The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA 2/TRIGONOMETRY

Tuesday, June 15, 2010—9:15 a.m. to 12:15 p.m., only

Student Name: _____

School Name: _____

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

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, using a No. 2 pencil, on the separate answer sheet provided to you. Write your answers to the questions in Parts II, III, and IV directly in this test booklet. All work for Parts II, III, and IV 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, record your answer, using a No. 2 pencil, on the separate answer sheet provided to you. [54]

Use this space for computations.

1 What is the common difference of the arithmetic sequence 5, 8, 11, 14?

(1) $\frac{8}{5}$

(2) -3

(3) 3

(4) 9

2 What is the number of degrees in an angle whose radian measure is $\frac{11\pi}{12}$?

(1) 150

(2) 165

(3) 330

(4) 518

3 If $a = 3$ and $b = -2$, what is the value of the expression $\frac{a^{-2}}{b^{-3}}$?

(1) $-\frac{9}{8}$

(2) -1

(3) $-\frac{8}{9}$

(4) $\frac{8}{9}$

Use this space for computations.

4 Four points on the graph of the function f(x) are shown below.

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

Which equation represents f(x)?

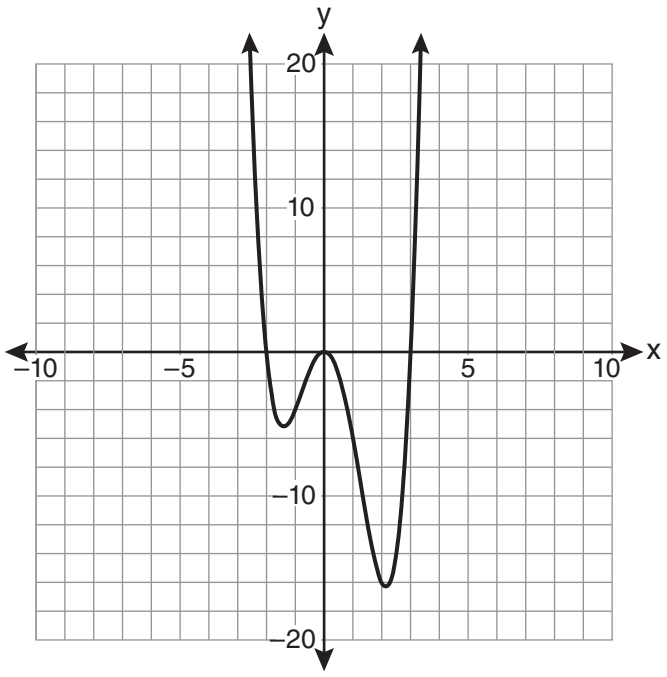
(1) $f(x) = 2^x$

(2) $f(x) = 2x$

(3) $f(x) = x + 1$

(4) $f(x) = \log_2 x$

5 The graph of $y = f(x)$ is shown below.



Which set lists all the real solutions of f(x) = 0?

(1) {−3, 2}

(2) {−2, 3}

(3) {−3, 0, 2}

(4) {−2, 0, 3}

Use this space for computations.

6 In simplest form, $\sqrt{-300}$ is equivalent to

(1) $3i\sqrt{10}$

(2) $5i\sqrt{12}$

(3) $10i\sqrt{3}$

(4) $12i\sqrt{5}$

7 Twenty different cameras will be assigned to several boxes. Three cameras will be randomly selected and assigned to box *A*. Which expression can be used to calculate the number of ways that three cameras can be assigned to box *A*?

(1) 20!

(2) $\frac{20!}{3!}$

(3) ${}_{20}C_3$

(4) ${}_{20}P_3$

8 Factored completely, the expression $12x^4 + 10x^3 - 12x^2$ is equivalent to

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

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

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

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

9 The solutions of the equation $y^2 - 3y = 9$ are

(1) $\frac{3 \pm 3i\sqrt{3}}{2}$

(2) $\frac{3 \pm 3i\sqrt{5}}{2}$

(3) $\frac{-3 \pm 3\sqrt{5}}{2}$

(4) $\frac{3 \pm 3\sqrt{5}}{2}$

Use this space for computations.

