The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA 2/TRIGONOMETRY

Wednesday, January 25, 2012 — 1:15 to 4:15 p.m., only

Student Name:_____

School Name:_____

Print your name and the name of your school on the lines above. Then turn to the last page of this booklet, which is the answer sheet for Part I. Fold the last page along the perforations and, slowly and carefully, tear off the answer sheet. Then fill in the heading of your answer sheet.

This examination has four parts, with a total of 39 questions. You must answer all questions in this examination. Write your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in Parts II, III, and IV directly in this booklet. All work should be written in pen, except graphs and drawings, which should be done in pencil. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc.

The formulas that you may need to answer some questions in this examination are found at the end of the examination. This sheet is perforated so you may remove it from this booklet.

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

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

Notice…

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

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

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. No partial credit will be allowed. For each question, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question. [54]

1 The yearbook staff has designed a survey to learn student opinions on how the yearbook could be improved for this year. If they want to distribute this survey to 100 students and obtain the most reliable data, they should survey

(1) every third student sent to the office

(2) every third student to enter the library

(3) every third student to enter the gym for the basketball game

(4) every third student arriving at school in the morning

2 What is the sum of the first 19 terms of the sequence 3, 10, 17, 24, 31, …?

(1) 1188   (3) 1254

(2) 1197   (4) 1292

3 Which expression, when rounded to three decimal places, is equal to -1.155?

(1) $\sec\left(\dfrac{5\pi}{6}\right)$ (3) $\sin\left(-\dfrac{3\pi}{5}\right)$

(2) $\tan(49°20')$ (4) $\csc(-118°)$

4 If $f(x) = 4x - x^2$ and $g(x) = \dfrac{1}{x}$, then $(f \circ g)\left(\dfrac{1}{2}\right)$ is equal to

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

(2) -2 (4) 4

5 A population of rabbits doubles every 60 days according to the formula $P = 10(2)^{\frac{t}{60}}$, where P is the population of rabbits on day t. What is the value of t when the population is 320?
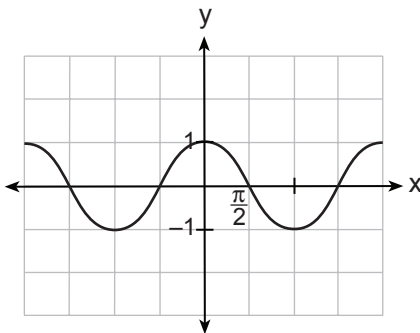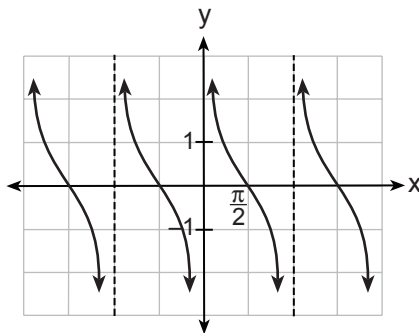
(1) 240

(3) 660

(2) 300

(4) 960

6 What is the product of $\left(\dfrac{x}{4} - \dfrac{1}{3}\right)$ and $\left(\dfrac{x}{4} + \dfrac{1}{3}\right)$?

(1) $\dfrac{x^2}{8} - \dfrac{1}{9}$

(3) $\dfrac{x^2}{8} - \dfrac{x}{6} - \dfrac{1}{9}$

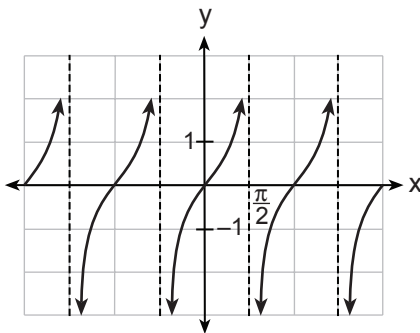(2) $\dfrac{x^2}{16} - \dfrac{1}{9}$

(4) $\dfrac{x^2}{16} - \dfrac{x}{6} - \dfrac{1}{9}$

7 Which is a graph of $y = \cot x$?

(1)
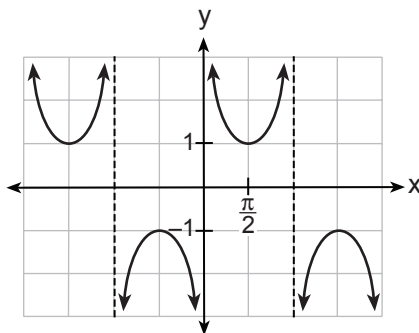
(3)

(2)

(4)

