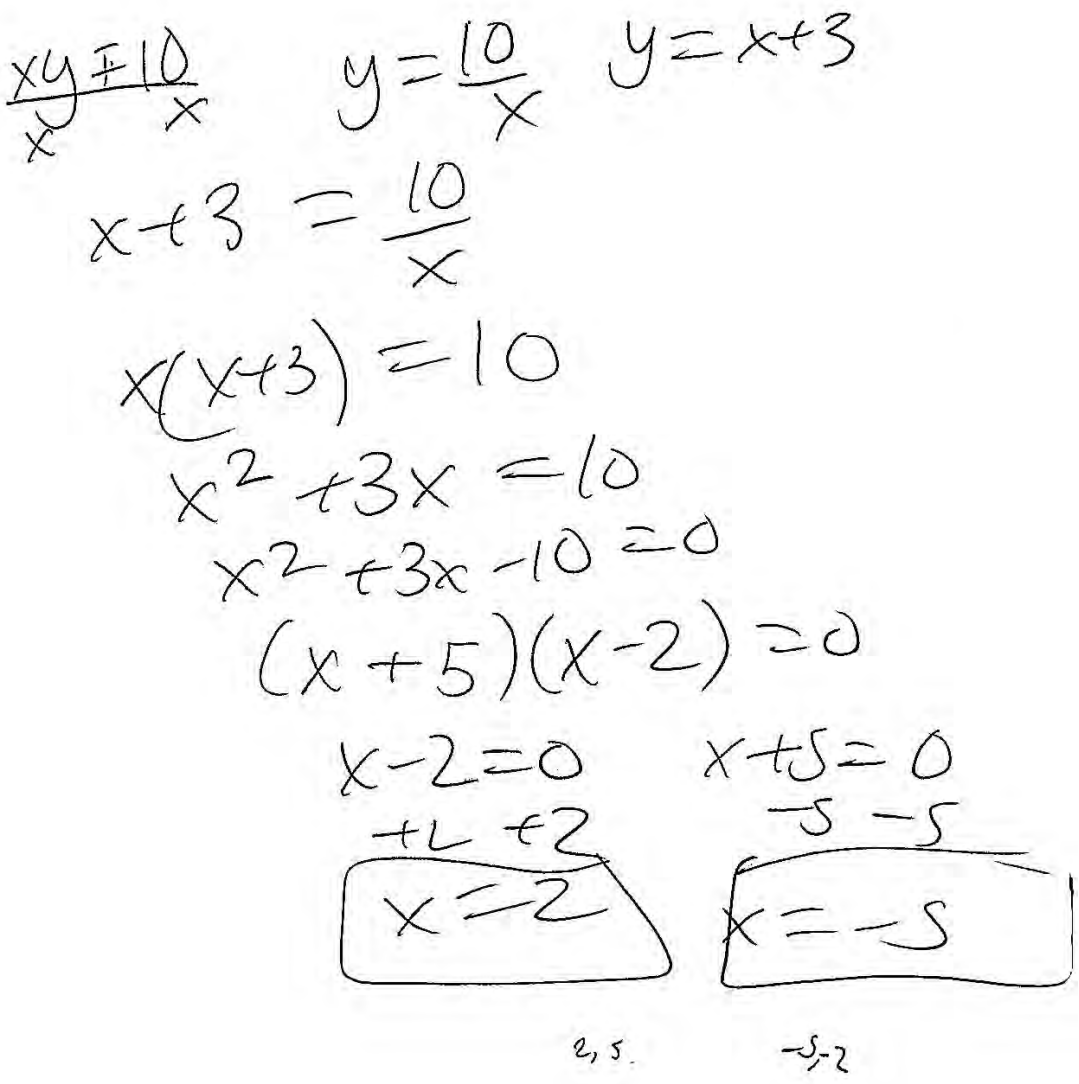
Find the interquartile range for this set of data.



Score 0: The student made two conceptual errors. The quartiles were found incorrectly and the interquartile range was expressed as a set.

Question 31

31 Determine algebraically the x-coordinate of all points where the graphs of $xy = 10$ and $y = x + 3$ intersect.



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

Question 31

31 Determine algebraically the x-coordinate of all points where the graphs of $xy = 10$ and $y = x + 3$ intersect.

$x(x+3)=10$

$x^2+3x=10$

$x^2+3x-10=0$

$(x+5)(x-2)=0$

$x=-5,2$

$y=-5+3=-2$

$y=3+2=5$

$(-5,-2),(2,5)$

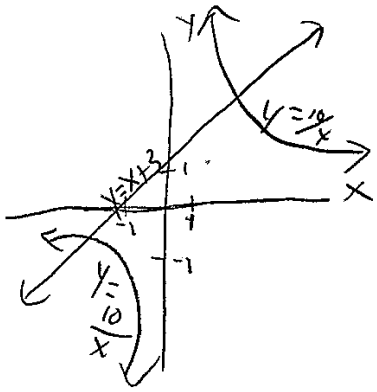
Score 2: The student has a complete and correct response, with correct work beyond the solutions.

Question 31

31 Determine algebraically the x-coordinate of all points where the graphs of $xy = 10$ and $y = x + 3$ intersect.

$\frac{xy}{x} = \frac{10}{x}$

$y = \frac{10}{x}$



x	$y = \frac{10}{x}$	$y = x + 3$
-5	-2	-2
-4	-2.5	-1
-3	-3.33	0
-2	-5	1
-1	-10	2
0	Error	3
1	10	4
2	5	5

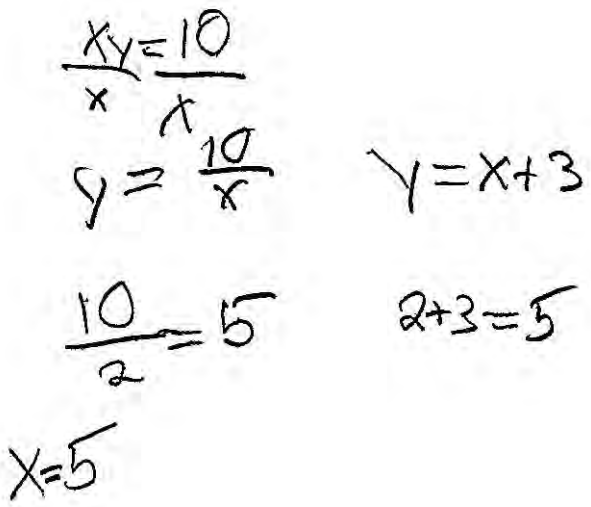
-5, -2

2, 5

Score 1: The student correctly solved the system of equations graphically.

Question 31

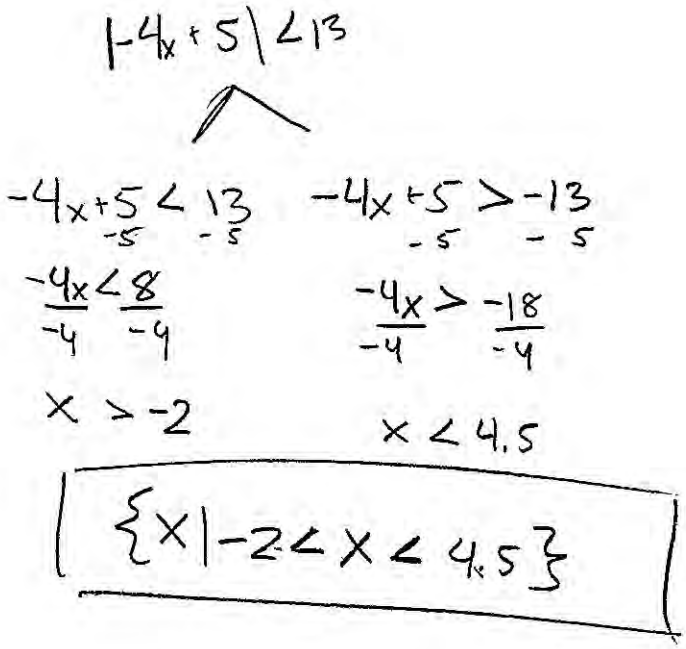
31 Determine algebraically the x-coordinate of all points where the graphs of $xy = 10$ and $y = x + 3$ intersect.



