The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Friday, January 25, 2008 — 9:15 a.m. to 12:15 p.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.

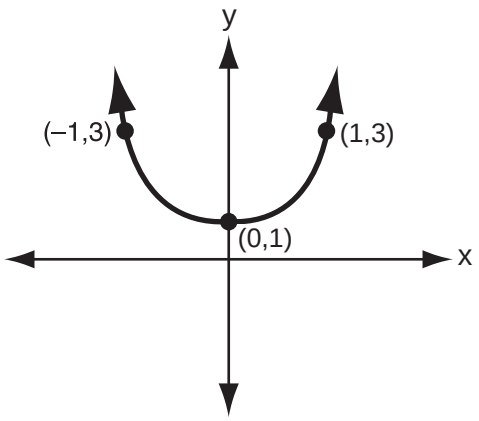
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

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]

Use this space for computations.

1 Which equation is represented by the accompanying graph?



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

2 What is the value of x in the equation $\sqrt{3+x} - 5 = -2$?

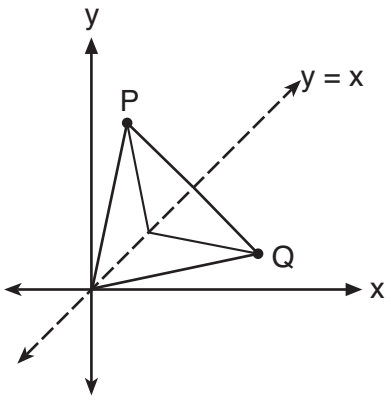
(1) 46
(2) 12
(3) 3
(4) 6

3 Under a dilation where the center of dilation is the origin, the image of $A(-2,-3)$ is $A'(-6,-9)$. What are the coordinates of B', the image of $B(4,0)$ under the same dilation?

(1) (–12,0)
(2) (12,0)
(3) (–4,0)
(4) (4,0)

Use this space for computations.

4 Matthew is a fan of the Air Force's Thunderbirds flying team and is designing a jacket patch for the team, as shown in the accompanying diagram.



If P has the coordinates (a,b), what are the coordinates of Q, the reflection of P in the line $y = x$?

(1) (a,b)
(2) (b,a)
(3) $(-a,b)$
(4) (y,x)

5 Sean tells prospective clients that the probability of rain at the dive location is .2 each day. Which expression can be used to calculate the probability that it will rain on *exactly* 5 days of the 7 days at the dive location?

(1) ${}_7C_5(.2)^5(.8)^2$
(2) ${}_7C_5(.2)^2(.8)^5$
(3) ${}_7C_5(.5)(.7)$
(4) ${}_7C_2(.5)(.7)$

6 Jack wants to plant a border of flowers in the shape of an arc along the edge of a circular walkway. If the circle has a radius of 5 yards and the angle subtended by the arc measures $1\frac{1}{2}$ radians, what is the length, in yards, of the border?

(1) 0.5
(2) 2
(3) 5
(4) 7.5

Use this space for computations.

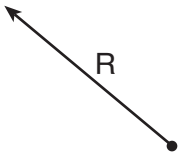
7 Mayken collected data about the size of the honors classes in her school building. This set of data is shown in the accompanying table.

Class Size	Frequency
8	1
10	3
14	2

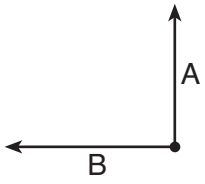
Which statement about the range of this sample is true?

(1) range = mean
(2) range > mean
(3) range < mean
(4) range < standard deviation

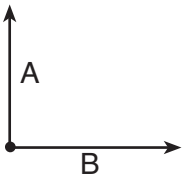
8 The accompanying diagram shows a resultant force vector, R.



Which diagram best represents the pair of component force vectors, A and B, that combined to produce the resultant force vector R?

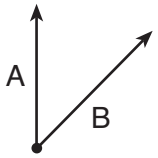


(1)



(3)

(2)



(4)

Use this space for computations.