8 Which expression always equals 1?

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

(2) $\cos^2 x + \sin^2 x$ (4) $\cos x + \sin x$

9 What are the sum and product of the roots of the equation $6x^2 - 4x - 12 = 0$?

(1) sum $= -\dfrac{2}{3}$; product $= -2$

(2) sum $= \dfrac{2}{3}$; product $= -2$

(3) sum $= -2$; product $= \dfrac{2}{3}$

(4) sum $= -2$; product $= -\dfrac{2}{3}$

10 Given $\triangle ABC$ with $a = 9$, $b = 10$, and $m\angle B = 70$, what type of triangle can be drawn?

(1) an acute triangle, only

(2) an obtuse triangle, only

(3) both an acute triangle and an obtuse triangle

(4) neither an acute triangle nor an obtuse triangle

11 When $x^{-1} + 1$ is divided by $x + 1$, the quotient equals

(1) 1   (3) x

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

12 If the amount of time students work in any given week is normally distributed with a mean of 10 hours per week and a standard deviation of 2 hours, what is the probability a student works between 8 and 11 hours per week?

(1) 34.1%   (3) 53.2%

(2) 38.2%   (4) 68.2%

13 What is the conjugate of $\dfrac{1}{2} + \dfrac{3}{2}i$?

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

(2) $\dfrac{1}{2} - \dfrac{3}{2}i$ (4) $-\dfrac{1}{2} - \dfrac{3}{2}i$

14 Given angle A in Quadrant I with $\sin A = \dfrac{12}{13}$ and angle B in Quadrant II with $\cos B = -\dfrac{3}{5}$, what is the value of $\cos (A - B)$?

(1) $\dfrac{33}{65}$ (3) $\dfrac{63}{65}$

(2) $-\dfrac{33}{65}$ (4) $-\dfrac{63}{65}$

15 Which expression represents the third term in the expansion of $(2x^4 - y)^3$?

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

(2) $-6x^4y^2$ (4) $2x^4y^2$

16 What is the solution set of the equation $3x^5 - 48x = 0$?

(1) $\{0, \pm 2\}$　　　　　　　(3) $\{0, \pm 2, \pm 2i\}$

(2) $\{0, \pm 2, 3\}$　　　　　　(4) $\{\pm 2, \pm 2i\}$

17 A sequence has the following terms: $a_1 = 4, a_2 = 10, a_3 = 25, a_4 = 62.5$. Which formula represents the nth term in this sequence?

(1) $a_n = 4 + 2.5n$　　　　　(3) $a_n = 4(2.5)^n$

(2) $a_n = 4 + 2.5(n - 1)$　　(4) $a_n = 4(2.5)^{n-1}$

18 In parallelogram $BFLO$, $OL = 3.8$, $LF = 7.4$, and $m\angle O = 126$. If diagonal $\overline{BL}$ is drawn, what is the area of $\triangle BLF$?

(1) 11.4　　　　　　　　　　(3) 22.7

(2) 14.1　　　　　　　　　　(4) 28.1

19 Which statement about the graph of the equation $y = e^x$ is *not* true?

(1) It is asymptotic to the x-axis.

(2) The domain is the set of all real numbers.

(3) It lies in Quadrants I and II.

(4) It passes through the point $(e, 1)$.

20 What is the number of degrees in an angle whose measure is 2 radians?

(1) $\dfrac{360}{\pi}$　　　　　　　　(3) 360

(2) $\dfrac{\pi}{360}$　　　　　　　　(4) 90

21 A spinner is divided into eight equal sections. Five sections are red and three are green. If the spinner is spun three times, what is the probability that it lands on red *exactly* twice?

(1) $\dfrac{25}{64}$　　　　　　　　(3) $\dfrac{75}{512}$

(2) $\dfrac{45}{512}$　　　　　　　(4) $\dfrac{225}{512}$

22 What is the range of $f(x) = |x - 3| + 2$?

(1) $\{x \,|\, x \geq 3\}$　　　　　　(3) $\{x \,|\, x \in \text{real numbers}\}$

(2) $\{y \,|\, y \geq 2\}$　　　　　　(4) $\{y \,|\, y \in \text{real numbers}\}$

23 Which calculator output shows the strongest linear relationship between x and y?

(1) $\underline{\text{Lin Reg}}$
$y = a + bx$
$a = 59.026$
$b = 6.767$
$r = .8643$