Score 0: The student correctly solved for $y = \frac{10}{x}$, but no further correct work is shown. The x-coordinate that the student wrote is incorrect.

Question 32

32 Solve $|-4x + 5| < 13$ algebraically for x.



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

Question 32

32 Solve $|-4x + 5| < 13$ algebraically for x.

$-4x+5<13$

$-4x<8$

$x>-2$

$-4x+5>-13$

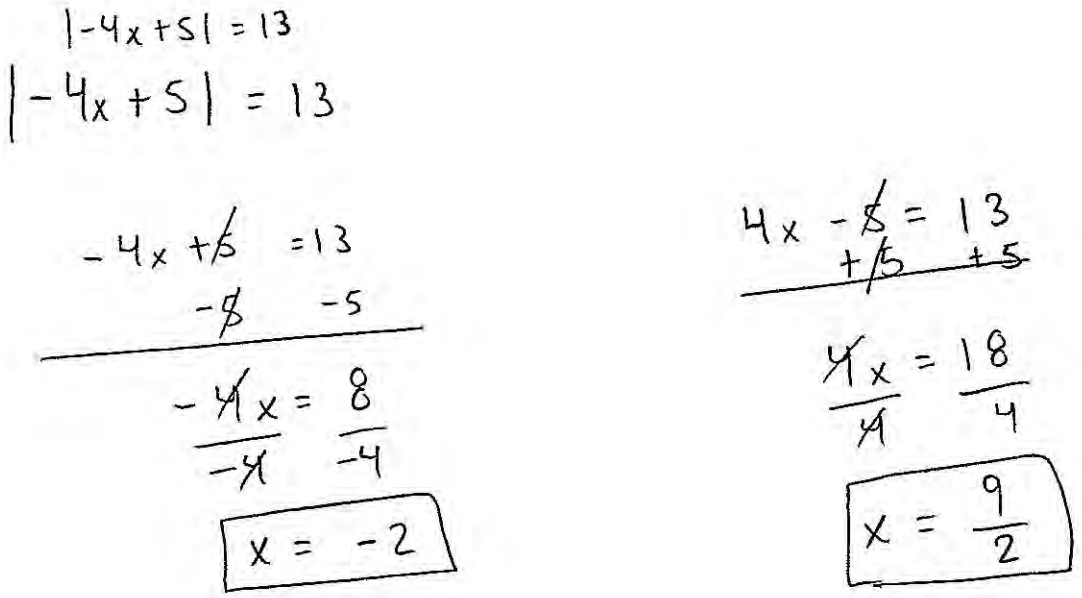
$-4x>-18$

$x<9/2$

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

Question 32

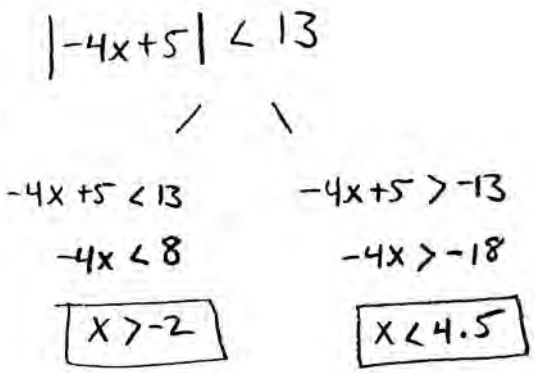
32 Solve $|-4x + 5| < 13$ algebraically for x.



Score 1: The student correctly solved the absolute value inequality as an absolute value equation. This is considered a conceptual error.

Question 32

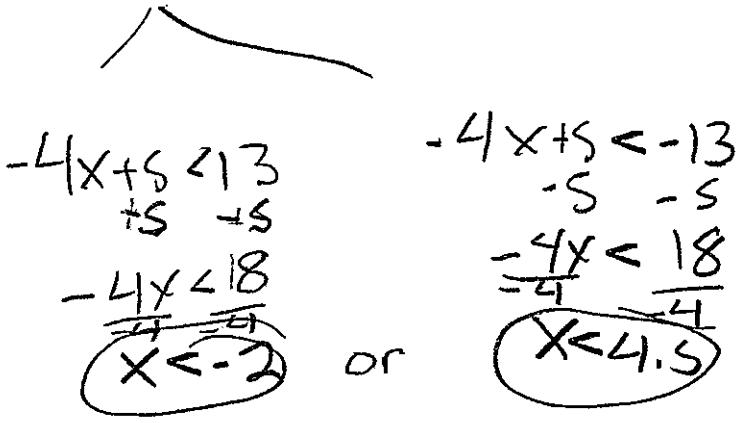
32 Solve $|-4x + 5| < 13$ algebraically for x.



Score 1: The answer is not expressed as a conjunction.

Question 32

32 Solve $|-4x + 5| < 13$ algebraically for x.



Score 0: The student made more than one conceptual error.

Question 33

33 Express $4xi + 5yi^8 + 6xi^3 + 2yi^4$ in simplest $a + bi$ form.

$4xi + 5yi^8 + 6xi^3 + 2yi^4$

$4xi - 6xi + 5y + 2y$

$-2xi + 7y$

$\boxed{7y - 2xi}$

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

Question 33

33 Express $4xi + 5yi^8 + 6xi^3 + 2yi^4$ in simplest $a + bi$ form.

$4x(\sqrt{-1}) + 5y(1) + 6x(-i) + 2y(1)$

$4x\sqrt{-1} + 5y - 6xi + 2y$

$7y + 4x\sqrt{-1} - 6xi$

Score 1: The student did not express the answer in simplest form. The $\sqrt{-1}$ should have been simplified to i.

Question 33

33 Express $4xi + 5yi^8 + 6xi^3 + 2yi^4$ in simplest $a + bi$ form.

$-4xi+5y-6xi+2y$

$-2xi+7y$

Score 1: The student did not write the solution in $a + bi$ form.

Question 33

33 Express $4xi + 5yi^8 + 6xi^3 + 2yi^4$ in simplest $a + bi$ form.

$4xi - 5y + 6xi - 2y$

$10xi - 7y$

Score 0: The student made one conceptual error in replacing i and did not put the answer in $a + bi$ form.