10 The expression $2 \log x - (3 \log y + \log z)$ is equivalent to

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

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

(3) $\log \frac{2x}{3yz}$

(4) $\log \frac{2xz}{3y}$

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

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

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

(3) $\sqrt{(x^2 - 1)^3}$

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

12 Which expression is equivalent to $\frac{\sqrt{3} + 5}{\sqrt{3} - 5}$?

(1) $-\frac{14 + 5\sqrt{3}}{11}$

(2) $-\frac{17 + 5\sqrt{3}}{11}$

(3) $\frac{14 + 5\sqrt{3}}{14}$

(4) $\frac{17 + 5\sqrt{3}}{14}$

13 Which relation is *not* a function?

(1) $(x - 2)^2 + y^2 = 4$

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

(3) $x + y = 4$

(4) $xy = 4$

Use this space for computations.

14 If $\angle A$ is acute and $\tan A = \frac{2}{3}$, then

(1) $\cot A = \frac{2}{3}$

(2) $\cot A = \frac{1}{3}$

(3) $\cot(90° - A) = \frac{2}{3}$

(4) $\cot(90° - A) = \frac{1}{3}$

15 The solution set of $4^{x^2 + 4x} = 2^{-6}$ is

(1) $\{1, 3\}$

(2) $\{-1, 3\}$

(3) $\{-1, -3\}$

(4) $\{1, -3\}$

16 The equation $x^2 + y^2 - 2x + 6y + 3 = 0$ is equivalent to

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

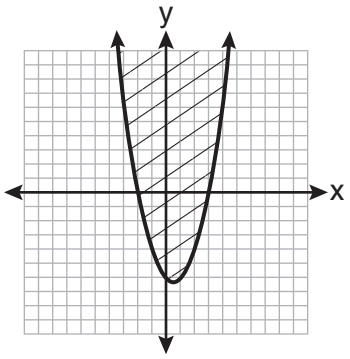
(2) $(x - 1)^2 + (y + 3)^2 = 7$

(3) $(x + 1)^2 + (y + 3)^2 = 7$

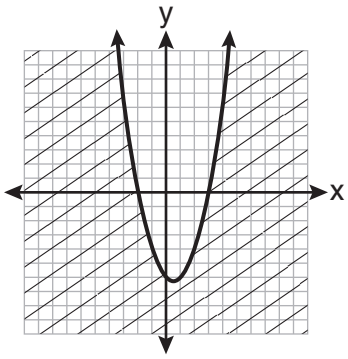
(4) $(x + 1)^2 + (y + 3)^2 = 10$

Use this space for computations.

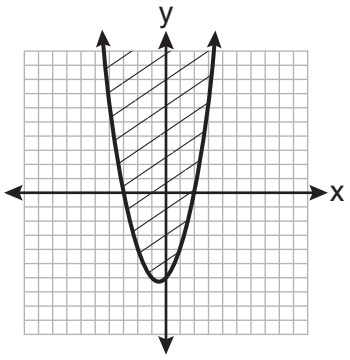
17 Which graph best represents the inequality $y + 6 \geq x^2 - x$?



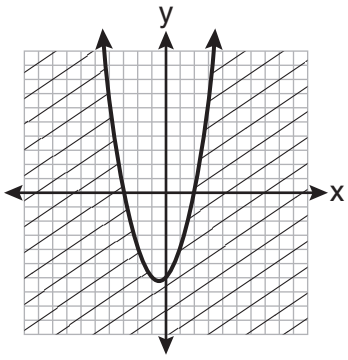
(1)



(3)



(2)



(4)

18 The solution set of the equation $\sqrt{x + 3} = 3 - x$ is

(1) $\{1\}$

(2) $\{0\}$

(3) $\{1, 6\}$

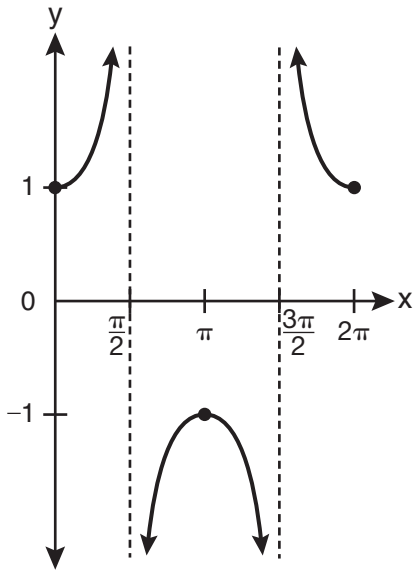
(4) $\{2, 3\}$

Use this space for computations.

