The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Thursday, August 16, 2007 — 8:30 to 11:30 a.m., only

Print Your Name:

Print Your School's Name:

Print your name and the name of your school in the boxes 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.

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. Write all your work in pen, except graphs and drawings, which should be done in pencil.

The formulas that you may need to answer some questions in this examination are found on page 23. This sheet is perforated so you may remove it from this booklet.

This examination has four parts, with a total of 34 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. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc.

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, a straightedge (ruler), and a compass 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 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. [40]

1 If $f(x) = (x^{-x} - x^0 + 2^x)$, then f(3) is equal to

  (1) $8\frac{1}{27}$ (3) −21

  (2) $7\frac{1}{27}$ (4) −22

2 The expression $3i(2i^2 - 5i)$ is equivalent to

  (1) $15 - 6i$ (3) $-15 - 5i$

  (2) $15 - 5i$ (4) $-1 + 0i$

3 If csc θ = −2, what is the value of sin θ?

  (1) −2   (3) $-\frac{1}{2}$

  (2) 2   (4) $\frac{1}{2}$

4 What is 235°, expressed in radian measure?

  (1) 235π (3) $\dfrac{36\pi}{47}$

  (2) $\dfrac{\pi}{235}$ (4) $\dfrac{47\pi}{36}$

5 The flight paths of two Thunderbird jets are plotted on a Cartesian coordinate plane, and the equations of the jets' flight paths are represented by $y = 2^x + 3$ and $y = 0.5^x$. The best approximation of the intersection of the flight paths is
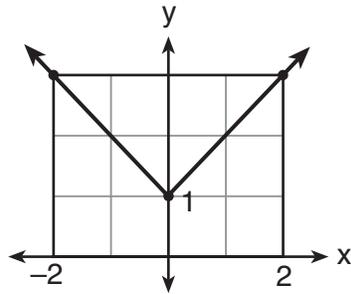
  (1) (−1.72,3.3)   (3) (−1.50,2.82)

  (2) (0,1)   (4) (−2,−1)

6 Which expression is equivalent to the complex fraction $\dfrac{\frac{1}{a} - a}{\frac{1}{a} + 1}$?
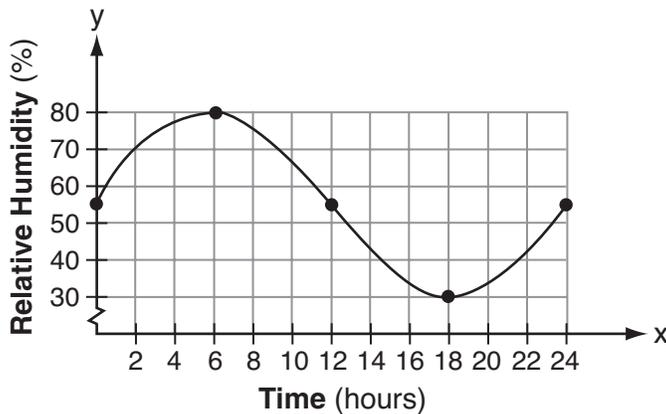
(1) +1   (3) $1 - a$
(2) −1   (4) $-(1 - a)$

7 Which equation represents the function shown in the accompanying graph?

(1) $f(x) = |x| + 1$ (3) $f(x) = |x + 1|$
(2) $f(x) = |x| - 1$ (4) $f(x) = |x - 1|$

8 A meteorologist drew the accompanying graph to show the changes in relative humidity during a 24-hour period in New York City.

What is the range of this set of data?

(1) $0 \le y \le 24$ (3) $30 \le y \le 80$
(2) $0 \le x \le 24$ (4) $30 \le x \le 80$

9 The equation used to determine the time it takes a swinging pendulum to return to its starting point is $T = 2\pi\sqrt{\dfrac{\ell}{g}}$, where T represents time, in seconds, ℓ represents the length of the pendulum, in feet, and g equals 32 ft/sec². How is this equation expressed in logarithmic form?