Question 34

34 In an arithmetic sequence, $a_4 = 19$ and $a_7 = 31$. Determine a formula for a_n, the n^{th} term of this sequence.

$d = 4$

$a_n = a_1 + (n-1)d$

$a_n = 7 + (n-1)4$

31
−19
12

7 11 15 19 23 27 31

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

Question 34

34 In an arithmetic sequence, $a_4 = 19$ and $a_7 = 31$. Determine a formula for a_n, the n^{th} term of this sequence.

7, 11, 15, 19, 23, 27, 31

$an = \frac{n(a_1 + an)}{2}$

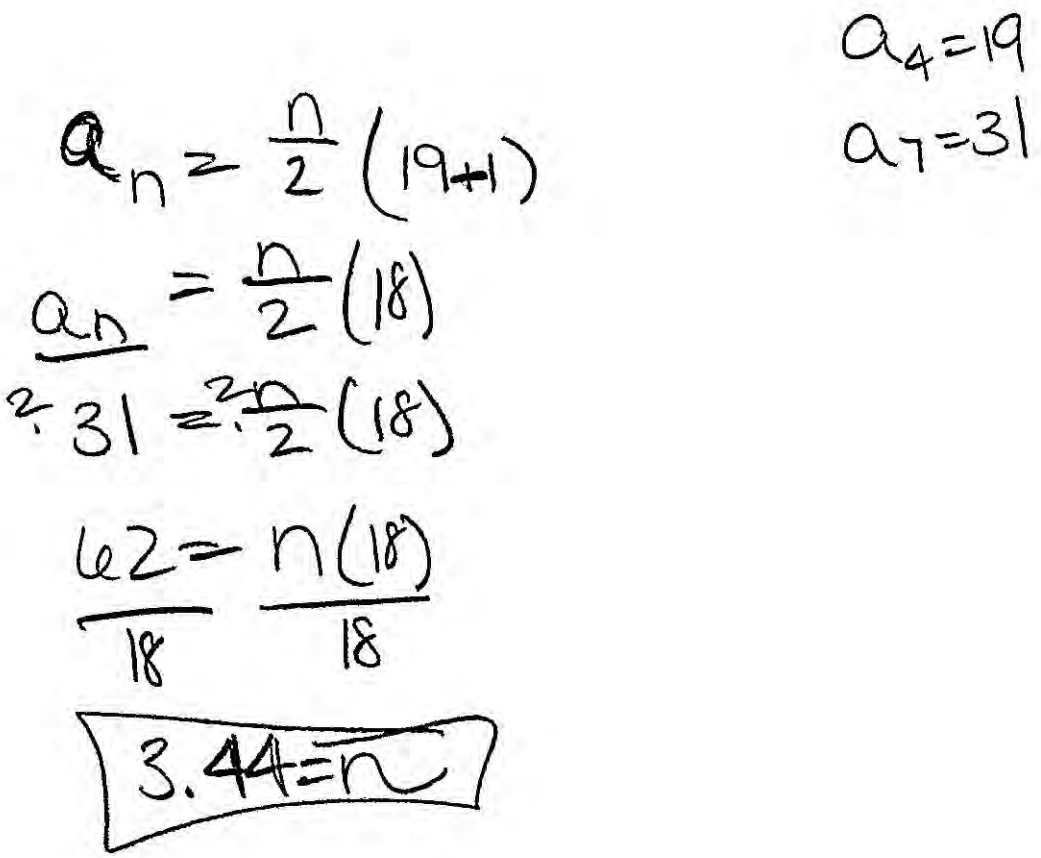
$an = 7\frac{(7+4)}{2}$

$an = \frac{7(11)}{2} = \frac{77}{2} = 38.5$

Score 1: The student found the first term, 7, and the common difference of 4. No further correct work is shown.

Question 34

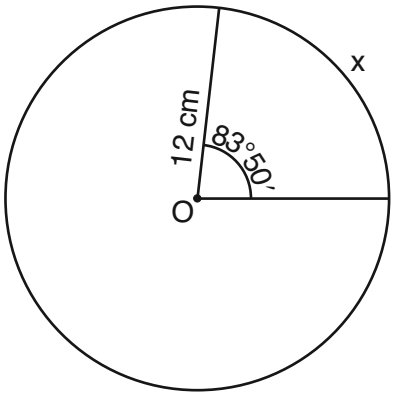
34 In an arithmetic sequence, $a_4 = 19$ and $a_7 = 31$. Determine a formula for a_n, the n^{th} term of this sequence.



Score 0: The student response is completely incoherent.

Question 35

35 Circle O shown below has a radius of 12 centimeters. To the *nearest tenth of a centimeter*, determine the length of the arc, x, subtended by an angle of 83°50′.



$S = r\theta$

$S = 12\left(\frac{83°50'\pi}{180}\right)$

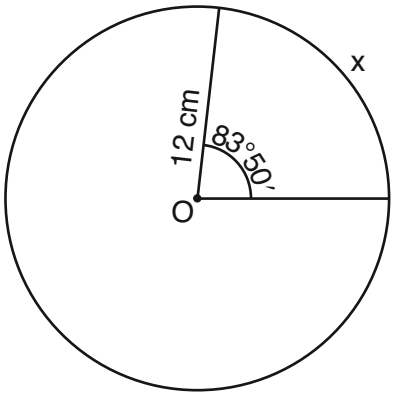
$S = 17.55801228$

$S = 17.6$ cm

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

Question 35

35 Circle O shown below has a radius of 12 centimeters. To the *nearest tenth of a centimeter*, determine the length of the arc, x, subtended by an angle of 83°50′.



$$\frac{83°50'}{360} = \frac{x}{144\pi}$$

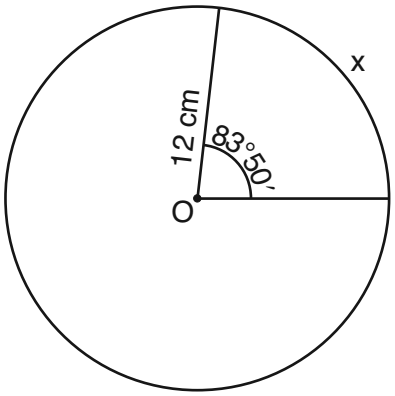
$$360x = 37925.30651$$

$$x = 105.3 \text{ cm}$$

Score 1: The student made a conceptual error by using the area of a circle rather than the circumference.

Question 35

35 Circle O shown below has a radius of 12 centimeters. To the *nearest tenth of a centimeter*, determine the length of the arc, x, subtended by an angle of 83°50′.



$C = 2\pi r$

$C = 2\pi(12)$

$C = 24\pi$

$\frac{83}{360} = \frac{50}{x}$

$\frac{83x}{83} = \frac{18000}{83}$

$x = 216.87$

$\frac{83}{360} = \frac{}{2\pi}$

Score 0: The student response is completely incoherent.

Question 36

36 Solve algebraically for all exact values of x in the interval $0 \leq x < 2\pi$:

$$2 \sin^2 x + 5 \sin x = 3$$

$2\sin^2 x + 5\sin x - 3 = 0$

$(2\sin x - 1)(\sin x + 3) = 0$

$2\sin x - 1 = 0$ or $\sin x + 3 = 0$

$2\sin x = 1$ $\quad\quad$ $\sin x = -3$

$\sin x = \frac{1}{2}$ $\quad\quad$ (IMPOSSIBLE)

