The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA 2/TRIGONOMETRY

Wednesday, August 17, 2016 — 12:30 to 3:30 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 If the roots of the quadratic equation $ax^2 + bx + c = 0$ are real, irrational, and unequal, then the value of the discriminant is

(1) equal to zero

(2) less than zero

(3) greater than zero and a perfect square

(4) greater than zero and not a perfect square

2 Factored completely, the expression $16 \tan \theta - \tan^3 \theta$ is equivalent to

(1) $\tan \theta (4 - \tan \theta)^2$

(2) $\tan \theta (\tan \theta - 4)^2$

(3) $\tan \theta (4 - \tan \theta)(4 + \tan \theta)$

(4) $\tan \theta (\tan \theta + 4)(\tan \theta - 4)$

3 High school officials wanted to assess the need for a new diving board. They created a survey and distributed it to a large, diverse crowd at the State Swim Meet held at their school. Which characteristic of the survey is most likely to create a bias?

(1) the number of participants

(2) the height of the participants

(3) the way the set of data from the survey was analyzed

(4) the way the participants were selected to take the survey

4 Which expression is equivalent to $\cos P \cos 50 - \sin P \sin 50$?

(1) $\cos (P - 50)$

(2) $\sin (P - 50)$

(3) $\cos (P + 50)$

(4) $\sin (P + 50)$

Use this space for computations.

5 What is the product of the roots of the quadratic equation $2x^2 - x = 4$?

(1) $\frac{1}{2}$

(2) 2

(3) -2

(4) 4

6 In which method of data collection does the researcher intentionally intervene to arrange for a comparison of results?

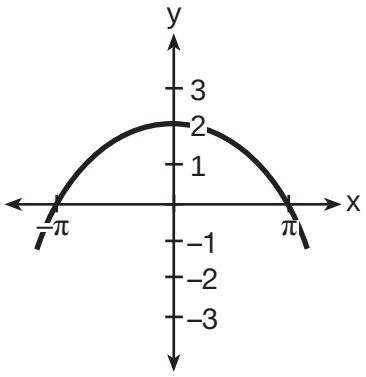
(1) taking a survey

(2) making observations

(3) filling out a questionnaire

(4) conducting a controlled experiment

7 Which equation could be represented by the graph below?



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

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

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

(4) $y = \frac{1}{2} \cos 2x$

8 The first four terms of the sequence with $a_1 = 40$ and $a_n = \frac{3}{4}a_{n-1}$ are

(1) 30, 22, 17, 13

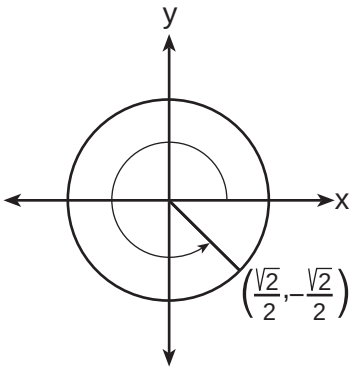
(2) 40, 30, $22\frac{1}{2}$, $16\frac{7}{8}$

(3) 40, 30, 22, 17

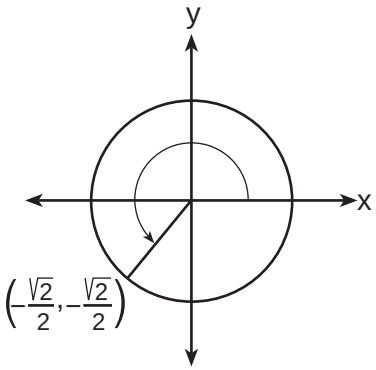
(4) 30, $22\frac{1}{2}$, $16\frac{7}{8}$, $12\frac{21}{33}$

Use this space for computations.

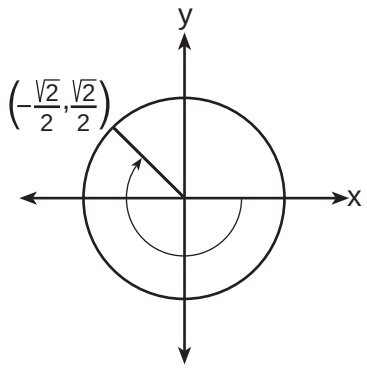
9 Which diagram represents an angle of $\frac{7}{4}\pi$ radians in standard position?