(1) $\log T = \log 2 + \log \pi + \log \sqrt{\ell} - 32$

(2) $\log T = \log 2 + \log \pi + \frac{1}{2} \log \ell - \frac{1}{2} \log 32$

(3) $\log T = \log 2 + \log \pi + \frac{1}{2} \log \ell - \log 16$

(4) $\log T = 2 + \log \pi + \frac{1}{2} \log \ell - 16$

10 Which type of function could be used to model the data shown in the accompanying graph?

Radioactive Decay of Carbon-14
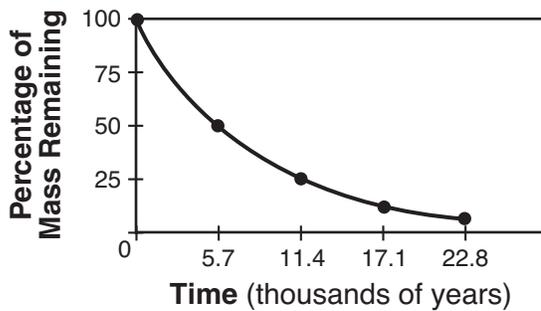
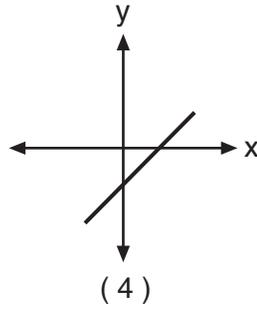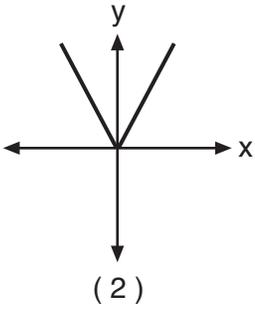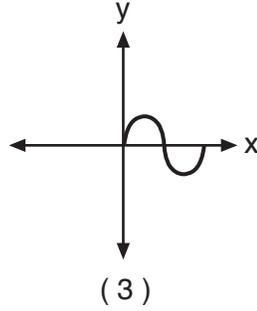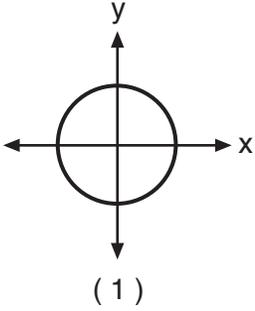(1) exponential   (3) trigonometric
(2) quadratic   (4) linear

11 Under a dilation with respect to the origin, the image of $P(-15,6)$ is $P'(-5,2)$. What is the constant of dilation?

(1) -4 (3) 3
(2) $\frac{1}{3}$ (4) 10

12 Which graph has an inverse that is a function?

(1)

(3)

(2)

(4)

13 What is the solution set of the inequality $x^2 + 4x - 5 < 0$?

(1) $\{x | x < -1 \text{ or } x > 5\}$ (3) $\{x | -1 < x < 5\}$

(2) $\{x | x < -5 \text{ or } x > 1\}$ (4) $\{x | -5 < x < 1\}$

14 The graph of which function is symmetric with respect to the graph of the line $y = x$?

(1) $y = \dfrac{1}{x}$ (3) $y = x^3$

(2) $y = x^2$ (4) $y = \log x$

15 The coordinates of $\triangle JRB$ are $J(1,-2)$, $R(-3,6)$, and $B(4,5)$. What are the coordinates of the vertices of its image after the transformation $T_{2,-1} \circ r_{y\text{-axis}}$?

(1) $(3,1), (-1,-7), (6,-6)$ (3) $(1,-3), (5,5), (-2,4)$

(2) $(3,-3), (-1,5), (6,4)$ (4) $(-1,-2), (3,6), (-4,5)$

16 The expression $\frac{2}{1-\sqrt{3}}$ is equivalent to

(1) $1 + \sqrt{3}$ (3) $-1 + \sqrt{3}$

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

17 The accompanying graph represents a portion of a sound wave.
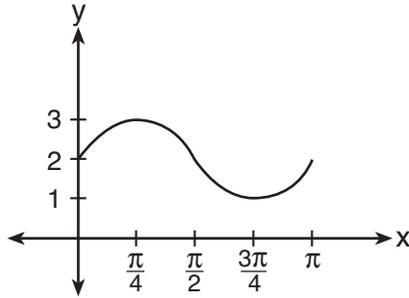
Which equation best represents this graph?

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

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

18 Which equation has the complex number $4 - 3i$ as a root?

(1) $x^2 + 6x - 25 = 0$ (3) $x^2 + 8x - 25 = 0$

(2) $x^2 - 6x + 25 = 0$ (4) $x^2 - 8x + 25 = 0$

19 In the accompanying diagram, $\overrightarrow{PA}$ is tangent to circle O at A, $\overline{PBC}$ is a secant, $PB = 4$, and $BC = 8$.
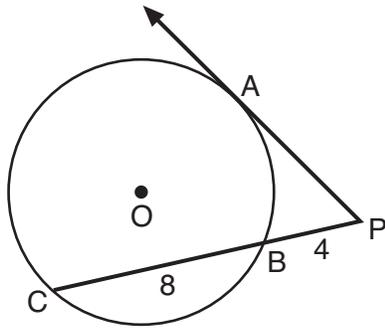
What is the length of $\overline{PA}$?