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

$x = 30°$ $\quad$ $x = 150°$

$\frac{\pi}{6}$ and $\frac{5\pi}{6}$

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

Question 36

36 Solve algebraically for all exact values of x in the interval $0 \leq x < 2\pi$:

$$2\sin^2 x + 5\sin x = 3$$

$-3 \quad -3$

$2x^2 + 5x - 3 = 0$

$(2x-1)(x+3) = 0$

$2x - 1 = 0$ | $x + 3 = 0$

$+1 \quad +1$ | $-3 \quad -3$

$\frac{2x}{2} = \frac{1}{2}$ | $x = -3$

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

$\sin x = \frac{1}{2}$ ~~$\sin x = -3$~~

$x = 30$

$\frac{\pi}{6}$

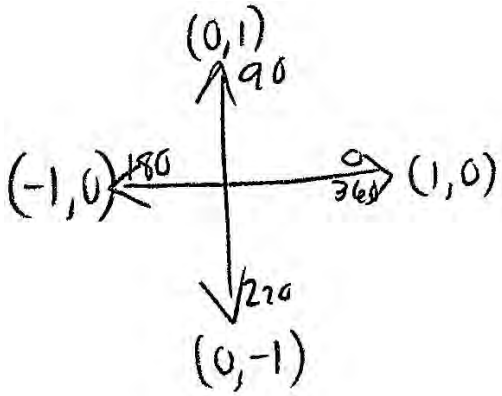
$\frac{5\pi}{6}$

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

Question 36

36 Solve algebraically for all exact values of x in the interval $0 \leq x < 2\pi$:

$$2 \sin^2 x + 5 \sin x = 3$$



$2\sin^2 x + 5\sin x - 3 = 0$

$\sin^2 x + 5\sin x - 6 = 0$

$(\sin x + \frac{3}{2})(\sin x - \frac{2}{2}) = 0$

~~$\sin x = \frac{-3}{2}$~~ $\sin x = 1$

90°

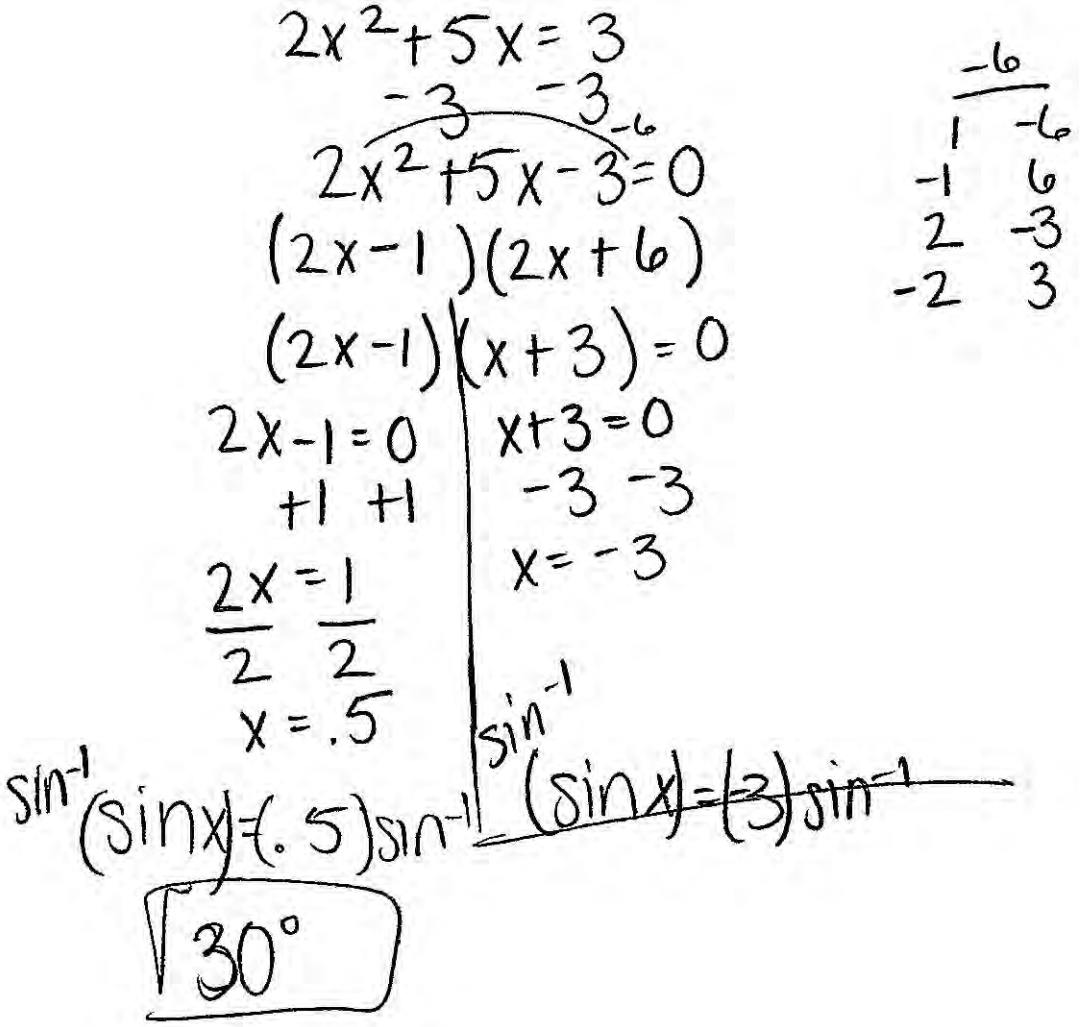
$\{\frac{\pi}{2}\}$

Score 3: The student made a factoring error.

Question 36

36 Solve algebraically for all exact values of x in the interval $0 \leq x < 2\pi$:

$$2 \sin^2 x + 5 \sin x = 3$$



Score 2: The student correctly found $\sin x = 0.5$ and $\sin x = -3$.

Question 36

36 Solve algebraically for all exact values of x in the interval $0 \leq x < 2\pi$:

$$2 \sin^2 x + 5 \sin x = 3$$

$2\sin^2 x + 5\sin x - 3 = 0$

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

$x = \frac{-5 \pm \sqrt{5^2 - 4(2)(-3)}}{2(2)}$

$x = \frac{-5 \pm \sqrt{49}}{4}$

$x = \frac{-5 \pm 7}{4}$

$\sin x = 3$
$\sin x = -5$

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

Question 36

36 Solve algebraically for all exact values of x in the interval $0 \leq x < 2\pi$:

$$2 \sin^2 x + 5 \sin x = 3$$

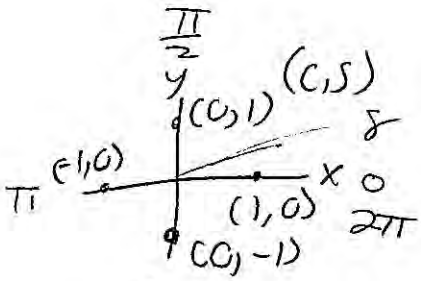
$2\sin^2 x + 5\sin x - 3 = 0$

$2\sin^2 x + 5\sin x = 3$

$\sin x(2\sin + 5) = 3$

$\sin$

2π



$\sin x(2\sin) = -2$

$3\pi/2$

θ π

$\theta/360$

$\pi/45$

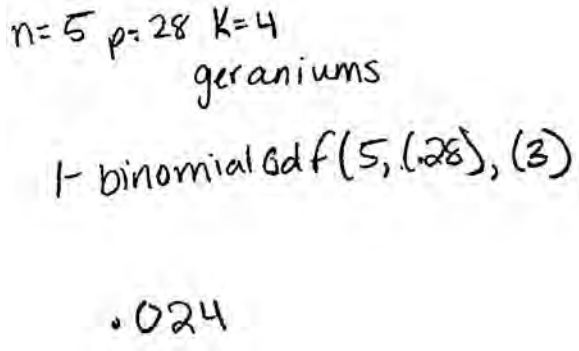
-2

360

Score 0: The student made more than one conceptual error.

Question 37

37 Because Sam's backyard gets very little sunlight, the probability that a geranium planted there will flower is 0.28. Sam planted five geraniums. Determine the probability, to the *nearest thousandth*, that *at least* four geraniums will flower.



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

Question 37

37 Because Sam's backyard gets very little sunlight, the probability that a geranium planted there will flower is 0.28. Sam planted five geraniums. Determine the probability, to the *nearest thousandth*, that *at least* four geraniums will flower.