9 On a standardized test with a normal distribution, the mean was 64.3 and the standard deviation was 5.4. What is the best approximation of the percent of scores that fell between 61.6 and 75.1?

(1) 38.2%
(2) 66.8%
(3) 68.2%
(4) 95%

10 A wave displayed by an oscilloscope is represented by the equation $y = 3 \sin x$. What is the period of this function?

(1) 2π
(2) 2
(3) 3
(4) 3π

11 The expression $\frac{10}{3+i}$ is equivalent to

(1) $3 - i$
(2) $3 + i$
(3) $\frac{15+5i}{4}$
(4) $\frac{5}{4}$

12 The accompanying tables define functions f and g.

x	1	2	3	4	5
$f(x)$	3	4	5	6	7

x	3	4	5	6	7
$g(x)$	4	6	8	10	12

What is $(g \circ f)(3)$?

(1) 6
(2) 2
(3) 8
(4) 4

Use this space for computations.

13 A radioactive substance has an initial mass of 100 grams and its mass halves every 4 years. Which expression shows the number of grams remaining after t years?

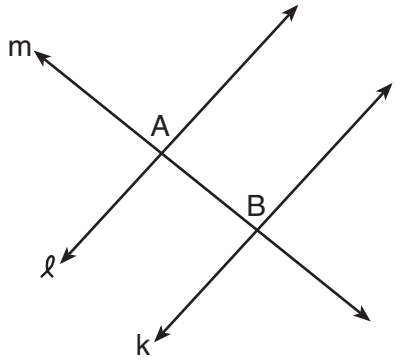
(1) $100(4)^{\frac{t}{4}}$

(2) $100(4)^{-2t}$

(3) $100\left(\frac{1}{2}\right)^{\frac{t}{4}}$

(4) $100\left(\frac{1}{2}\right)^{4t}$

14 In the accompanying diagram, line ℓ is perpendicular to line m at A, line k is perpendicular to line m at B, and lines ℓ, m, and k are in the same plane.



Which statement is the first step in an indirect proof to prove that ℓ is parallel to k?

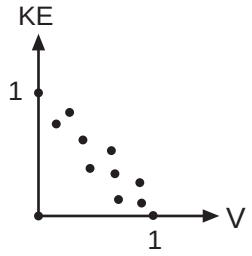
(1) Assume that ℓ, m, and k are not in the same plane.
(2) Assume that ℓ is perpendicular to k.
(3) Assume that ℓ is not perpendicular to m.
(4) Assume that ℓ is not parallel to k.

15 Which method of collecting data would most likely result in an unbiased random sample?

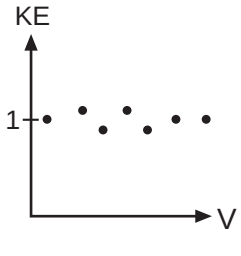
(1) selecting every third teenager leaving a movie theater to answer a survey about entertainment
(2) placing a survey in a local newspaper to determine how people voted in the 2004 presidential election
(3) selecting students by the last digit of their school ID number to participate in a survey about cafeteria food
(4) surveying honor students taking Mathematics B to determine the average amount of time students in a school spend doing homework each night

Use this space for computations.

16 In the physics lab, Thelma determined the kinetic energy, *KE*, of an object at various velocities, *V*, and found the linear correlation coefficient between *KE* and *V* to be +0.8. Which graph shows this relationship?



(1)



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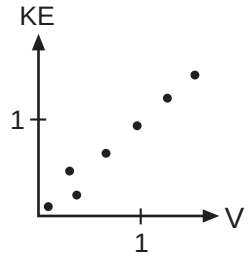
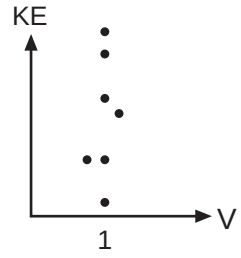


(2)



(4)

17 Which equation has roots that are real, rational, and unequal?

(1) $x^2 + x + 1 = 0$

(2) $x^2 - 4x + 4 = 0$

(3) $x^2 - 4 = 0$

(4) $x^2 - 2 = 0$

18 The expression $\cos(\pi - x)$ is equivalent to

(1) $\sin x$

(2) $-\sin x$

(3) $\cos x$

(4) $-\cos x$

Use this space for computations.