(1) $4\sqrt{6}$ (3) $4\sqrt{3}$

(2) $4\sqrt{2}$ (4) 4

20 If $\log_2 a = \log_3 a$, what is the value of a?

(1) 1 (3) 3

(2) 2 (4) 4

Answer all 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. [12]

21 The graph of the function $f(x) = a^x$ is shown on the accompanying set of axes. On the same set of axes, sketch the reflection of $f(x)$ in the y-axis.

State the coordinates of the point where the graphs intersect.
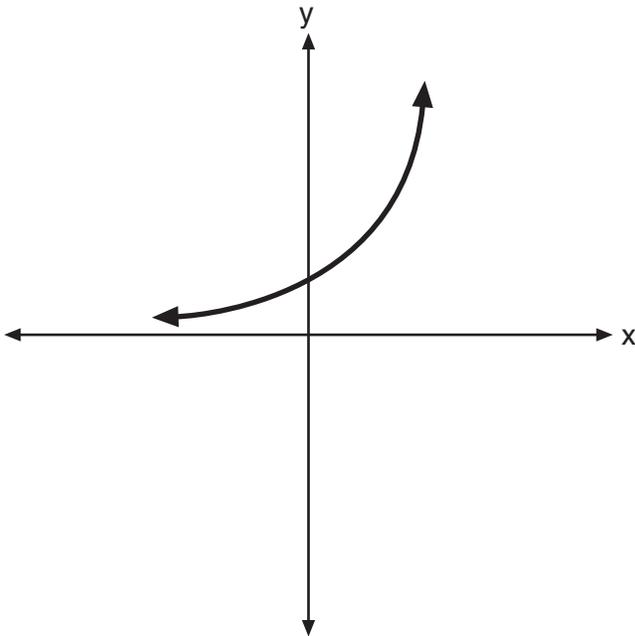
22 Solve for all values of x:

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

23 Mr. and Mrs. Doran have a genetic history such that the probability that a child being born to them with a certain trait is $\frac{1}{8}$. If they have four children, what is the probability that *exactly* three of their four children will have that trait?

24 Classical mathematics uses the term "Golden Ratio" for the ratio $\left(1 + \sqrt{5}\right) : 2$. The Golden Ratio was used by many famous artists to determine the dimensions of their paintings. If the ratio of the length to the width of a painting is $\left(1 + \sqrt{5}\right) : 2$, find the length, in feet, of a painting that has a width of 14 feet. Express your answer in simplest radical form.

25 The slant height, ℓ, of the conical water tank shown in the accompanying diagram is $\ell = \sqrt[3]{\dfrac{8v}{\pi}}$. Solve for v, in terms of ℓ and π.
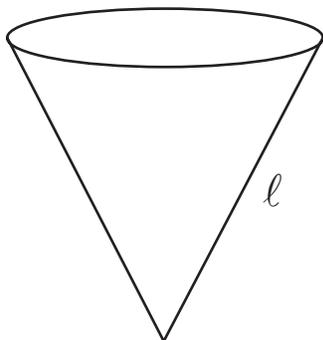
26 The accompanying diagram shows ramp $\overline{RA}$ leading to level platform $\overline{AM}$, forming an angle of 45° with level ground. If platform $\overline{AM}$ measures 2 feet and is 6 feet above the ground, explain why the exact length of ramp $\overline{RA}$ is $6\sqrt{2}$ feet.
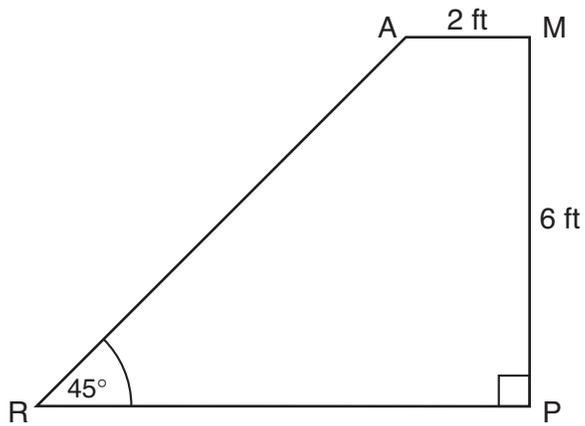
Part III

Answer all 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. [24]

27 A rectangular patio measuring 6 meters by 8 meters is to be increased in size to an area measuring 150 square meters. If both the width and the length are to be increased by the same amount, what is the number of meters, to the *nearest tenth*, that the dimensions will be increased?

28 The accompanying table shows the percent of the adult population that married before age 25 in several different years. Using the year as the independent variable, find the linear regression equation. Round the regression coefficients to the *nearest hundredth*.

Using the equation found above, estimate the percent of the adult population in the year 2009 that will marry before age 25, and round to the *nearest tenth of a percent*.