(3) $\underline{\text{Lin Reg}}$
$y = a + bx$
$a = 2.45$
$b = .95$
$r = .6022$

(2) $\underline{\text{Lin Reg}}$
$y = a + bx$
$a = .7$
$b = 24.2$
$r = .8361$

(4) $\underline{\text{Lin Reg}}$
$y = a + bx$
$a = -2.9$
$b = 24.1$
$r = -.8924$

24 If $\log x^2 - \log 2a = \log 3a$, then $\log x$ expressed in terms of $\log a$ is equivalent to

(1) $\dfrac{1}{2}\log 5a$　　　　　　(3) $\log 6 + \log a$

(2) $\dfrac{1}{2}\log 6 + \log a$　　　　(4) $\log 6 + 2\log a$

25 Which function is one-to-one?

(1) $f(x) = |x|$ (3) $f(x) = x^2$

(2) $f(x) = 2^x$ (4) $f(x) = \sin x$

26 If p varies inversely as q, and $p = 10$ when $q = \dfrac{3}{2}$, what is the value

of p when $q = \dfrac{3}{5}$?

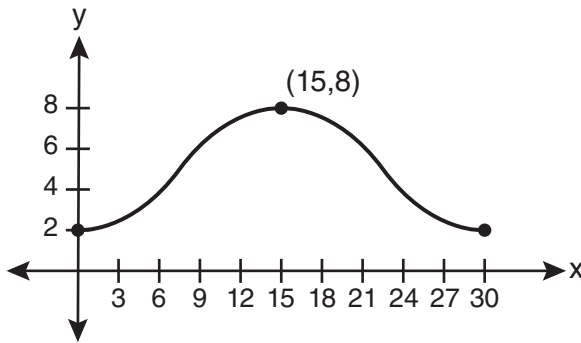(1) 25   (3) 9

(2) 15   (4) 4

27 Which equation is graphed in the diagram below?

(1) $y = 3\cos\left(\dfrac{\pi}{30}x\right) + 8$ (3) $y = -3\cos\left(\dfrac{\pi}{30}x\right) + 8$

(2) $y = 3\cos\left(\dfrac{\pi}{15}x\right) + 5$ (4) $y = -3\cos\left(\dfrac{\pi}{15}x\right) + 5$

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 Find the solution of the inequality $x^2 - 4x > 5$, algebraically.

29 Solve algebraically for x: $4 - \sqrt{2x - 5} = 1$

30 Evaluate: $\displaystyle\sum_{n=1}^{3}(-n^4 - n)$

31 Express in simplest form: $\sqrt[3]{\dfrac{a^6b^9}{-64}}$

32 A blood bank needs twenty people to help with a blood drive. Twenty-five people have volunteered. Find how many different groups of twenty can be formed from the twenty-five volunteers.