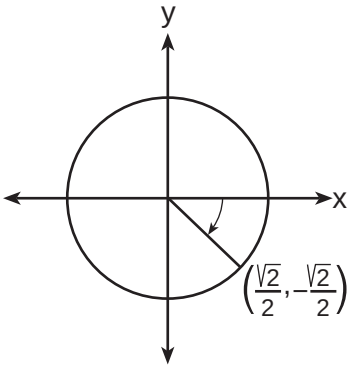
(1)



(3)



(2)



(4)

10 For all values for which the function is defined, the expression $\sqrt{\frac{a}{bc}}$ is equivalent to

(1) $\sqrt{a}$

(2) $\frac{a\sqrt{bc}}{bc}$

(3) $\sqrt{abc}$

(4) $\frac{\sqrt{abc}}{bc}$

11 The expression $\left(x^{\frac{1}{2}}y^{-\frac{2}{3}}\right)^{-6}$ is equivalent to

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

(2) $\frac{x^3}{y^4}$

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

(4) x^3y^4

Use this space for computations.

12 The value of $\sum_{x=4}^{8} i^x$, where i is the imaginary unit, is

(1) 1
(2) -1
(3) i
(4) $-i$

13 Which expression has a value of $\frac{\sqrt{3}}{3}$?

(1) cot 60°
(2) tan 60°
(3) csc 30°
(4) sec 30°

14 The solution set of $-|2x - 9| = -11$ is

(1) {}
(2) {10}
(3) {1, 10}
(4) {−1, 10}

15 Which relation is *not* a function?

(1) $y = 2|x| + 3$
(2) $y = -5(3.2)^x$
(3) $3x^2 + 3y = 20$
(4) $4x^2 + 3y^2 = 9$

16 The expression $\frac{1-\sin^2 x}{\cos^2 x}$ is equivalent to

(1) 1
(2) -1
(3) $\cos x$
(4) $\sin x$

17 Which relation is one-to-one?

(1) $x = 3$
(2) $y = x^2 - 2x$
(3) $y = \log x$
(4) $y = |x|$

Use this space for computations.

18 If $\log a = x$ and $\log b = y$, then $\log (ab^2)$ equals

(1) $\frac{1}{2}(x + y)$

(2) $x + \frac{1}{2}y$

(3) $x + 2y$

(4) $2x + 2y$

19 For a member of a certain species of bird, the probability of surviving to adulthood is $\frac{4}{7}$. In a nest of five eggs, what is the probability, to the *nearest hundredth*, that *at least* four eggs will survive to adulthood?

(1) 0.23

(2) 0.29

(3) 0.63

(4) 0.94

20 In $\triangle XYZ$, $m\angle X = 71$, $x = 6$, and $z = 2$. How many distinct triangles can be created with these parameters?

(1) 1

(2) 2

(3) 3

(4) 0

21 Which expression could be used to determine the value of y in the equation $\log_x 8 = y$?

(1) $\frac{\log 8}{x}$

(2) $\frac{\log 8}{\log x}$

(3) $\frac{8}{\log x}$

(4) $\frac{\log x}{\log 8}$

22 An electron travels along a circular path with a radius of 4.6 miles. What is the number of miles the electron traveled during an interval when the central angle formed by the electron's path was 220°?

(1) 3.84

(2) 8.83

(3) 17.66

(4) 1012

Use this space for computations.

23 Which statement about the function $f(x) = \frac{x-3}{x+2}$ is true?

(1) Its domain does not include 2.

(2) Its domain does not include 3.

(3) Its range does not include 1.

(4) Its range does not include $-\frac{3}{2}$.

24 Which value of a correlation coefficient represents the strongest relationship between the two variables in a given linear regression model?

(1) -0.94

(2) 0

(3) 0.5

(4) 0.91

25 The fourth term of the expansion of $(2x - 3)^5$ is

(1) $-1080x^2$

(2) $-540x^2$

(3) $720x^3$

(4) $810x$

26 What are the center and radius of the circle whose equation is $x^2 + y^2 + 4x = 5$?

(1) (2,0) and 1

(2) $(-2,0)$ and 1

(3) (2,0) and 3

(4) $(-2,0)$ and 3

27 The product of $\sqrt[3]{4m^2}$ and $\sqrt[3]{10m}$ expressed in simplest radical form is

(1) $\sqrt[3]{40m^3}$

(2) $2\sqrt[3]{5m^3}$

(3) $m\sqrt[3]{40}$

(4) $2m\sqrt[3]{5}$

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 Jamal has forgotten his password for the school computers. He knows that it must be 4 characters long (only lowercase letters or digits). He also knows that his password begins with one of 26 letters and ends with a digit. Determine how many different 4-character passwords are possible for Jamal if no letter or digit may be repeated.