Year (*x*)	Percent (*y*)
1971	42.4
1976	37.4
1980	37.1
1984	34.1
1989	32.1
1993	28.8
1997	25.7
2000	25.5

29 Drew's parents invested $1,500 in an account such that the value of the investment doubles every seven years. The value of the investment, V, is determined by the equation $V = 1500(2)^{\frac{t}{7}}$, where t represents the number of years since the money was deposited. How many years, to the *nearest tenth of a year*, will it take the value of the investment to reach $1,000,000?

30 Mr. Koziol has 17 students in his high school golf club. Each student played one round of golf. The summarized scores of the students are listed in the accompanying table.

Score	Frequency
70	4
73	3
75	2
80	3
85	1
86	1
90	2
92	1

Find the population standard deviation of this set of students' scores, to the *nearest tenth*.

How many of the individual students' golf scores fall within one population standard deviation of the mean?

31 The accompanying diagram shows quadrilateral *BRON*, with diagonals $\overline{NR}$ and $\overline{BO}$, which bisect each other at *X*.
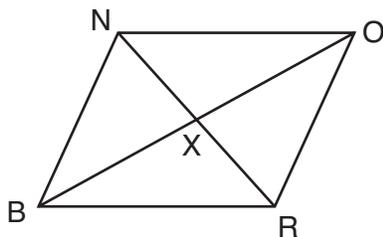
Prove: $\Delta BNX \cong \Delta ORX$

32 Two circles whose equations are $(x - 3)^2 + (y - 5)^2 = 25$ and $(x - 7)^2 + (y - 5)^2 = 9$ intersect in two points. What is the equation of the line passing through these two points? [The use of the accompanying grid is optional.]
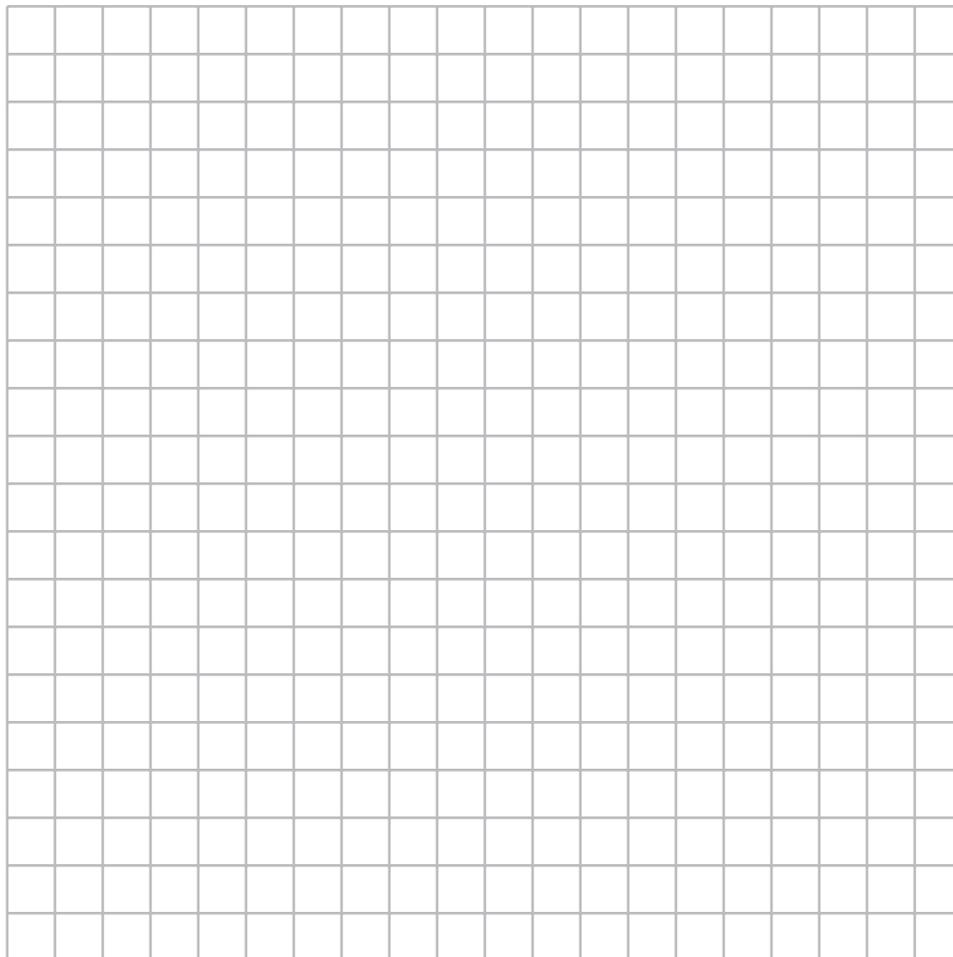
Answer all questions in this part. Each correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [12]

33 Express in simplest form:

$$\frac{2x}{x^2-4} \div \frac{4}{x^2-4x+4} + \frac{12}{x^2-4} \bullet \frac{2-x}{3}$$

34 A farmer has a triangular field with sides of 240 feet, 300 feet, and 360 feet. He wants to apply fertilizer to the field. If one 40-pound bag of fertilizer covers 6,000 square feet, how many bags must he buy to cover the field?