19 The product of i^7 and i^5 is equivalent to

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

20 Which equation is represented by the graph below?



(1) $y = \cot x$
(2) $y = \csc x$
(3) $y = \sec x$
(4) $y = \tan x$

21 Which value of r represents data with a strong negative linear correlation between two variables?

(1) -1.07
(2) -0.89
(3) -0.14
(4) 0.92

Use this space for computations.

22 The function $f(x) = \tan x$ is defined in such a way that $f^{-1}(x)$ is a function. What can be the domain of $f(x)$?

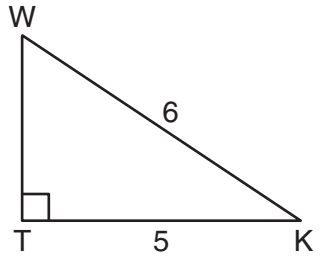
(1) $\{x \mid 0 \leq x \leq \pi\}$

(2) $\{x \mid 0 \leq x \leq 2\pi\}$

(3) $\left\{x \mid -\frac{\pi}{2} < x < \frac{\pi}{2}\right\}$

(4) $\left\{x \mid -\frac{\pi}{2} < x < \frac{3\pi}{2}\right\}$

23 In the diagram below of right triangle KTW, $KW = 6$, $KT = 5$, and $m\angle KTW = 90$.



What is the measure of $\angle K$, to the *nearest minute*?

(1) 33°33'

(2) 33°34'

(3) 33°55'

(4) 33°56'

24 The expression $\cos^2 \theta - \cos 2\theta$ is equivalent to

(1) $\sin^2 \theta$

(2) $-\sin^2 \theta$

(3) $\cos^2 \theta + 1$

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

Use this space for computations.

25 Mrs. Hill asked her students to express the sum $1 + 3 + 5 + 7 + 9 + \ldots + 39$ using sigma notation. Four different student answers were given. Which student answer is correct?

(1) $\sum_{k=1}^{20} (2k - 1)$

(2) $\sum_{k=2}^{40} (k - 1)$

(3) $\sum_{k=-1}^{37} (k + 2)$

(4) $\sum_{k=1}^{39} (2k - 1)$

26 What is the formula for the nth term of the sequence 54, 18, 6, . . .?

(1) $a_n = 6\left(\frac{1}{3}\right)^n$

(2) $a_n = 6\left(\frac{1}{3}\right)^{n-1}$

(3) $a_n = 54\left(\frac{1}{3}\right)^n$

(4) $a_n = 54\left(\frac{1}{3}\right)^{n-1}$

27 What is the period of the function $y = \frac{1}{2}\sin\left(\frac{x}{3} - \pi\right)$?

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

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

(3) $\frac{2}{3}\pi$

(4) 6π

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 Use the discriminant to determine all values of k that would result in the equation $x^2 - kx + 4 = 0$ having equal roots.