$_5C_4(.28)^4(.72)^1 + {}_5C_5(.28)^5(.72)^0$

0.024

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

Question 37

37 Because Sam's backyard gets very little sunlight, the probability that a geranium planted there will flower is 0.28. Sam planted five geraniums. Determine the probability, to the *nearest thousandth*, that *at least* four geraniums will flower.

$_5C_4(.28)^4(.72) + {}_5C_5(.28)^5(.72)^0 =$

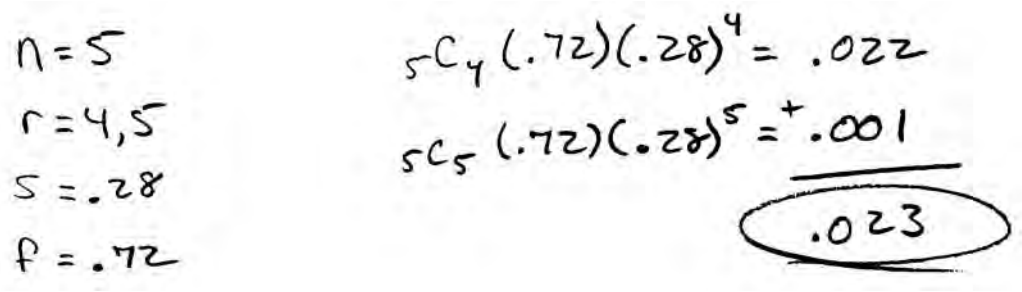
.0236486528

2.4%

Score 4: The student has a complete and correct response. The answer of 2.4% is mathematically equivalent to 0.024.

Question 37

37 Because Sam's backyard gets very little sunlight, the probability that a geranium planted there will flower is 0.28. Sam planted five geraniums. Determine the probability, to the *nearest thousandth*, that *at least* four geraniums will flower.



Score 3: The student made one rounding error.

Question 37

37 Because Sam's backyard gets very little sunlight, the probability that a geranium planted there will flower is 0.28. Sam planted five geraniums. Determine the probability, to the *nearest thousandth*, that *at least* four geraniums will flower.

4 + 5

$_5C_4\ (.28)^4 \times (.72)^1 \quad + \quad _5C_5\ (.28)^5 \times (.72)^0$

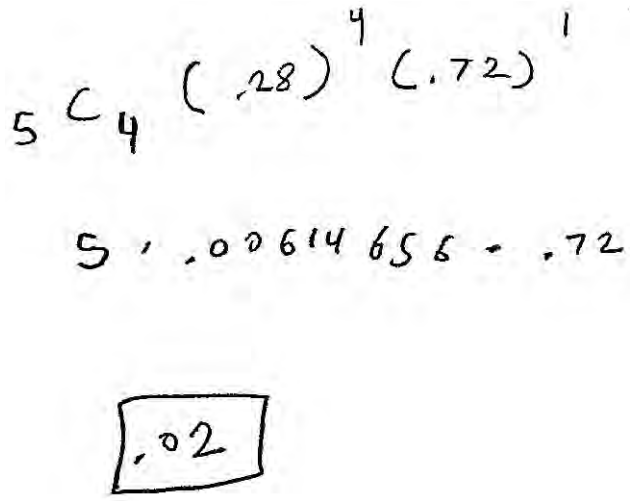
0.022127616 + 0.001721036 8

= .023 %

Score 2: The student made one rounding error and expressed the answer as a percent.

Question 37

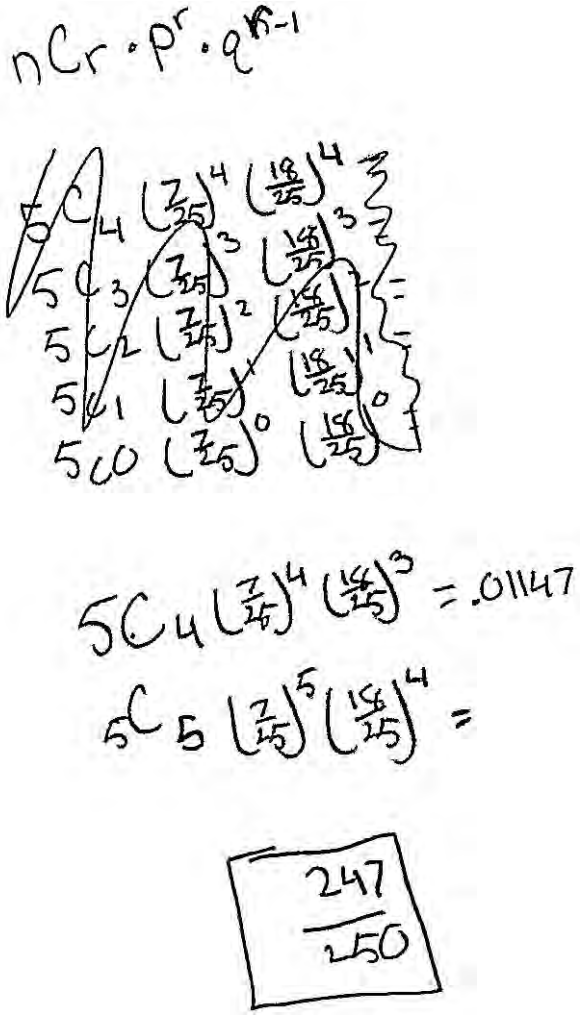
37 Because Sam's backyard gets very little sunlight, the probability that a geranium planted there will flower is 0.28. Sam planted five geraniums. Determine the probability, to the *nearest thousandth*, that *at least* four geraniums will flower.



Score 1: The student found a correct probability for exactly four out of five, and did not round to the *nearest thousandth*.

Question 37

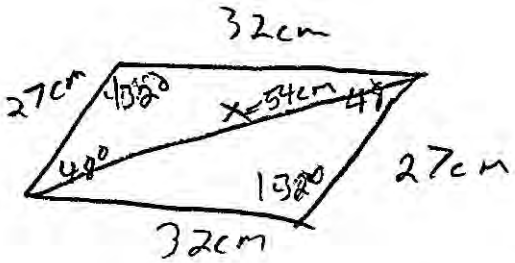
37 Because Sam's backyard gets very little sunlight, the probability that a geranium planted there will flower is 0.28. Sam planted five geraniums. Determine the probability, to the *nearest thousandth*, that *at least* four geraniums will flower.



Score 0: The student made two conceptual errors. Incorrect exponents were written, and then the student subtracted this answer from 1.

Question 38

38 Two sides of a parallelogram measure 27 cm and 32 cm. The included angle measures 48°. Find the length of the longer diagonal of the parallelogram, to the *nearest centimeter*.



$x^2 = 32^2 + 27^2 - 2(32)(27)\cos 132°$

$x^2 = 1024 + 729 - 1728\cos 132°$

$x^2 = 1753 - 1728\cos 132°$

$\sqrt{x^2} = \sqrt{2909.257688}$

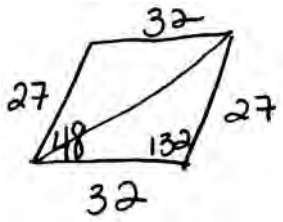
$x = 53.9$

≈ 54 cm

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

Question 38

38 Two sides of a parallelogram measure 27 cm and 32 cm. The included angle measures 48°. Find the length of the longer diagonal of the parallelogram, to the *nearest centimeter*.