33 On the axes below, for $-2 \le x \le 2$, graph $y = 2^{x + 1} - 3$.
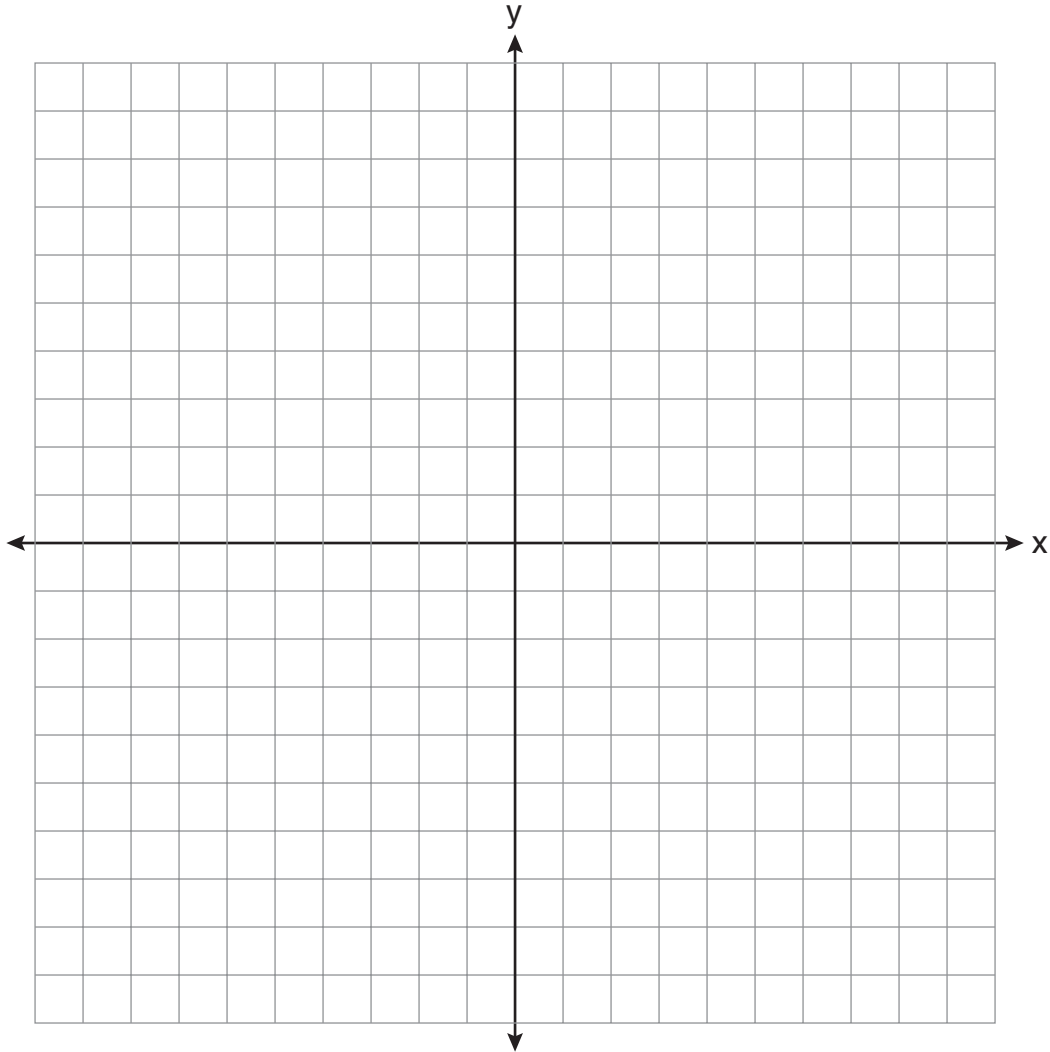
34 Write an equation of the circle shown in the diagram below.
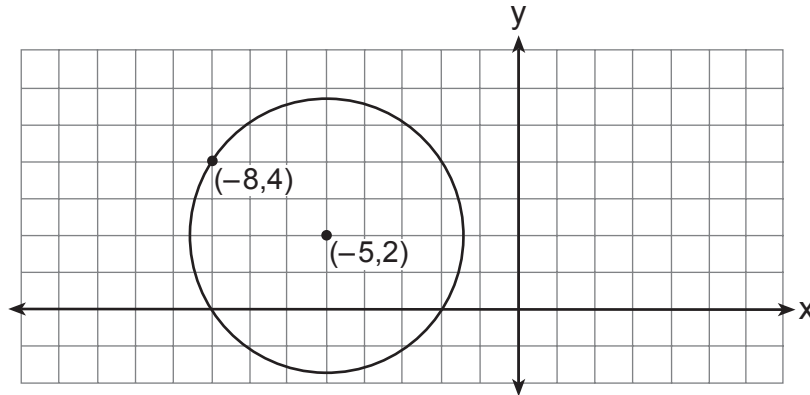
35 Express the exact value of csc 60°, with a rational denominator.

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 The diagram below shows the plans for a cell phone tower. A guy wire attached to the top of the tower makes an angle of 65 degrees with the ground. From a point on the ground 100 feet from the end of the guy wire, the angle of elevation to the top of the tower is 32 degrees. Find the height of the tower, to the *nearest foot*.

Wire   Tower

32°   65°

— 100 ft —
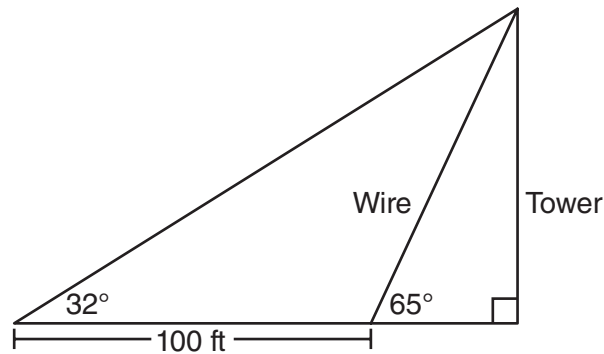
37 If $\log_4 x = 2.5$ and $\log_y 125 = -\frac{3}{2}$, find the numerical value of $\frac{x}{y}$, in simplest form.

38 A population of single-celled organisms was grown in a Petri dish over a period of 16 hours. The number of organisms at a given time is recorded in the table below.

Time, hrs (x)	Number of Organisms (y)
0	25
2	36
4	52
6	68
8	85
10	104
12	142
16	260

Determine the exponential regression equation model for these data, rounding all values to the *nearest ten-thousandth*.

Using this equation, predict the number of single-celled organisms, to the *nearest whole number*, at the end of the 18th hour.