19 If $\log_x 9 = -2$, what is the value of x?

(1) 81
(2) $\frac{1}{81}$
(3) 3
(4) $\frac{1}{3}$

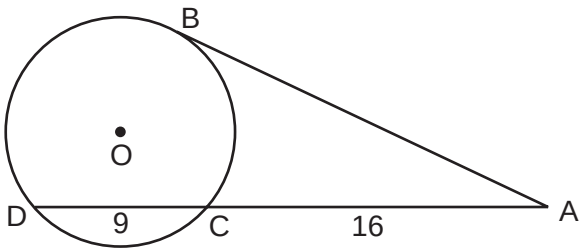
20 What is the coefficient of the fifth term in the expansion of $(x + 1)^8$?

(1) 8
(2) 28
(3) 56
(4) 70

Part II

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 In the accompanying diagram, $\overline{AB}$ is tangent to circle O at B. If $AC = 16$ and $CD = 9$, what is the length of $\overline{AB}$?



22 Solve for all values of x: $|2x-5|=3$

23 The amount of money each member of a band earns playing at a graduation party varies inversely as the number of members in the band. If the band has five members, each member earns \$70. Write an equation that models the relationship between the number of members in a band, n, and the amount each member earns, d.

Use the equation to calculate the amount each member earns if there are four members in the band.

24 Simplify the expression $\left(m^6\right)^{-\frac{2}{3}}$ and write your answer using a positive exponent.

25 If $i = \sqrt{-1}$, what is the value of the expression $\sum_{n=1}^{20} i^{4n}$?

26 Express in simplest form: $\dfrac{x - \dfrac{4}{x}}{\dfrac{2+x}{x}}$

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 The measures of the angles between the resultant and two applied forces are 65° and 42°, and the magnitude of the resultant is 24 pounds. Find, to the *nearest pound*, the magnitude of the larger force.

28 The number of houses in Central Village, New York, grows every year according to the function $H(t) = 540(1.039)^t$, where H represents the number of houses, and t represents the number of years since January 1995. A civil engineering firm has suggested that a new, larger well must be built by the village to supply its water when the number of houses exceeds 1,000. During which year will this first happen?

29 Find all values of x in the interval $0° \leq x < 360°$ that satisfy the equation $3 \cos x + \sin 2x = 0$.

30 Write a quadratic equation such that the sum of its roots is –5 and the product of its roots is 6.

What are the roots of this equation?

31 Water is draining from a tank maintained by the Yorkville Fire Department. Students measured the depth of the water in 15-second intervals and recorded the results in the accompanying table.

Time (*x*) (in seconds)	**Depth of Water (*y*)** (in feet)
15	11.8
30	9.9
45	8.2
60	6.3
75	5.9

Write the power regression equation for this set of data, rounding all values to the *nearest ten thousandth*.

Using this equation, predict the depth of the water at 2 minutes, to the *nearest tenth of a foot*.

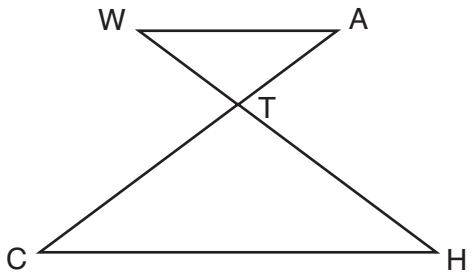
32 The horizontal distance, in feet, that a golf ball travels when hit can be determined by the formula $d = \frac{v^2 \sin 2\theta}{g}$, where v equals initial velocity, in feet per second; g equals acceleration due to gravity; θ equals the initial angle, in degrees, that the path of the ball makes with the ground; and d equals the horizontal distance, in feet, that the ball will travel.