29 Emma's parents deposited \$5000 into a bank account during her freshman year. The account pays 5% interest compounded continuously using the formula $A = Pe^{rt}$, where A is the total amount accrued, P is the principal, r is the annual interest rate, and t is time, in years.

Determine, to the *nearest dollar,* the amount in the account 4 years later.

30 Find the common difference in the arithmetic sequence, a_n, in which $a_1 = 16$ and $a_9 = 36$.

31 Solve the equation below algebraically for all values of θ in the interval $0 \leq \theta < 360°$.

$$3 \cos \theta - 1 = \cos \theta$$

32 Bacteria are being grown in a Petri dish in a biology lab. The number of bacteria in the culture after a given number of hours is shown in the table below.

Hour	1	2	3	4	5
Bacteria	1990	2200	2430	2685	2965

Assuming this exponential trend continues, is it reasonable to expect *at least* 3500 bacteria at hour 7?

Justify your answer.

33 Express in simplest form:

$$\left(\frac{a}{b}-\frac{b}{a}\right)\div\left(\frac{b}{a}-\frac{a}{b}\right)$$

34 Determine the exact value of csc P if P is an angle in standard position and its terminal side passes through the point $(5,-8)$.

35 Determine the number of degrees in $\frac{8\pi}{9}$ radians.

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 for x:

$$8^{x+3} = 32^{x^2-1}$$

37 Determine algebraically the solution to $4x^2 - 5x \geq 6(5 - 4x)$.

38 The table below shows the number of hurricanes in the North Atlantic Ocean from 1990 to 2002.

North Atlantic Ocean Hurricanes

Number of Hurricanes	8	4	4	4	3	11	9	3	10	8	8	9	4

Determine the interquartile range for this set of data.

Determine the population variance for this set of data, to the *nearest tenth*.

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 The Bermuda Triangle on a map is a section of the Atlantic Ocean bordered by line segments stretching from Miami to Bermuda to Puerto Rico and back to Miami. The distance from Miami to Bermuda is 1042 miles; the distance from Bermuda to Puerto Rico is 2057 miles; and the distance from Puerto Rico to Miami is 1127 miles. Find the area contained within the Bermuda Triangle, to the *nearest square mile.*