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 Perform the indicated operations and simplify completely:

$$\frac{x^3 - 3x^2 + 6x - 18}{x^2 - 4x} \bullet \frac{2x - 4}{x^4 - 3x^3} \div \frac{x^2 + 2x - 8}{16 - x^2}$$

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

$(a + b)^n = {}_nC_0 a^n b^0 + {}_nC_1 a^{n-1} b^1 + {}_nC_2 a^{n-2} b^2 + \ldots + {}_nC_n a^0 b^n$

$(a + b)^n = \sum_{r=0}^{n} {}_nC_r a^{n-r} b^r$

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

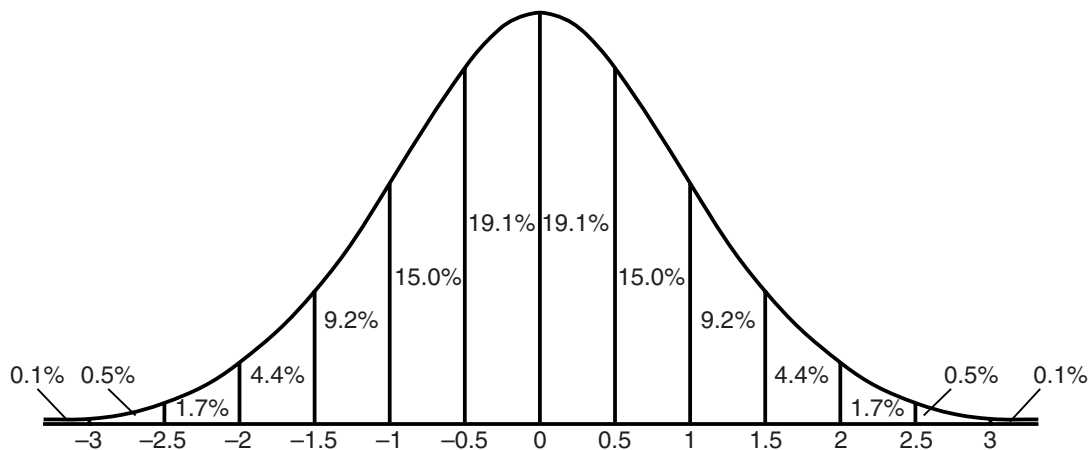$$\sin \frac{1}{2} A = \pm \sqrt{\frac{1 - \cos A}{2}}$$