Formulas

Area of Triangle

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

Law of Cosines

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

Functions of the Sum of Two Angles

$\sin (A + B) = \sin A \cos B + \cos A \sin B$
$\cos (A + B) = \cos A \cos B - \sin A \sin B$

Functions of the Double Angle

$\sin 2A = 2 \sin A \cos A$
$\cos 2A = \cos^2 A - \sin^2 A$
$\cos 2A = 2 \cos^2 A - 1$
$\cos 2A = 1 - 2 \sin^2 A$

Functions of the Difference of Two Angles

$\sin (A - B) = \sin A \cos B - \cos A \sin B$
$\cos (A - B) = \cos A \cos B + \sin A \sin B$

Functions of the Half Angle

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

Law of Sines

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

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

Normal Curve

Standard Deviation
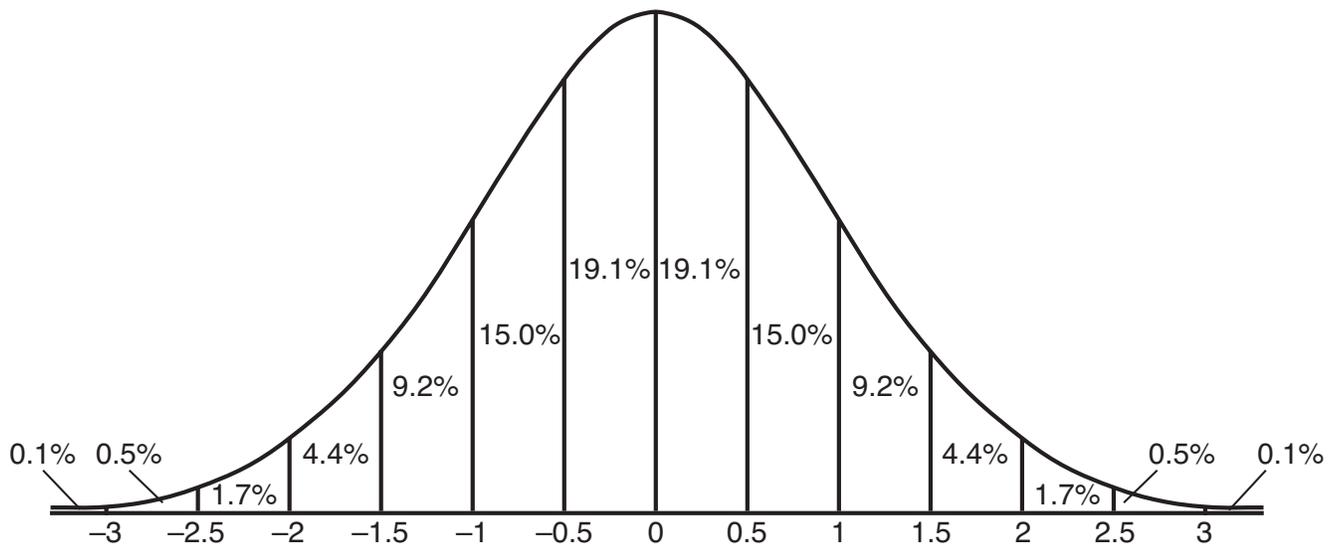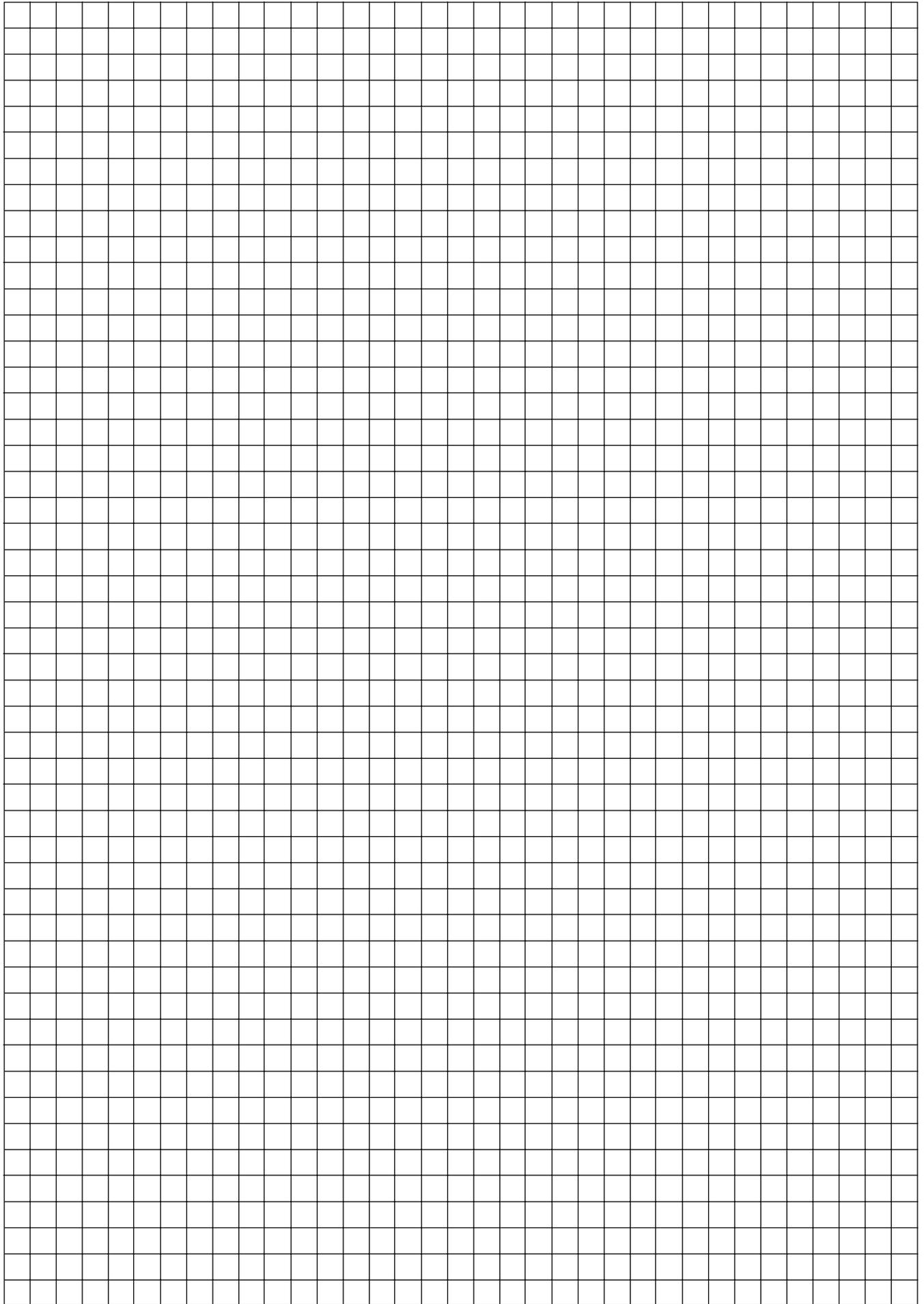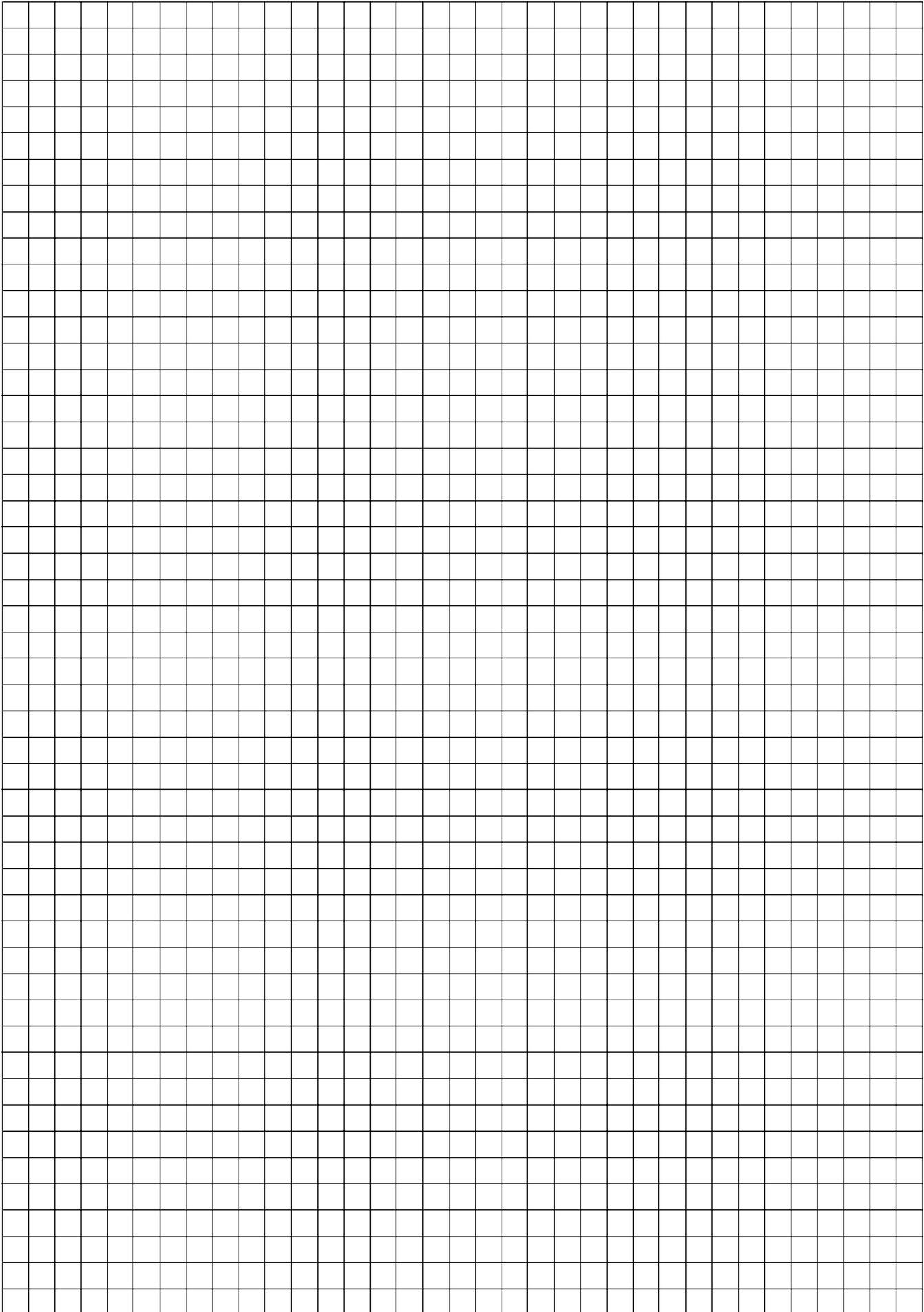
MATHEMATICS B