Tear Here

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

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

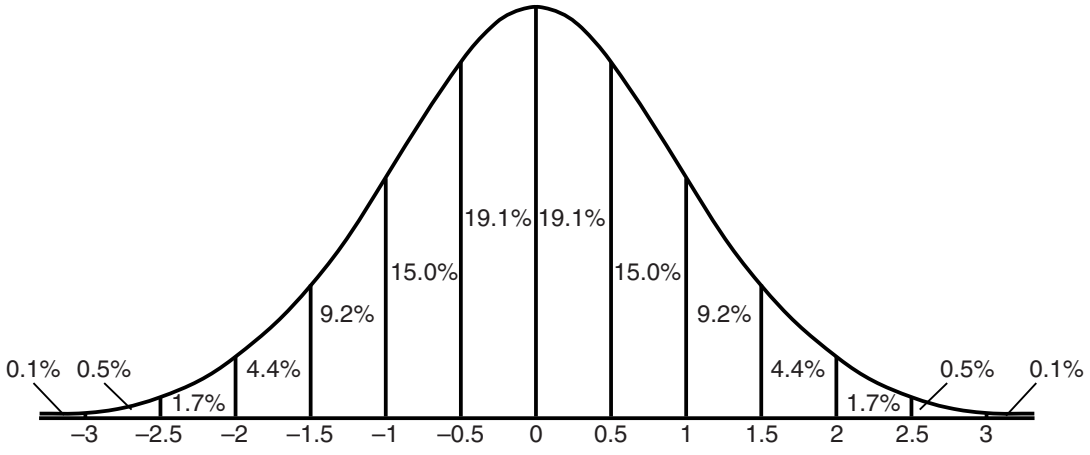
Functions of the Half Angle

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

Sum of a Finite Geometric Series

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

Normal Curve
Standard Deviation



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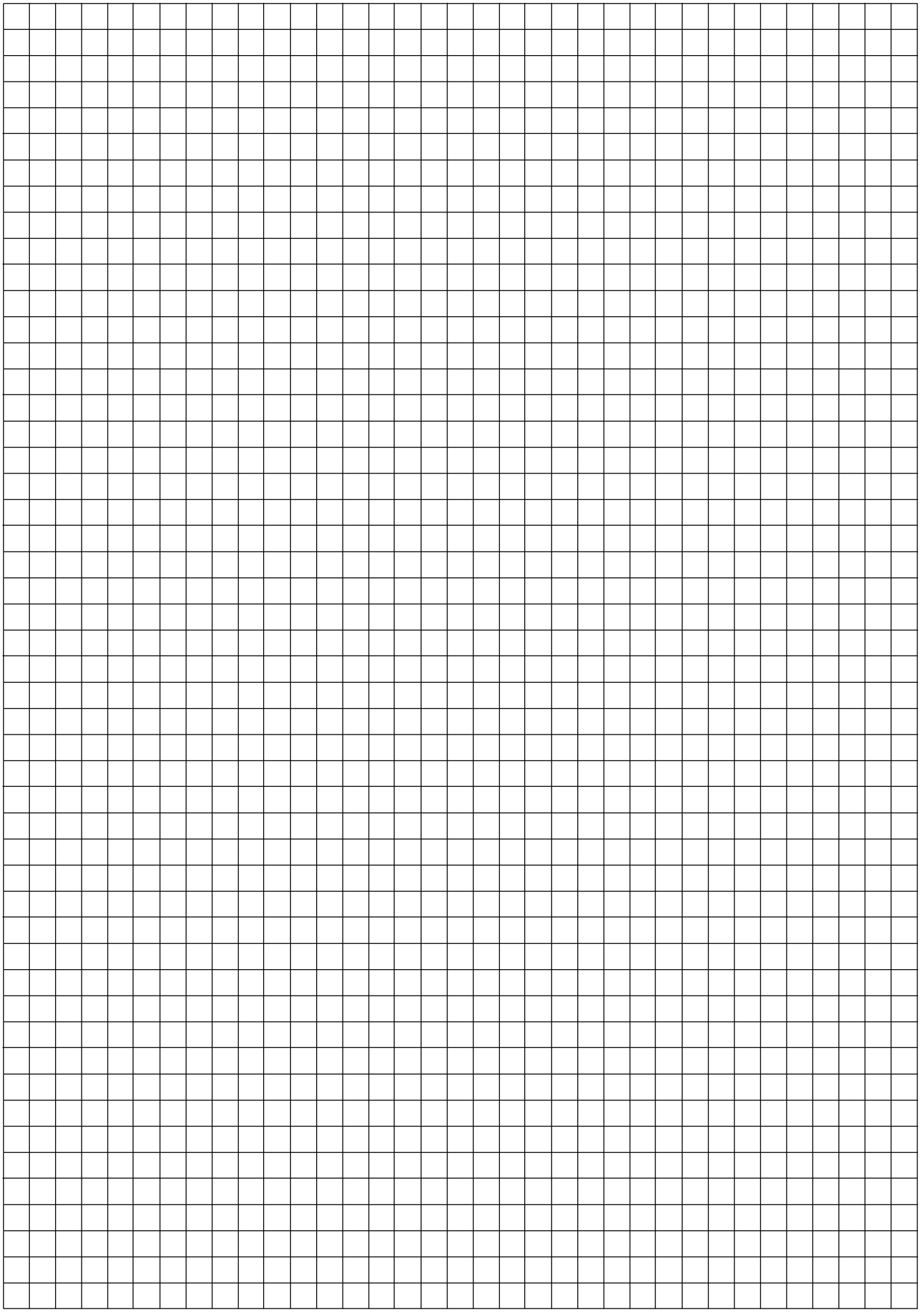
Scrap Graph Paper — This sheet will *not* be scored.