$a^2 = b^2 + c^2 - 2bc \cos A$

$a^2 = (27)^2 + (32)^2 - 2(27)(32)\cos(132)$

$a^2 = 27.44$

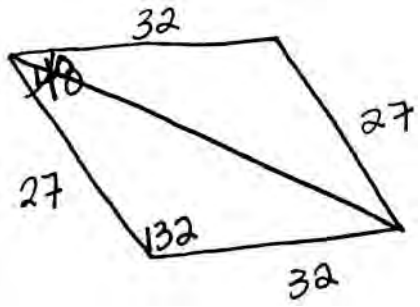
$\sqrt{27.44} = 5.24$

5cm

Score 3: The student made one computational error by using radian mode.

Question 38

38 Two sides of a parallelogram measure 27 cm and 32 cm. The included angle measures 48°. Find the length of the longer diagonal of the parallelogram, to the *nearest centimeter*.



$a^2 = b^2 + c^2 - 2bc \cos A$

$a^2 = 27^2 + 32^2 - 2(27)(32)\cos 132$

$a^2 = 729 + 1024 - 2(27)(32)\cos 132$

$a^2 = 1753 - 2(27)(32)\cos 132$

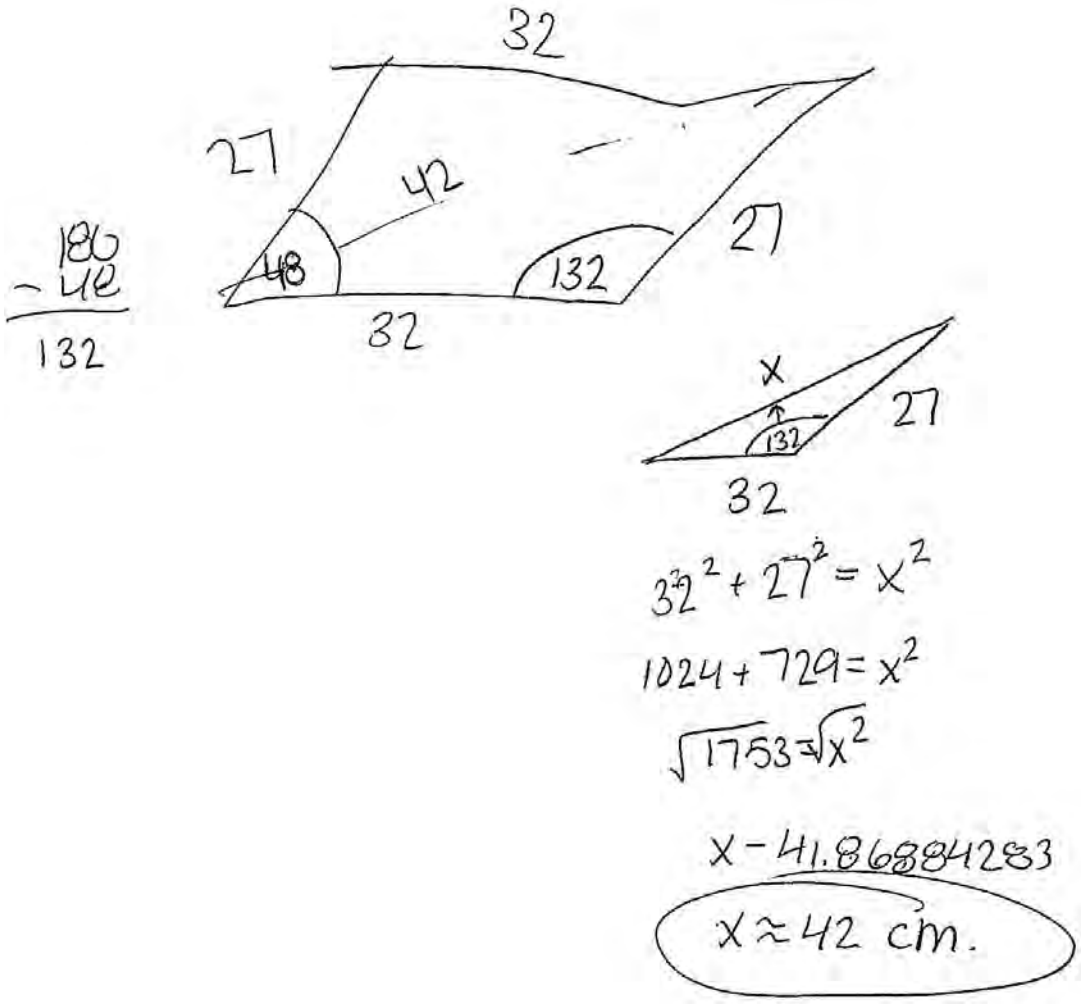
$a^2 = 1753 - 1728 \cos 132$

$a^2 = 27.436\,554\,82$

Score 2: The student made a correct substitution into the Law of Cosines.

Question 38

38 Two sides of a parallelogram measure 27 cm and 32 cm. The included angle measures 48°. Find the length of the longer diagonal of the parallelogram, to the *nearest centimeter*.



Score 1: The student drew a correctly labeled diagram. The remainder of the work shown is incorrect.

Question 38

38 Two sides of a parallelogram measure 27 cm and 32 cm. The included angle measures 48°. Find the length of the longer diagonal of the parallelogram, to the *nearest centimeter*.

$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = (32)^2 + (27)^2 - 2(32)(27)\cos 48$

$a^2 = 1024 + 729 - 1728\cos 48$

$a^2 = 25\cos 48$

$\sqrt{a^2} = \sqrt{16.728265516}$

$a = 4.090020191$

$a = 4.1$ cm

Score 0: The student made two conceptual errors by finding the shorter diagonal and combining terms incorrectly. There was also one rounding error.

Question 39

39 Solve algebraically for all values of x:

$$\log_{(x+3)}(2x + 3) + \log_{(x+3)}(x + 5) = 2$$

$\log_{(x+3)}(2x+3)(x+5) = 2$

$(x+3)^2 = (2x+3)(x+5)$

$x^2+6x+9 = 2x^2+13x+15$

$-x^2-6x-9 \quad -x^2-6x-9$

$0 = x^2+7x+6$

$0 = (x+6)(x+1)$

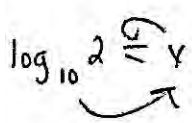
$x=-6$ reject | $x=-1$

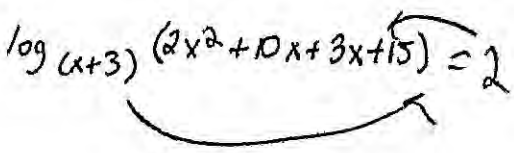
Score 6: The student has a complete and correct response.