29 The scores of one class on the Unit 2 mathematics test are shown in the table below.

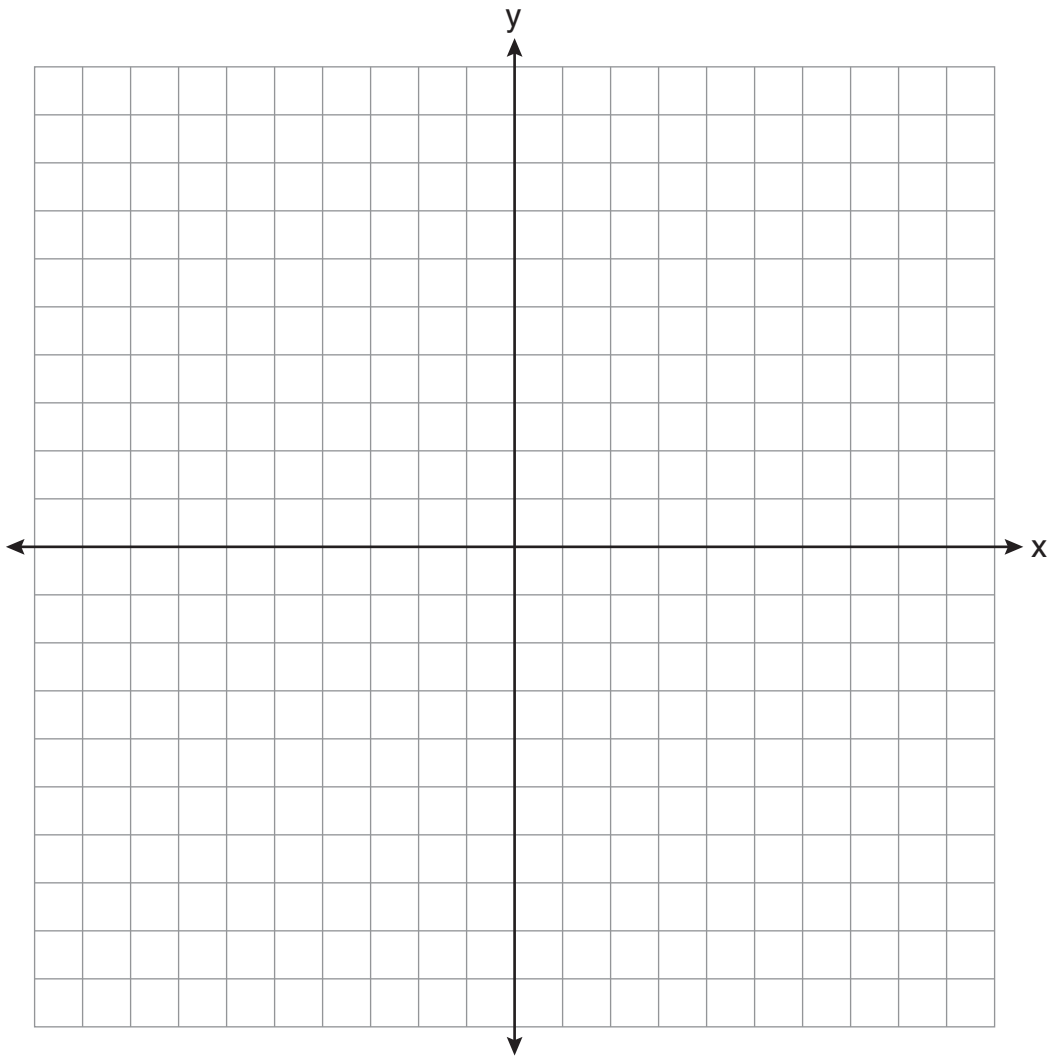
Unit 2 Mathematics Test

Test Score	Frequency
96	1
92	2
84	5
80	3
76	6
72	3
68	2

Find the population standard deviation of these scores, to the *nearest tenth*.

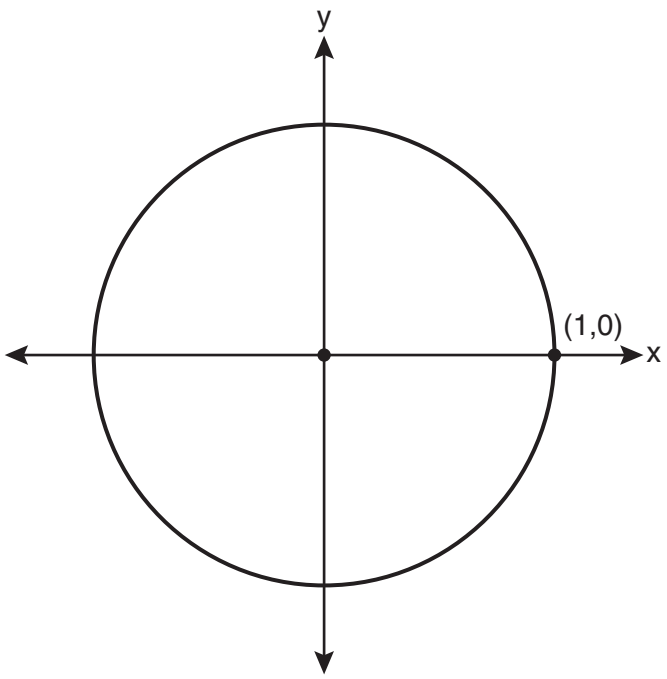
30 Find the sum and product of the roots of the equation $5x^2 + 11x - 3 = 0$.

31 The graph of the equation $y = \left(\frac{1}{2}\right)^x$ has an asymptote. On the grid below, sketch the graph of $y = \left(\frac{1}{2}\right)^x$ and write the equation of this asymptote.



32 Express $5\sqrt{3x^3} - 2\sqrt{27x^3}$ in simplest radical form.

33 On the unit circle shown in the diagram below, sketch an angle, in standard position, whose degree measure is 240 and find the exact value of sin 240°.



34 Two sides of a parallelogram are 24 feet and 30 feet. The measure of the angle between these sides is 57°. Find the area of the parallelogram, to the *nearest square foot*.