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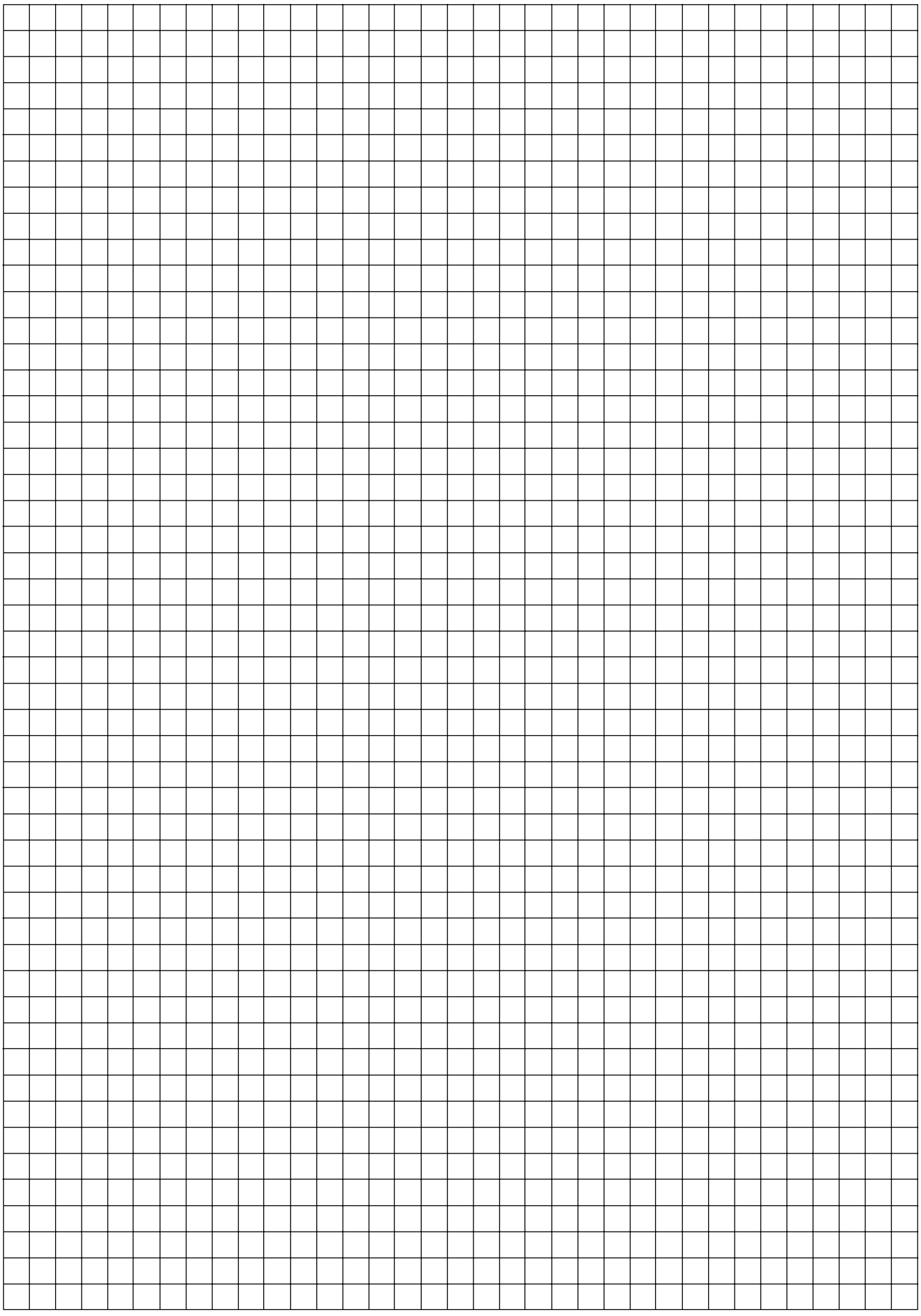

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ALGEBRA 2/TRIGONOMETRY

FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA 2/TRIGONOMETRY

Wednesday, August 17, 2016 — 12:30 to 3:30 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 Wednesday, August 17, 2016. 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) 4	(10) 4	(19) . . . . . 2 . . . . .
(2) 3	(11) 1	(20) . . . . . 1 . . . . .
(3) 4	(12) 1	(21) . . . . . 2 . . . . .
(4) 3	(13) 1	(22) . . . . . 3 . . . . .
(5) 3	(14) 4	(23) . . . . . 3 . . . . .
(6) 4	(15) 4	(24) . . . . . 1 . . . . .
(7) 2	(16) 1	(25) . . . . . 1 . . . . .
(8) 2	(17) 3	(26) . . . . . 4 . . . . .
(9) 1	(18) 3	(27) . . . . . 4 . . . . .

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

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

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

Part II

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

(28) **[2]** 291,720, 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] $26 \cdot 34 \cdot 33 \cdot 10$, but no further correct work is shown.

or

[1] 291,720, but no work is shown.

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

(29) **[2]** 6107, 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] 6107, 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]** 2.5, 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] 2.5, but no work is shown.

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

(31) **[2]** 60 and 300, 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 to find 60 or 300, but no further correct work is shown.

or

[1] 60 and 300, but a method other than algebraic is used.

or

[1] 60 and 300, 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]** Yes, and a correct justification is given.

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

or

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

or

[1] A correct exponential regression equation is given, but no further correct work is shown.

or

[1] Yes, but the justification is incomplete or incorrect.