A golfer hits the ball with an initial velocity of 180 feet per second and it travels a distance of 840 feet. If g = 32 feet per second per second, what is the smallest initial angle the path of the ball makes with the ground, to the *nearest degree*?

Part IV

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 In the accompanying diagram, $\overline{WA} \parallel \overline{CH}$ and $\overline{WH}$ and $\overline{AC}$ intersect at point T. Prove that $(WT)(CT) = (HT)(AT)$.



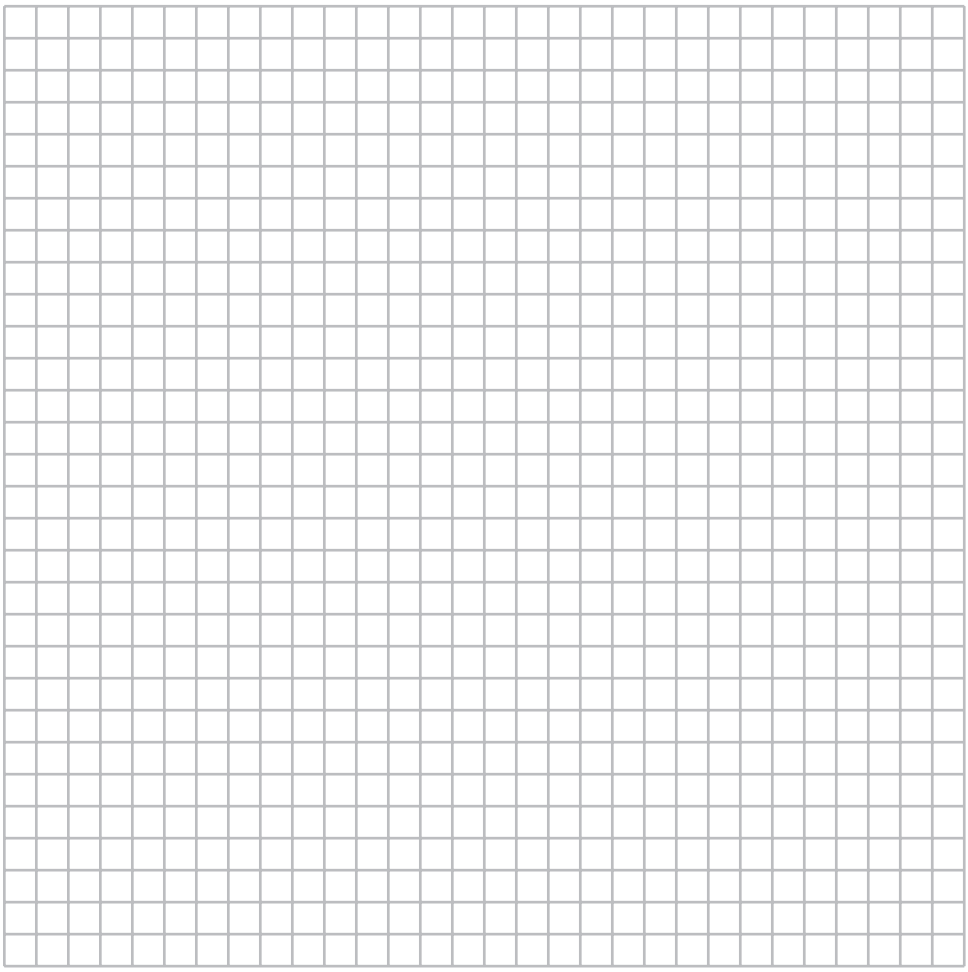
34 The members of the Lincoln High School Prom Committee are trying to raise money for their senior prom. They plan to sell teddy bears. The senior advisor told them that the profit equation for their project is $y = -0.1x^2 + 9x - 50$, where x is the price at which the teddy bears will be sold and y is the profit, in dollars.

On the grid on the next page, graph this relationship so that $0 \le x \le 90$ and $-50 \le y \le 160$.

How much profit can the committee expect to make if they sell the teddy bears for $20 each?

What price should they charge for the teddy bears to make the maximum profit possible?