35 Express in simplest form: $\dfrac{\frac{1}{2} - \frac{4}{d}}{\frac{1}{d} + \frac{3}{2d}}$

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 The members of a men's club have a choice of wearing black or red vests to their club meetings. A study done over a period of many years determined that the percentage of black vests worn is 60%. If there are 10 men at a club meeting on a given night, what is the probability, to the *nearest thousandth*, that *at least* 8 of the vests worn will be black?

37 Find all values of θ in the interval $0° \leq \theta < 360°$ that satisfy the equation $\sin 2\theta = \sin \theta$.

38 The letters of any word can be rearranged. Carol believes that the number of different 9-letter arrangements of the word "TENNESSEE" is greater than the number of different 7-letter arrangements of the word "VERMONT." Is she correct? Justify your answer.

Part IV

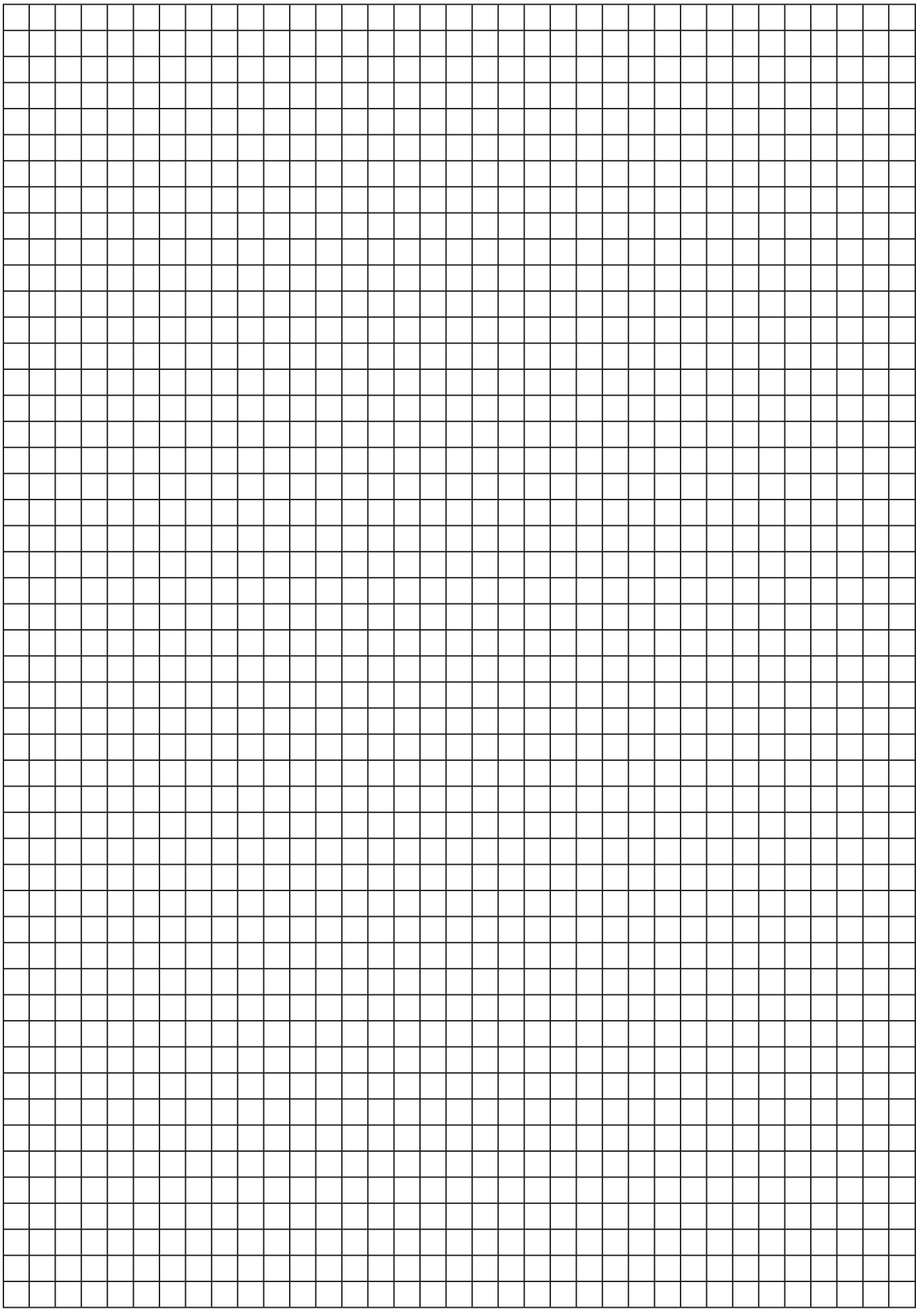
Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. A correct numerical answer with no work shown will receive only 1 credit. The answer should be written in pen. [6]

39 In a triangle, two sides that measure 6 cm and 10 cm form an angle that measures 80°. Find, to the *nearest degree*, the measure of the smallest angle in the triangle.