Thursday, August 16, 2007 — 8:30 to 11:30 a.m., only

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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 20 questions in this part.

1	6	11	16 ....
2	7	12	17 ....
3	8	13	18 ....
4	9	14	19 ....
5	10	15	20 ....

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

The declaration below should 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

Tear Here

MATHEMATICS B

MATHEMATICS B			
Question	Maximum Credit	Credits Earned	Rater's/Scorer's Initials
Part I 1–20	40		
Part II 21	2		
22	2		
23	2		
24	2		
25	2		
26	2		
Part III 27	4		
28	4		
29	4		
30	4		
31	4		
32	4		
Part IV 33	6		
34	6		
Maximum Total	88		

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

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

FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Thursday, August 16, 2007 — 8:30 to 11:30 a.m., only

SCORING KEY

Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Mathematics B examination. More detailed information about scoring is provided in the publication *Information Booklet for Scoring the Regents Examinations in Mathematics A and Mathematics B*.

Use only *red* ink or *red* pencil in rating Regents papers. Do *not* attempt to correct the student's work by making insertions or changes of any kind. 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. 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."

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 scaled score by using the conversion chart that will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Thursday, August 16, 2007. The student's scaled score should be entered in the box provided on the student's detachable answer sheet. The scaled score is the student's final examination score.

Part I

Allow a total of 40 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) 2	(6) 3	(11) 2	(16) 4
(2) 1	(7) 1	(12) 4	(17) 4
(3) 3	(8) 3	(13) 4	(18) 4
(4) 4	(9) 2	(14) 1	(19) 3
(5) 1	(10) 1	(15) 3	(20) 1

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site 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 Examinations in Mathematics A and Mathematics B 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 A and Mathematics B*, 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, 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.

(21)   **[2]** A correct graph is drawn, and the coordinates (0,1) are stated.

   [1] One graphing error is made, but appropriate coordinates are stated.

or

   [1] A correct graph is drawn, but the coordinates of the point of intersection are not stated or are stated incorrectly.

or

   [1] The coordinates (0,1) are stated, but no graph is drawn.

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

(22)   **[2]** 1 and −2, 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] Appropriate work is shown, but only one value is found.

or

   [1] 1 and −2, but no work is shown.

   [0] 1 *or* −2, 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.

(23)   **[2]** $\frac{28}{4096}$ or an equivalent answer, and appropriate work is shown, such as evaluating

the expression $_4C_3\left(\frac{1}{8}\right)^3\left(\frac{7}{8}\right)^1$.

[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] The expression $_4C_3\left(\frac{1}{8}\right)^3\left(\frac{7}{8}\right)^1$ is written, but no further correct work is shown.

or

[1] $\frac{28}{4096}$ or an equivalent answer, 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.