Question 39

39 Solve algebraically for all values of x:

$$\log_{(x+3)}(2x + 3) + \log_{(x+3)}(x + 5) = 2$$





$(x+3)^2 = 2x^2 + 10x + 3x + 15$

$x^2 + 6x + 9 = 2x^2 + 13x + 15$

$-x^2 - 6x - 9 \quad -x^2 - 6x - 9$

$0 = x^2 + 7x + 6$

$0 = (x+6)(x+1)$

$x+6=0 \mid x+1=0$

$x = -6 \mid x = -1$

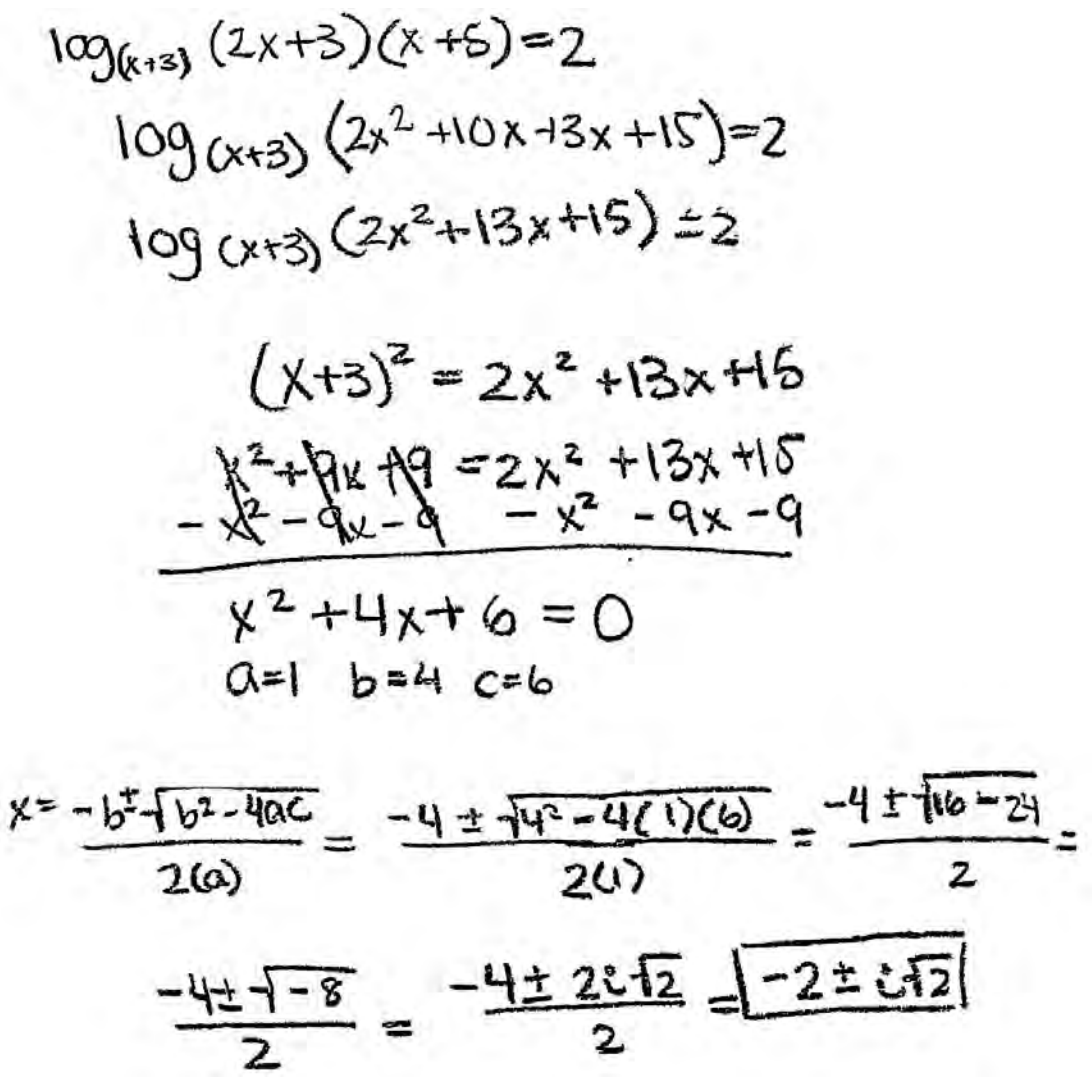
$\{-6, -1\}$

Score 5: The student did not reject −6.

Question 39

39 Solve algebraically for all values of x:

$$\log_{(x+3)}(2x + 3) + \log_{(x+3)}(x + 5) = 2$$

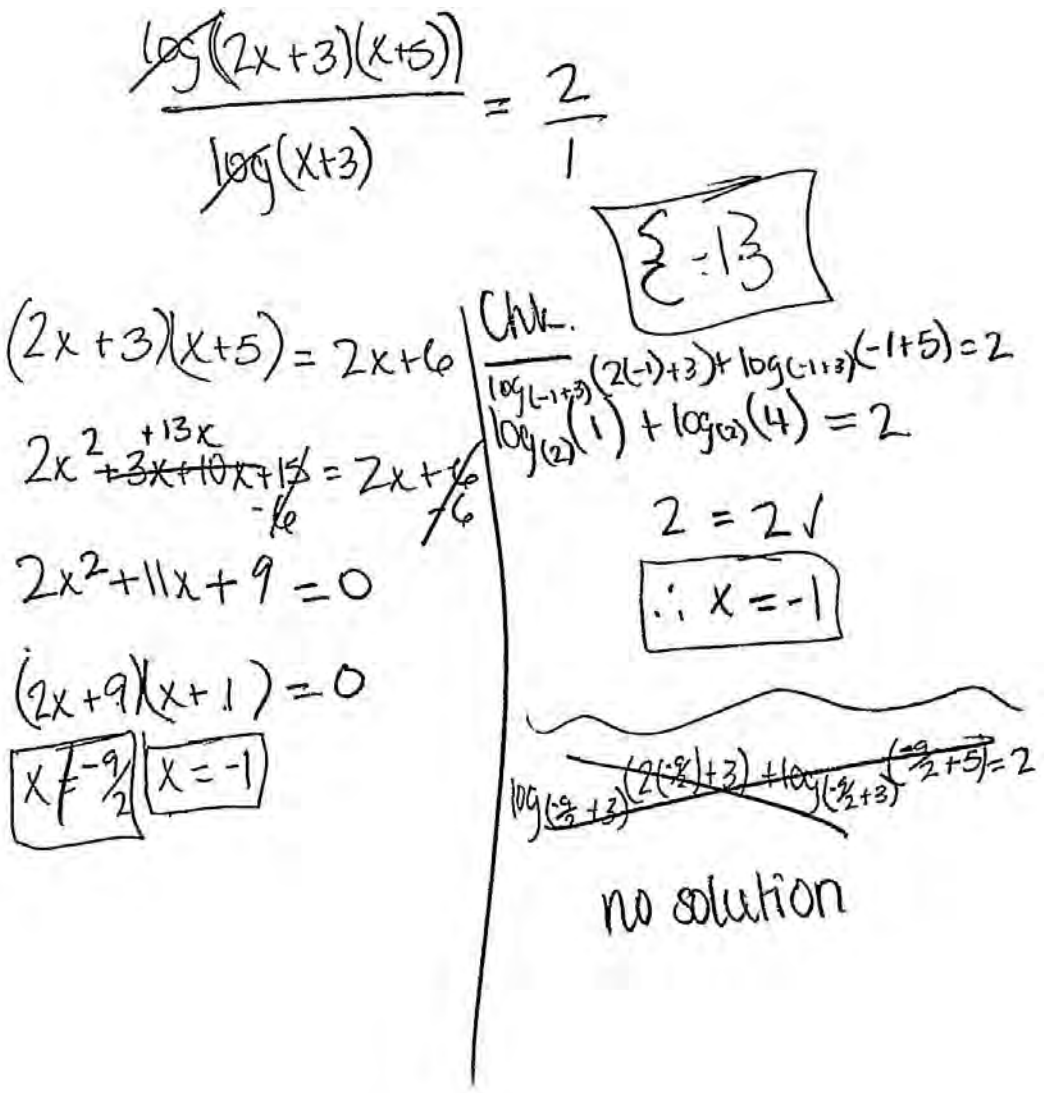


Score 4: The student made one computational error when squaring $x + 3$. The student also made an error in not discarding the imaginary solutions.