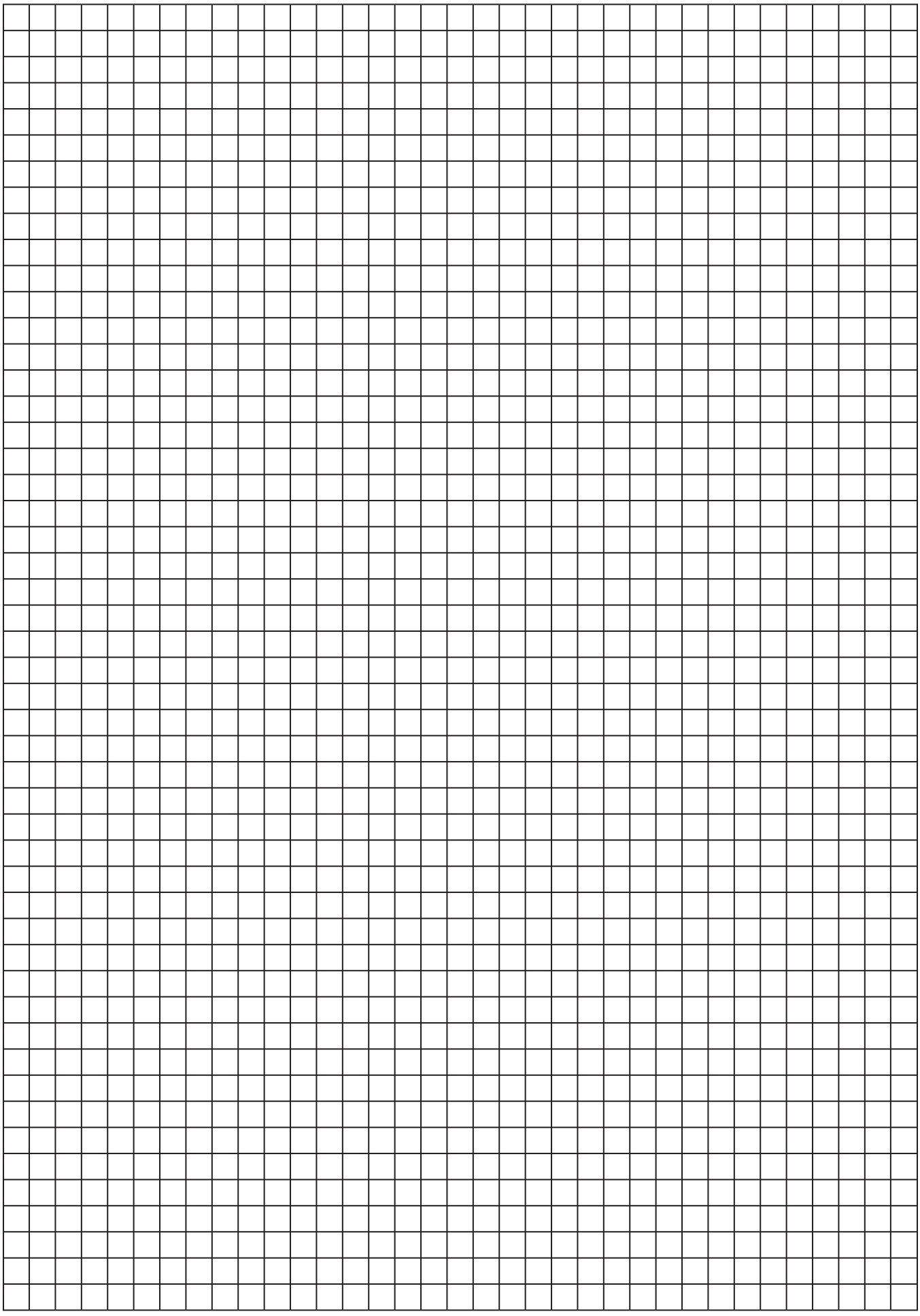
Tear Here

Tear Here

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



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



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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