(24)   **[2]** $7 + 7\sqrt{5}$ or $7\left(1 + \sqrt{5}\right)$, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made, or the answer is not expressed in simplest radical form.

or

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

or

[1] $7 + 7\sqrt{5}$ or $7\left(1 + \sqrt{5}\right)$, 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.

(25)   **[2]** $v = \dfrac{\pi \ell^3}{8}$, 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] $v = \dfrac{\pi \ell^3}{8}$, 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.

(26) **[2]** An appropriate explanation is written, such as defining special isosceles right triangles, or appropriate work is shown, such as using legs of six and finding the hypotenuse.

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

or

[1] Appropriate work is shown, but 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.

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.

(27)   **[4]** 5.3, and appropriate work is shown, such as solving the equation $(x + 6)(x + 8) = 150$ by using a table or the quadratic formula.

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

or

[3] Appropriate solutions are found, but the negative root is not rejected.

[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.

[1] The correct quadratic equation in standard form, $x^2 + 14x - 102 = 0$, is written, but no further correct work is shown.

or

[1] An incorrect quadratic equation is solved appropriately.

or

[1] 5.3, 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.

(28)   **[4]** $y = -0.58x + 1185.09$ and 19.9, 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] A correct linear equation is written, but no further correct work is shown.

or

[2] An incorrect linear equation is written, but an appropriate percentage is found.

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

or

[1] 19.9, 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.

[OVER]

(29)   **[4]** 65.7, 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.

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

or

[1] 65.7, 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)   **[4]** 7.5 and 9, 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 using 7.7, the sample standard deviation.

or

[2] The population standard deviation and mean are 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] 7.5 and 9, but no work is shown.

[0] 7.5 *or* 9, 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.

[8]

(31) **[4]** A complete and correct proof that includes a concluding statement is written.

[3] A proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one statement or reason is missing or is incorrect or the concluding statement is missing.

[2] A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[1] Some correct relevant statements about the proof are made, but two or three statements and/or reasons are missing or are incorrect.

[0] The "given" and/or the "prove" statements are rewritten in the style of a formal proof, but no further correct relevant statements are written.

or

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

[OVER]

(32) **[4]** $x = 7$, and appropriate algebraic work is shown or a correct sketch of the graph of the circles is drawn.

[3] Appropriate work is shown, but one computational or graphing error is made, but an appropriate equation is written.

or

[3] The two points of intersection are correctly identified, but the equation is missing or is incorrect.

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

or

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

or

[2] Both circles are graphed correctly, but no further correct work is shown.

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

or

[1] One circle is graphed correctly, but no further correct work is shown.

or

[1] $x = 7$, but no work or sketch is shown.

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

Part IV

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

(33) **[6]** $\frac{x-4}{2}$, and appropriate work is shown.

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

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

or

[4] Appropriate work is shown, but −1 is not factored out.

[3] Appropriate work is shown, but one conceptual error is made, such as not following the correct order of operations.

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

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

or

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

or

[1] $\frac{x-4}{2}$, 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.

[OVER]

(34) **[6]** 6, and appropriate work is shown, such as determining the area of the field, using Heron's formula or using the Law of Cosines to determine one angle of the triangle, followed by $A = \frac{1}{2}ab\sin C$, and then $A \div 6000$.

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

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

or

[4] Appropriate work is shown to find the area of the triangle, but the number of bags of fertilizer is not found.

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

or

[3] The Law of Cosines is used to find an angle, and substitution is made into the correct area equation, but no further correct work is shown.

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

or

[2] The Law of Cosines is used to find an angle, but no further correct work is shown.

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

or

[1] 6, but no work is shown.

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

Map to Learning Standards

Key Ideas	Item Numbers
Mathematical Reasoning	31
Number and Numeration	2, 6, 16, 18
Operations	25, 33
Modeling/Multiple Representation	1, 5, 9, 15, 21, 27, 29, 32
Measurement	3, 4, 17, 19, 26, 34
Uncertainty	8, 23, 28, 30
Patterns/Functions	7, 10, 11, 12, 13, 14, 20, 22, 24

Regents Examination in Mathematics B

August 2007

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

The *Chart for Determining the Final Examination Score for the August 2007 Regents Examination in Mathematics B* will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Thursday, August 16, 2007. Conversion charts provided for the previous administrations of the Regents Examination in Mathematics B must NOT be used to determine students' final scores for this administration.

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.

Regents Examination in Mathematics B
August 2007

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

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

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 scaled score that corresponds to that raw score. The scaled score is the student's final examination score. Enter this score in the space labeled "Scaled Score" on the student's answer sheet.

All student answer papers that receive a scaled score of 60 through 64 **must** be scored a second time. 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 scaled 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 Mathematics B Examination.