Question 34 continued



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Formulas

Area of Triangle

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

Functions of the Sum of Two Angles

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

Functions of the Difference of Two Angles

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

Law of Sines

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

Law of Cosines

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

Functions of the Double Angle

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

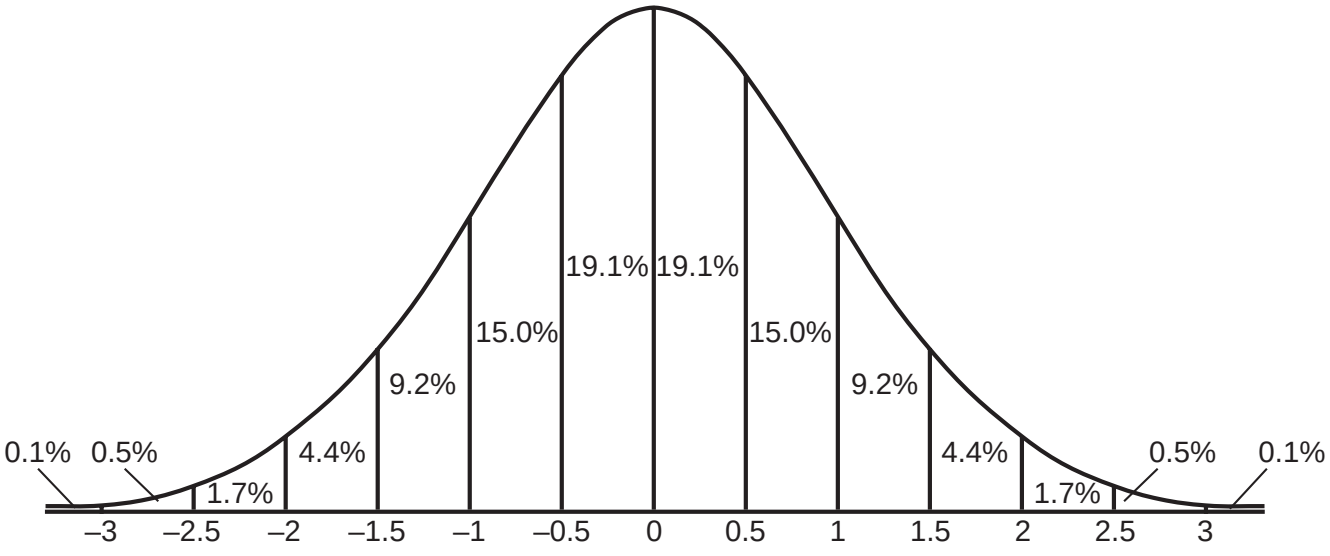
Functions of the Half Angle

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

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

Normal Curve

Standard Deviation



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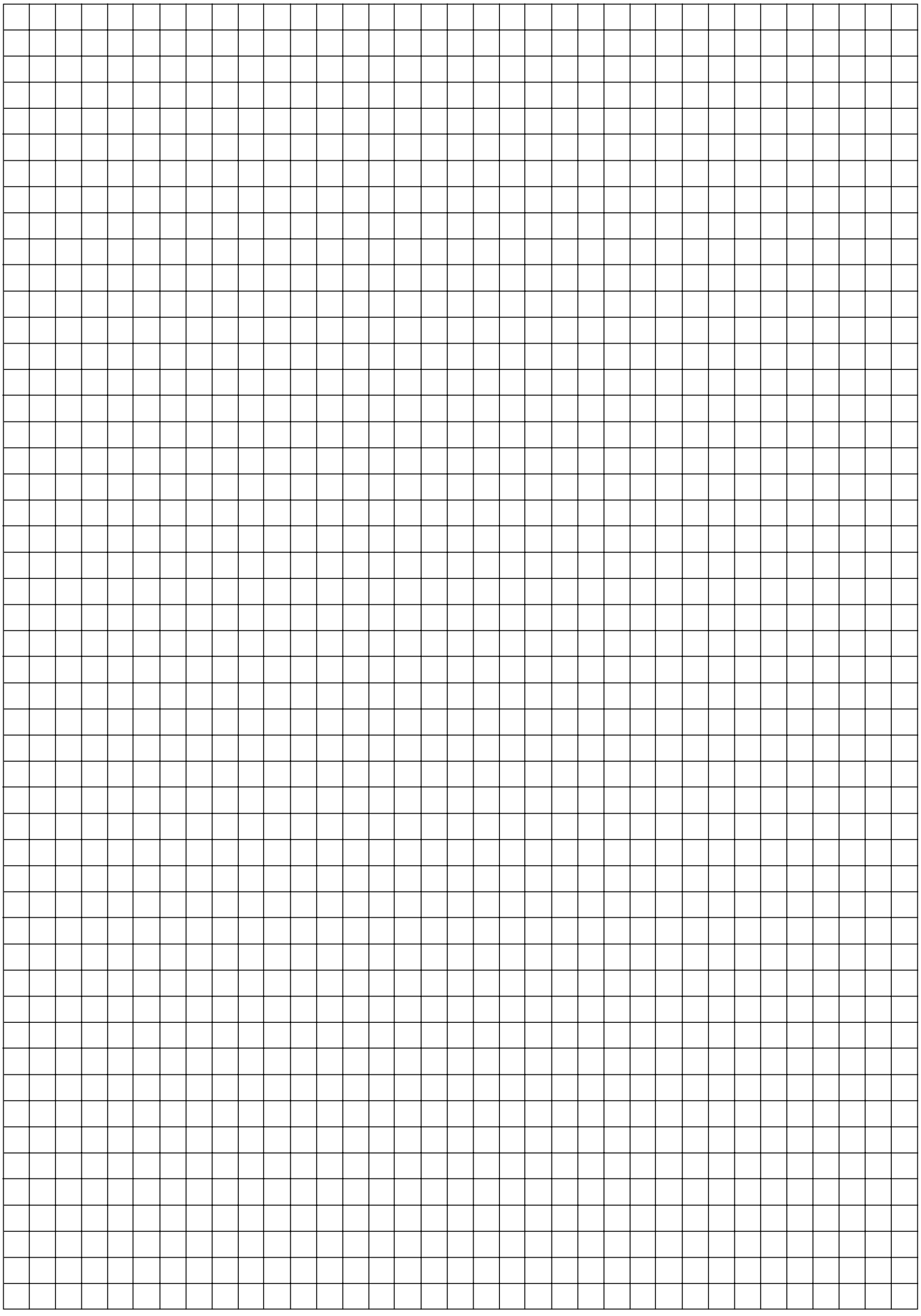