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

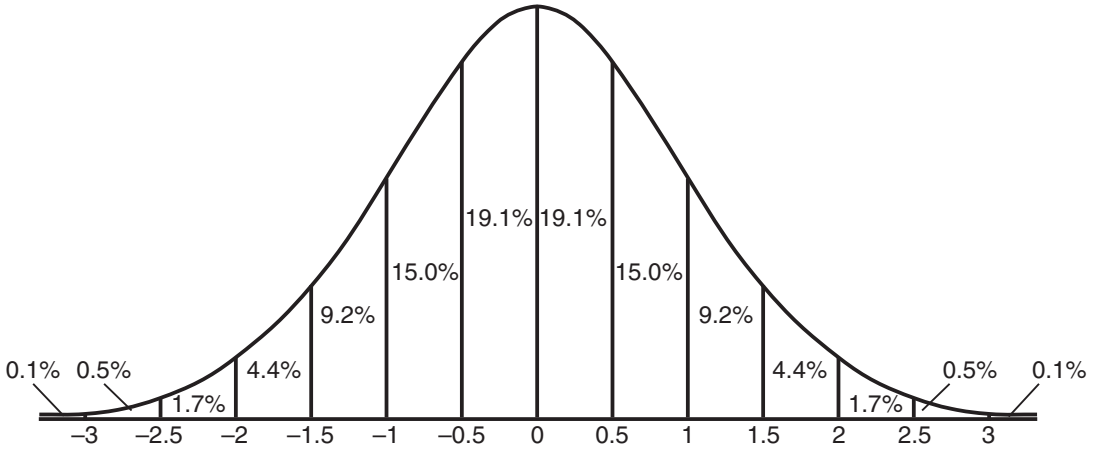
Functions of the Half Angle

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

Sum of a Finite Geometric Series

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

Normal Curve
Standard Deviation



FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA 2/TRIGONOMETRY

Tuesday, June 15, 2010 – 9:15 a.m. to 12:15 p.m., only

SCORING KEY AND RATING GUIDE

Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Regents Examination in Algebra 2/Trigonometry. More detailed information about scoring is provided in the publication *Information Booklet for Scoring the Regents Examination in Algebra 2/Trigonometry.*

Use only a No. 2 pencil in rating the Regents Examination in Algebra 2/Trigonometry. Do *not* attempt to correct the student's work by making insertions or changes of any kind. Scoring overlays have been included in the package of scoring materials and must be used to score Part I, the multiple-choice section. When scoring the examination:

- **cut out** the rectangular space on the bottom of the scoring overlay to record the total Part I score
- **do not** punch holes in the scoring overlay
- **do not** make any marks on the answer sheet, other than in the spaces provided for recording scores
- **do not** machine scan the answer sheets. Marking up or scanning these answer sheets will interfere with the score collection.

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. On the back of the student's detachable answer sheet, raters must write their name in the box under the heading "Rater's/Scorer's Name," and also bubble in the circle under "Rater's/Scorer's Code Letter" that corresponds to their name.

Raters should record the student's scores for all questions and the total raw score on the student's answer sheet. Make a careful record to be retained in the school of the total raw score earned by each student. The State Education Department will provide a recordkeeping form for this purpose as part of the detailed directions for administering and scoring the June 2010 Regents Examination in Algebra 2/Trigonometry.

The conversion chart for the Regents Examination in Algebra 2/Trigonometry will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ no later than Rating Day, Thursday, June 24, 2010.

Part I

Allow a total of 54 credits, 2 credits for each of the following:

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

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site http://www.emsc.nysed.gov/osa/ and select the link "Examination 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.

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 Examination in Algebra 2/Trigonometry*, use their own professional judgment, confer with other mathematics teachers, and/or contact the consultants at 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 two credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(28) **[2]** 4 and –4, and appropriate work using the discriminant 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 only one value of k is found.

or

[1] $k^2 - 4(1)(4) = 0$ or an equivalent equation, but no further correct work is shown.

or

[1] 4 and –4, but a method other than the discriminant is used.

or

[1] 4 and –4, but no work is shown.

[0] 4 or –4, 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.

(29) **[2]** 7.4

[1] One rounding error is made.

or

[1] One conceptual error is made, such as stating 7.5, the sample standard deviation.

[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]** Sum = $-\frac{11}{5}$ and product = $-\frac{3}{5}$ or an equivalent answer, and appropriate work is shown, such as stating the formulas.