Question 39

39 Solve algebraically for all values of x:

$$\log_{(x+3)}(2x + 3) + \log_{(x+3)}(x + 5) = 2$$

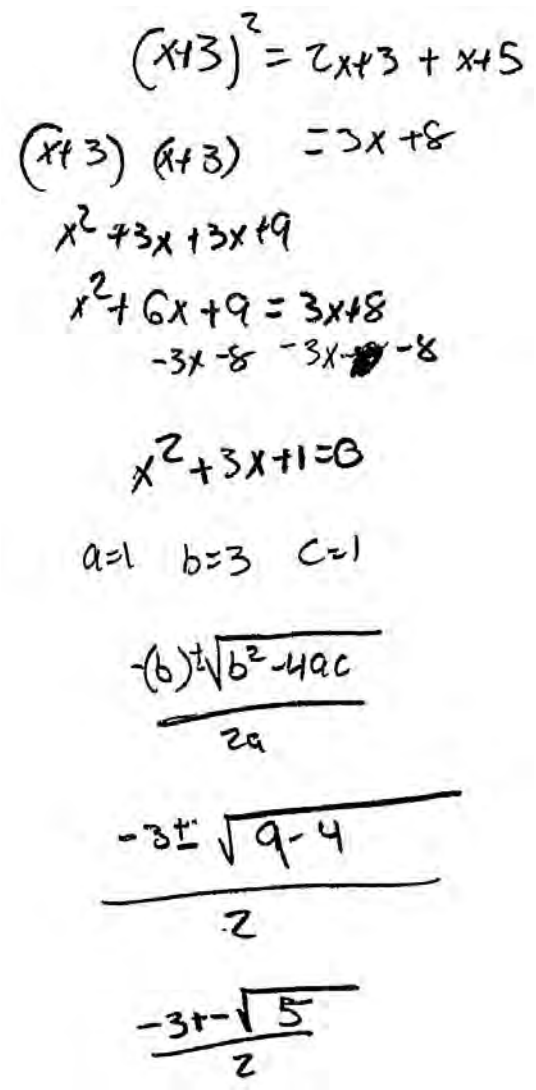


Score 3: The student made a conceptual error by canceling the logs.

Question 39

39 Solve algebraically for all values of x:

$$\log_{(x+3)}(2x + 3) + \log_{(x+3)}(x + 5) = 2$$



Score 2: The student made a conceptual error by adding the binomials. The student did not discard the solution outside the domain.

Question 39

39 Solve algebraically for all values of x:

$$\log_{(x+3)}(2x + 3) + \log_{(x+3)}(x + 5) = 2$$

$\log_{(x+3)}(2x+3)(x+5) = 2$

$\log_{(x+3)}(2x^2 + 10x + 3x + 15) = 2$

$\log_{(x+3)}(2x^2 + 7x + 15) = 2$

$(2x^2 + 7x + 15) = (x+3)^2$

$(2x^2 + 7x + 15) = x^2 + 9$

$-x^2 \quad -x^2$

$2 + 7x + 15 = 9$

$7x + 17 = 9$

$-17 \quad -17$

$\frac{7x}{7} = \frac{-8}{7}$

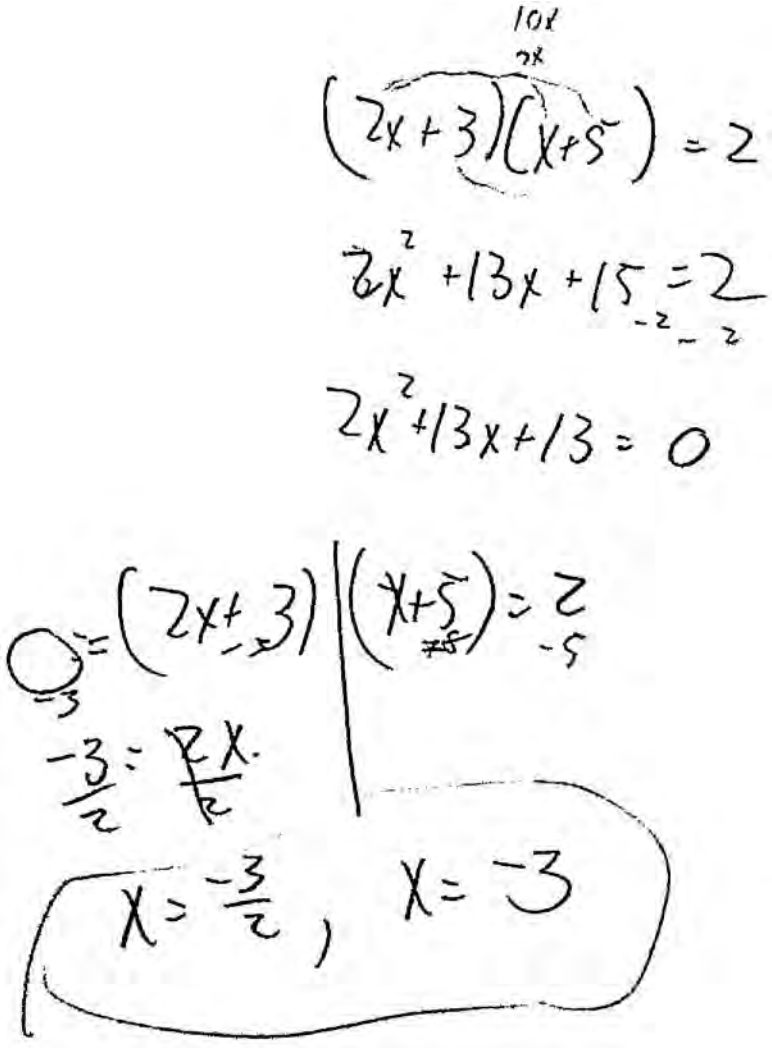
$x = -\frac{8}{7}$

Score 1: The student correctly wrote $\log_{(x+3)}(2x + 3)(x + 5) = 2$. The remainder of the work was incorrect.

Question 39

39 Solve algebraically for all values of x:

$$\log_{(x+3)}(2x + 3) + \log_{(x+3)}(x + 5) = 2$$



Score 0: The student made multiple errors in attempting to solve the log equation.

Regents Examination in Algebra 2/Trigonometry – January 2014

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

Raw Score	Scale Score
88	**100**
87	**99**
86	**99**
85	**98**
84	**98**
83	**97**
82	**96**
81	**96**
80	**95**
79	**94**
78	**94**
77	**93**
76	**92**
75	**92**
74	**91**
73	**90**
72	**89**
71	**88**
70	**88**
69	**87**
68	**86**
67	**85**
66	**84**

Raw Score	Scale Score
65	**83**
64	**83**
63	**82**
62	**81**
61	**80**
60	**79**
59	**78**
58	**77**
57	**76**
56	**76**
55	**75**
54	**74**
53	**73**
52	**72**
51	**71**
50	**70**
49	**69**
48	**68**
47	**67**
46	**66**
45	**65**
44	**63**

Raw Score	Scale Score
43	**62**
42	**61**
41	**60**
40	**59**
39	**58**
38	**56**
37	**55**
36	**54**
35	**53**
34	**51**
33	**50**
32	**49**
31	**48**
30	**46**
29	**45**
28	**43**
27	**42**
26	**41**
25	**39**
24	**38**
23	**36**
22	**35**

Raw Score	Scale Score
21	**33**
20	**32**
19	**30**
18	**29**
17	**27**
16	**26**
15	**24**
14	**23**
13	**21**
12	**19**
11	**18**
10	**16**
9	**15**
8	**13**
7	**12**
6	**10**
5	**8**
4	**7**
3	**5**
2	**3**
1	**2**
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 Algebra 2/Trigonometry.