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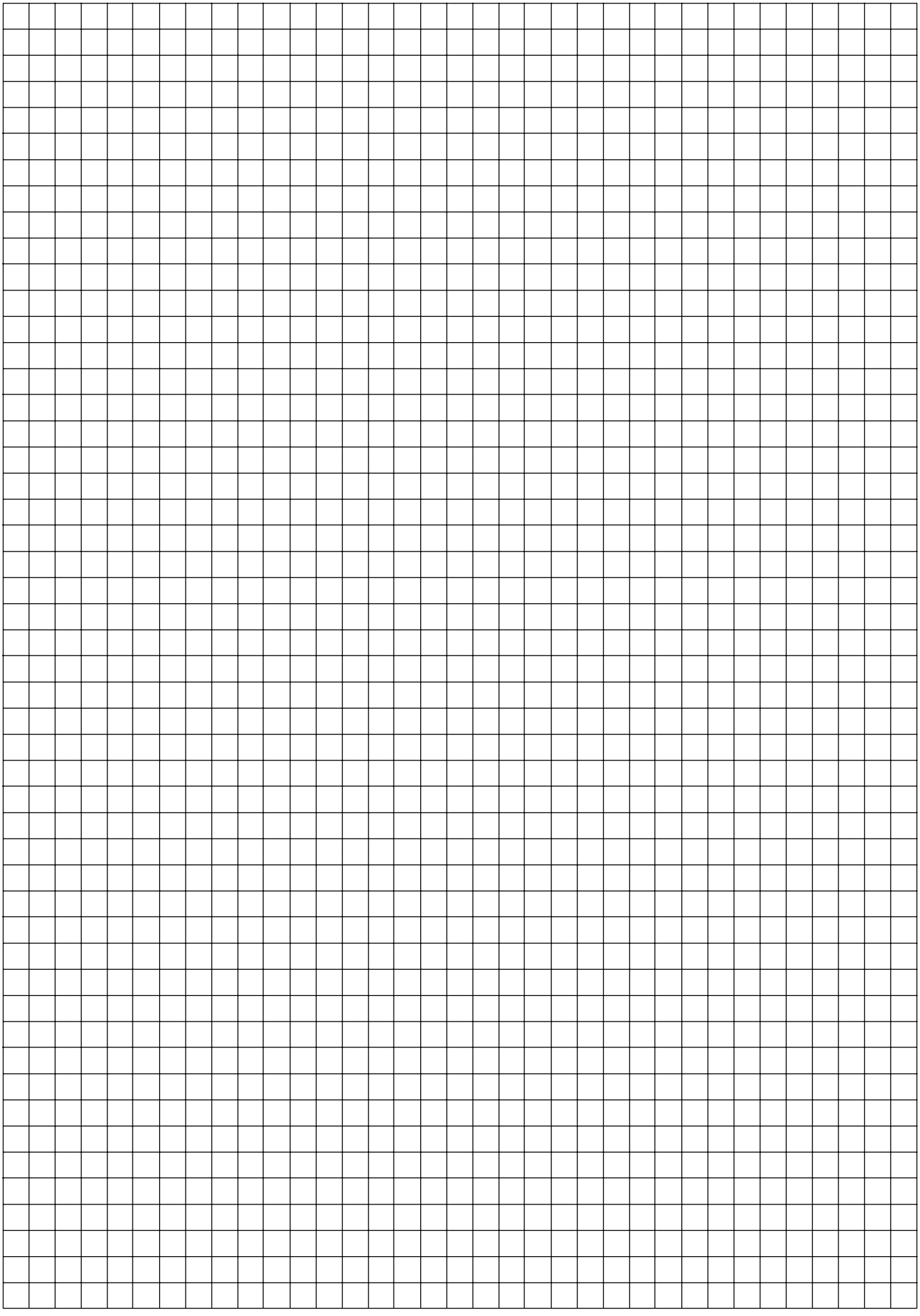

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Friday, January 25, 2008 — 9:15 a.m. to 12:15 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 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.

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Signature

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**		

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

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

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FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Friday, January 25, 2008 — 9:15 a.m. to 12:15 p.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 Friday, January 25, 2008. 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) 1	(6) 4	(11) 1	(16) 2
(2) 4	(7) 3	(12) 3	(17) 3
(3) 2	(8) 1	(13) 3	(18) 4
(4) 2	(9) 2	(14) 4	(19) 4
(5) 1	(10) 1	(15) 3	(20) 4

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site 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]** 20, 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] A correct equation is written, but no further correct work is shown.

or

[1] 20, 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.

(22) **[2]** 1 and 4, 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] 1 and 4, but no work is shown.

[0] 1 *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.

(23) **[2]** $nd = 350$ or an equivalent equation and \$87.50, and appropriate work is shown, such as the equation $350 = 4d$.

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

or

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

or

[1] A correct equation is written, but no further correct work is shown.

or

[1] \$87.50, 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]** $\frac{1}{m^4}$ or $\left(\frac{1}{m}\right)^4$, 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 the answer is expressed with a negative exponent, such as m^{-4}.

or

[1] $\frac{1}{m^4}$ or $\left(\frac{1}{m}\right)^4$, 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.

(25) **[2]** 20, and appropriate work is shown or an appropriate explanation is written.

[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] 20, but no work is shown or no explanation is written.

[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]** $x - 2$, 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] $x - 2$, 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.