[0] Yes, but no justification is given.

or

[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]** -1, and correct work is shown.

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

or

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

or

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

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

(34) **[2]** $-\frac{\sqrt{89}}{8}$, and correct work is shown.

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

or

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

or

[1] Appropriate work is shown, but the answer is stated as a decimal.

or

[1] $-\frac{\sqrt{89}}{8}$, but no work is shown.

[0] $\sqrt{89}$ is found, but no further correct work is shown.

or

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

(35) **[2]** 160, 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] 160, 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]** 2 and $-\frac{7}{5}$, and correct work is shown.

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

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

or

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

or

[2] Appropriate work is shown to find $5x^2 - 3x - 14 = 0$, but no further correct work is shown.

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

or

[1] $3(x + 3) = 5(x^2 - 1)$ or an equivalent equation is written, but no further correct work is shown.

or

[1] 2 and $-\frac{7}{5}$, 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.

(37) **[4]** "$x \leq -6$ or $x \geq \frac{5}{4}$" or an equivalent interval or graphical representation, and correct algebraic work is shown.

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

or

[3] Appropriate work is shown, but the solution is not expressed as a disjunction.

[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] Appropriate work is shown to find -6 and $\frac{5}{4}$, but no further correct work is shown.

or

[2] "$x \leq -6$ or $x \geq \frac{5}{4}$," 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] A correct substitution into the quadratic formula is made, but no further correct work is shown.

or

[1] A quadratic equation in standard form is written, but no further correct work is shown.

or

[1] $(x + 6)(4x - 5) \geq 0$ is written, but no further correct work is shown.

or

[1] "$x \leq -6$ or $x \geq \frac{5}{4}$," 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]** 5 and 7.8, and correct work is shown.

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

or

[3] Appropriate work is shown to find 5, but the sample standard deviation is used to find a variance of 8.4.

[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] Appropriate work is shown to find either 5 or 7.8, 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] 5 and 7.8, but no work is shown.

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

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]** 353,490, and correct work is shown.

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

or

[5] Appropriate work is shown and a correct substitution is made into the area of a triangle formula, but no further correct work is shown.

[4] Appropriate work is shown and a correct substitution is made into Heron's formula, but no further correct work is shown.

or

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

or

[4] Appropriate work is shown to find the correct measure of an angle, but no further correct work is shown.

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

or

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

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

or

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

or

[2] An angle was found using right triangle trigonometry and was used correctly in the formula $k = \frac{1}{2}ab \sin C$.

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

or

[1] A correctly labeled diagram is drawn, but no further correct work is shown.

or

[1] 2113, the semiperimeter, is found, but no further correct work is shown.

or

[1] 353,490, 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	12, 27
Algebra	1, 2, 4, 5, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 25, 26, 29, 30, 31, 33, 34, 36, 37, 39
Measurement	35
Statistics and Probability	3, 6, 19, 24, 28, 32, 38

Regents Examination in Algebra 2/Trigonometry
August 2016
Chart for Converting Total Test Raw Scores to Final Examination Scores (Scale Scores)

The *Chart for Determining the Final Examination Score for the August 2016 Regents Examination in Algebra 2/Trigonometry* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Wednesday, August 17, 2016. 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 State Education Department / The University of the State of New York

Regents Examination in Algebra 2/Trigonometry – August 2016

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	**89**
70	**88**
69	**87**
68	**86**
67	**86**
66	**85**

Raw Score	Scale Score
65	**84**
64	**83**
63	**82**
62	**81**
61	**80**
60	**79**
59	**78**
58	**77**
57	**76**
56	**75**
55	**74**
54	**73**
53	**72**
52	**71**
51	**70**
50	**69**
49	**68**
48	**67**
47	**66**
46	**65**
45	**64**
44	**63**
43	**61**

Raw Score	Scale Score
42	**60**
41	**59**
40	**58**
39	**57**
38	**56**
37	**55**
36	**53**
35	**52**
34	**51**
33	**50**
32	**48**
31	**47**
30	**46**
29	**45**
28	**44**
27	**42**
26	**41**
25	**40**
24	**38**
23	**37**
22	**36**
21	**34**
20	**33**

Raw Score	Scale Score
19	**32**
18	**30**
17	**29**
16	**28**
15	**26**
14	**25**
13	**23**
12	**22**
11	**20**
10	**19**
9	**17**
8	**16**
7	**14**
6	**12**
5	**11**
4	**9**
3	**7**
2	**5**
1	**3**
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.