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

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

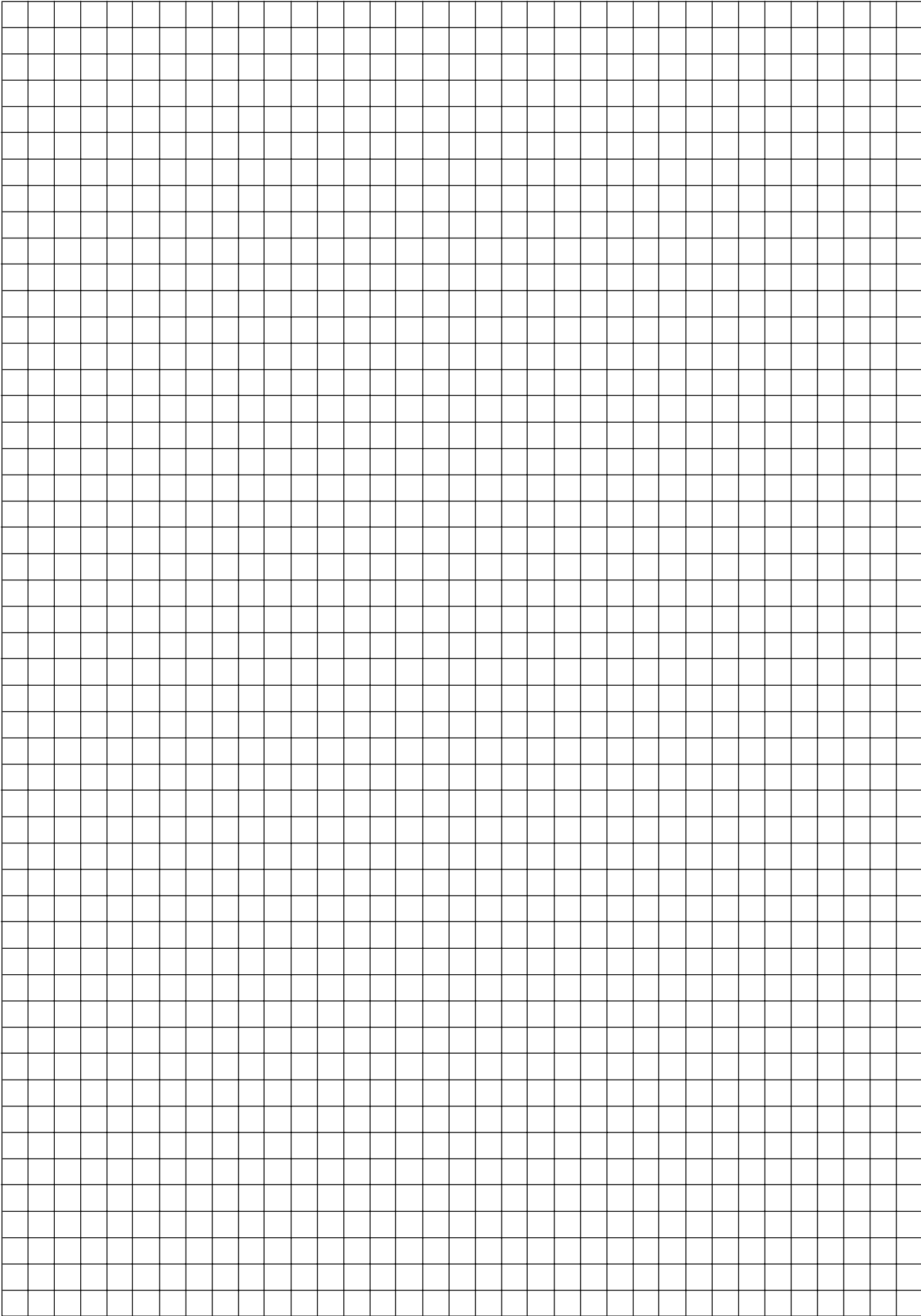**Sum of a Finite Geometric Series**

$$S_n = \frac{a_1(1 - r^n)}{1 - r}$$
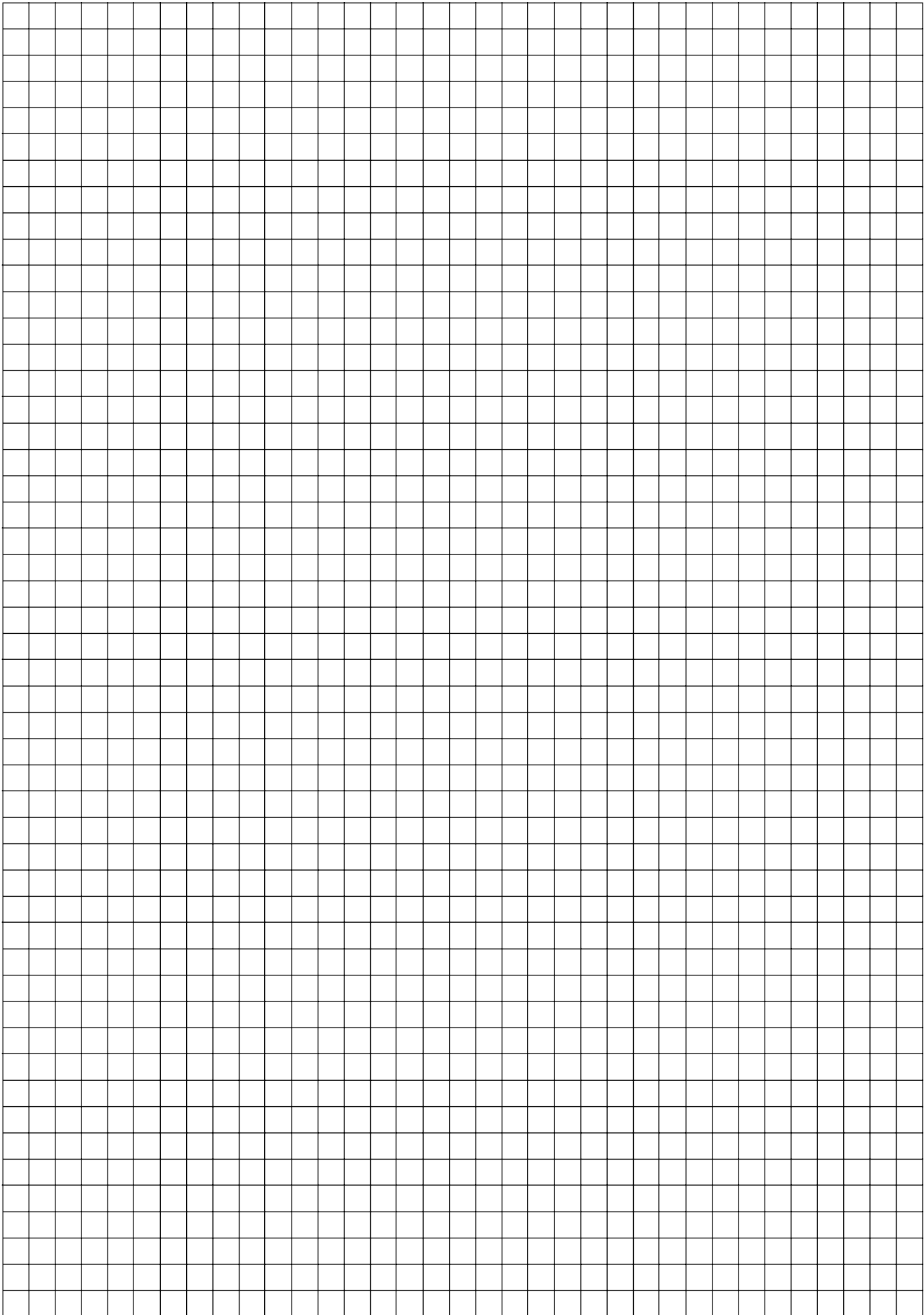
Normal Curve
Standard Deviation