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]** 23, and appropriate work is shown, such as using the Law of Sines.

[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 17, the smaller force.

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

or

[1] 23, 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]** 2011, and appropriate work is shown, such as solving a logarithmic equation or trial and error with at least three trials and appropriate checks.

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

or

[3] Appropriate work is shown to find t, but the year is not stated or is stated incorrectly.

[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 trial-and-error method is used to find the correct solution, but only two trials and appropriate checks are shown.

or

[2] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.

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

or

[1] 2011, but no work or only one trial with an appropriate check 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) **[4]** 90° and 270°, and appropriate work is shown, such as solving the equation $3 \cos x + 2 \sin x \cos x = 0$ or sketching a graph and finding the x-intercepts.

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

or

[3] Appropriate work is shown, but the answers are expressed in radian measure.

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

or

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

or

[2] An appropriate graph is sketched, but no further correct work is shown.

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

or

[1] Correct substitution is made for $\sin 2x$, but no further correct work is shown.

or

[1] 90° and 270°, but no work is shown.

[**0**] 90° *or* 270°, 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.

(30) **[4]** $x^2 + 5x + 6 = 0$ or an equivalent equation and –3 and –2, and appropriate work is shown, such as using the sum and product formulas or factoring the equation.

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

or

[3] The expression $x^2 + 5x + 6$ is written and –3 and –2, and appropriate work is shown.

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

or

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

or

[2] A correct quadratic equation is written, and appropriate work is shown, but the roots are not found.

or

[2] Appropriate work is shown to find –3 and –2, but no quadratic equation is written.

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

or

[1] $x^2 + 5x + 6 = 0$ or an equivalent equation and –3 and –2, but no work is shown.

[0] A correct quadratic equation *or* –3 and –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.

(31) **[4]** $y = 42.2326x^{-0.4494}$ and 4.9, and appropriate work is shown.

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

or

[3] A correct regression equation is written and 4.9, but the substitution is not shown.

or

[3] The expression $42.2326x^{-0.4494}$ is written and 4.9, and the substitution 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, such as not changing 2 minutes to 120 seconds.

or

[2] An incorrect power regression equation is solved appropriately, and the substitution is shown.

or

[2] A correct regression equation 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] An incorrect equation of a lesser degree of difficulty is solved appropriately.

or

[1] 4.9, 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.

(32) **[4]** 28, and appropriate work is shown, such as substituting into the given equation or solving the equation graphically.

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

or

[3] Appropriate work is shown, but 56, the value of 2θ, is given as the answer.

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

or

[1] Appropriate work is shown to find the value of $\sin 2\theta$, but no further correct work is shown.

or

[1] 28, 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 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]** A complete and correct proof that includes a concluding statement is written.

[5] 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 no concluding statement is written.

or

[5] $\frac{WT}{HT} = \frac{AT}{CT}$ or an equivalent proportion is proven, but no further correct work is shown.

[4] A proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but two statements and/or reasons are missing or are incorrect.

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

or

[3] $\Delta WAT \sim \Delta HCT$ is proven, but no further correct work is shown.

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

[1] Only one correct statement and reason are written, other than the given and/or the prove statements.

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

(34) **[6]** A correct graph is drawn, 90 and 45, and appropriate work is shown.

[5] Appropriate work is shown to answer all three parts of the question, but one computational or graphing error is made.

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

or

[4] A correct graph is drawn, and 90 *or* 45, and appropriate work is shown.

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

or

[3] 90 and 45, and appropriate work is shown, but no graph is drawn.

or

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

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

[1] 90 *or* 45, and appropriate work is shown.

or

[1] 90 and 45, but no work is shown and no graph is drawn.

[0] 90 *or* 45, 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.

Map to Learning Standards

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

Regents Examination in Mathematics B

January 2008

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

The *Chart for Determining the Final Examination Score for the January 2008 Regents Examination in Mathematics B* will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Friday, January 25, 2008. 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.

University of the State of New York
State Education Department

Regents Examination in Mathematics B
January 2008

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

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 Regents Examination in Mathematics B.