[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 answers are not labeled or are labeled incorrectly.

or

[1] Appropriate work is shown to find sum = $-\frac{11}{5}$ or product = $-\frac{3}{5}$, but no further correct work is shown.

or

[1] Sum = $-\frac{11}{5}$ and product = $-\frac{3}{5}$, but no work is shown.

[0] $-\frac{11}{5}$ and $-\frac{3}{5}$, 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.

(31) **[2]** A correct graph is drawn, and $y = 0$.

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

or

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

or

[1] A correct graph is drawn, and x-axis is stated as the asymptote.

or

[1] A correct graph is drawn, but no further correct work is shown.

or

[1] $y = 0$, 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]** $-x\sqrt{3x}$, 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, such as not expressing the answer in simplest radical form.

or

[1] $-x\sqrt{3x}$, 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]** An angle in standard position is drawn correctly and $-\frac{\sqrt{3}}{2}$.

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

or

[1] Appropriate work is shown, but one conceptual error is made, such as stating the value of sin 240 to be -0.866.

or

[1] An angle in standard position is drawn correctly, but no further correct work is shown.

or

[1] $-\frac{\sqrt{3}}{2}$, 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]** 604, and appropriate 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] 604, but no work is shown.

[0] Appropriate work is shown to find 720, but no further 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]** $\frac{d-8}{5}$, 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] $\frac{d-8}{5}$, but no work is shown.

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

Part III

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

(36) **[4]** 0.167, 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, such as finding at most 8 black vests.

or

[2] A correct expression, such as ${}_{10}C_8(0.6)^8(0.4)^2 + {}_{10}C_9(0.6)^9(0.4)^1 + {}_{10}C_{10}(0.6)^{10}(0.4)^0$, is written, 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] The probability for *exactly* eight times is calculated correctly.

or

[1] 0.167, 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]** 0, 60, 180, and 300, and appropriate work is shown.

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

or

[3] Appropriate work is shown, but only three of the four correct solutions are found.

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

or

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

or

[2] Appropriate work is shown, but only two of the four correct solutions are found.

or

[2] Appropriate work is shown, and $\sin\theta = 0$ and $2\cos\theta - 1 = 0$ is written, but no further correct work is shown.

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

or

[1] Appropriate work is shown, and $\sin\theta\,(2\cos\theta - 1) = 0$ is written, but no further correct work is shown.

or

[1] 0, 60, 180, and 300, but no work is shown.

[0] A correct substitution is made for $\sin\ 2\theta$, but no further correct work is shown.

or

[0] 0 or 60 or 180 or 300, but no work is shown.

or

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

(38) **[4]** No, and an appropriate justification is given, such as comparing 7! for Vermont to $\frac{9!}{4!2!2!}$ for Tennessee.

[3] Appropriate work is shown, but one computational error is made, but an appropriate justification is given.

or

[3] Appropriate work is shown to find 5,040 and 3,780, but No is not stated.

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

or

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

or

[2] Appropriate work is shown to find 3,780, but no further correct work is shown.

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

or

[1] Appropriate work is shown to find 5,040, but no further correct work is shown.

or

[1] 5,040 and 3,780 and No, but no work is shown.

[0] 5,040 and 3,780, 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.

Part IV

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

(39) **[6]** 33, and appropriate work is shown.

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

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

or

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

[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 and one computational or rounding error are made.

or

[3] Appropriate work is shown to find the third side, but no further correct work is shown.

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

or

[2] Appropriate work is shown, but two conceptual errors are made.

or

[2] Incorrectly uses the proportion $\frac{10}{\sin 80} = \frac{6}{\sin x}$ or $\frac{6}{\sin 80} = \frac{10}{\sin x}$ to find the smallest angle.

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

or

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

or

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

Regents Examination in Algebra 2/Trigonometry

June 2010

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

The *Chart for Determining the Final Examination Score for the June 2010 Regents Examination in Algebra 2/Trigonometry* will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ no later than Rating Day, Thursday, June 24, 2010.

Submitting 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.emsc.nysed.gov/osa/exameval.
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.

University of the State of New York
State Education Department

Regents Examination in Algebra 2/Trigonometry
June 2010

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

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.

It is recommended that all student answer papers that receive a scale score of 60 through 64 be scored a second time to ensure the accuracy of the score. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, except that no teacher may score the same open-ended questions that he/she scored in the first rating of the paper.

Because scale scores corresponding to raw scores in the conversion chart change from one examination 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.