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

ALGEBRA 2/TRIGONOMETRY

Wednesday, January 25, 2012 — 1:15 to 4:15 p.m., only

ANSWER SHEET

Student . . . .   Sex: ❑ Male   ❑ Female   Grade . . . . . .

Teacher . . . .   School . . . .

Your answers to Part I should be recorded on this answer sheet.

Part I

Answer all 27 questions in this part.

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

Your answers for Parts II, III, and IV should be written in the test booklet.

The declaration below must be signed when you have completed the examination.

I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination and that I have neither given nor received assistance in answering any of the questions during the examination.

_____
Signature

Tear Here

ALGEBRA 2/TRIGONOMETRY			
Question	Maximum Credit	Credits Earned	Rater's/Scorer's Initials
Part I 1–27	54		
Part II 28	2		
29	2		
30	2		
31	2		
32	2		
33	2		
34	2		
35	2		
Part III 36	4		
37	4		
38	4		
Part IV 39	6		
Maximum Total	88		

Total Raw Score Checked by Scale Score (from conversion chart)

Rater's/Scorer's Name
(minimum of three)

FOR TEACHERS ONLY

ALGEBRA 2/TRIGONOMETRY

Wednesday, January 25, 2012 — 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 rating the open-ended questions, you may make check marks in the exam booklet to indicate student errors. If the students were given scannable answer sheets for the multiple-choice questions, be careful not to make any stray marks on the answer sheet that might later interfere with the accuracy of the scanning.

Unless otherwise specified, mathematically correct variations in the answers will be allowed. Units need not be given when the wording of the questions allows such omissions.

Each student's answer paper is to be scored by a minimum of three mathematics teachers. No one teacher is to score more than approximately one-third of the open-ended questions on a student's paper. On the back of the student's detachable answer sheet, raters must enter their initials in the boxes next to the questions they have scored and also write their name in the box under the heading "Rater's/Scorer's Name."

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 detachable 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/apda/ on Wednesday, January 25, 2012. 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 detachable answer sheet. The scale score is the student's final examination score.

Part I

Allow a total of 54 credits, 2 credits for each of the following. Allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

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

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]** "$x < -1$ or $x > 5$", or an equivalent interval notation, and appropriate algebraic work is shown.

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

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

    [1] Appropriate work is shown, but one conceptual error is made, such as not representing the solution as a disjunction.

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

    [1] Appropriate work is shown, but only one correct inequality is found.

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

    [1] "$x < -1$ or $x > 5$", but a method other than algebraic is used.

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

    [1] "$x < -1$ or $x > 5$", 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.

(29)   **[2]** 7, and appropriate algebraic work is shown.

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

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

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

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

    [1] 7, but a method other than an algebraic method is used.

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

    [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.

(30)   **[2]** -104, and appropriate 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] -104, 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]** $-\dfrac{a^2b^3}{4}$

   [1] One computational or simplification error is made.

or

   [1] One conceptual error is made.

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

(32)   **[2]** 53,130, and appropriate work is shown.

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

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

       [1] Appropriate work is shown, but one conceptual error is made, such as evaluating $_{25}P_{20}$.

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

       [1] $_{25}C_{20}$ or an equivalent expression, but no further correct work is shown.

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

       [1] 53,130, but no work is shown.

       [0] $_{25}P_{20}$ is stated, but no further work is shown.

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

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

(33)   **[2]** A correct graph is drawn.

       [1] One graphing error is made.

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

       [1] One conceptual error is made.

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

(34) **[2]** $(x + 5)^2 + (y - 2)^2 = 13$, and appropriate work is shown.

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

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

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

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

[1] Appropriate work is shown to find the radius, but no further work is shown.

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

[1] $(x + 5)^2 + (y - 2)^2 = 13$, but no work is shown.

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

(35) **[2]** $\dfrac{2\sqrt{3}}{3}$, and appropriate work is shown.

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

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

[1] Appropriate work is shown, but one conceptual error is made, such as not expressing the answer with a rational denominator.

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

[1] $\dfrac{2\sqrt{3}}{3}$, but no work is shown.

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

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]** 88, and appropriate 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] The hypotenuse of one of the right triangles is found correctly, 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] 88, but no work is shown.

       [0] The obtuse triangle is treated as a right triangle.

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]** 800, and appropriate work is shown.

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

or

[3] Appropriate work is shown to find both x and y, but no further correct work is shown.

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

or

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

or

[2] Appropriate work is shown to find y, but no further correct work is shown.

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

or

[1] Appropriate work is shown to find x, but no further correct work is shown.

or

[1] 800, 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]** $y = 27.2025(1.1509)^x$ and 341, and appropriate work is shown.

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

or

[3] The expression $27.2025(1.1509)^x$ is written and 341, and appropriate work is shown.

or

[3] $y = 27.2025(1.1509)^x$ and 341, but no work is shown.

[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] The expression $27.2025(1.1509)^x$ is written and 341, but no work is shown.

or

[2] $y = 27.2025(1.1509)^x$, but no further correct work is shown.

or

[2] An incorrect regression equation of equal difficulty is solved appropriately for the number of single-celled organisms.

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

or

[1] The expression $27.2025(1.1509)^x$ is written, but no further correct work is shown.

or

[1] 341, 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]** $\dfrac{-2(x^2 + 6)}{x^4}$ *or* $\dfrac{-2x^2 - 12}{x^4}$, and appropriate work is shown.

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

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

or

[4] $\dfrac{(x^2 + 6)(x - 3)}{x(x - 4)} \bullet \dfrac{2(x - 2)}{x^3(x - 3)} \bullet \dfrac{-(x + 4)(x - 4)}{(x + 4)(x - 2)}$ or an equivalently factored expression, but no further correct work is shown.

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

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

or

[1] $\dfrac{-2(x^2 + 6)}{x^4}$ *or* $\dfrac{-2x^2 - 12}{x^4}$, 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.

Map to Core Curriculum

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

Regents Examination in Algebra 2/Trigonometry

January 2012

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

The *Chart for Determining the Final Examination Score for the January 2012 Regents Examination in Algebra 2/Trigonometry* will be posted on the Department's web site at: http://www.p12.nysed.gov/apda/ on Wednesday, January 25, 2012. Conversion charts provided for previous administrations of the Algebra 2/Trigonometry examination 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.

IMPORTANT NOTICE
Notice to Teachers

Regents Examination in Algebra 2/Trigonometry

Wednesday, January 25, 2012

This notice pertains to the scoring of Question 23 only of the Regents Examination in Algebra 2/Trigonometry.

A correct solution is not provided for Question 23. Therefore, all students shall be awarded credit for Question 23.

Please photocopy this notice and give a copy of it to each teacher scoring this examination.

We apologize for any inconvenience this may cause you and we thank you for your hard work on behalf of the students in New York State.

Regents Examination in Algebra 2/Trigonometry
January 2012

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

Raw Score	Scale Score	Raw Score	Scale Score	Raw Score	Scale Score	Raw Score	Scale Score
88	100	65	83	42	60	19	32
87	99	64	82	41	59	18	31
86	99	63	81	40	58	17	29
85	98	62	80	39	57	16	28
84	98	61	79	38	56	15	26
83	97	60	78	37	55	14	25
82	97	59	77	36	54	13	23
81	96	58	76	35	53	12	21
80	95	57	75	34	52	11	20
79	94	56	74	33	51	10	18
78	94	55	73	32	49	9	16
77	93	54	72	31	48	8	15
76	92	53	71	30	47	7	13
75	91	52	70	29	46	6	11
74	91	51	69	28	45	5	9
73	90	50	68	27	43	4	7
72	89	49	67	26	42	3	6
71	88	48	66	25	41	2	4
70	87	47	65	24	39	1	2
69	86	46	64	23	38	0	0
68	85	45	63	22	37		
67	84	44	62	21	35		
66	83	43	61	20	34		

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.