The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Tuesday, August 17, 2004 — 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. 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.

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. The formulas that you may need to answer some questions in this examination are found on page 23.

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.

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 condition does *not* prove that two triangles are congruent?

(1) SSS ≅ SSS
(2) SSA ≅ SSA
(3) SAS ≅ SAS
(4) ASA ≅ ASA

2 The speed of a laundry truck varies inversely with the time it takes to reach its destination. If the truck takes 3 hours to reach its destination traveling at a constant speed of 50 miles per hour, how long will it take to reach the same location when it travels at a constant speed of 60 miles per hour?

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

3 Which set of ordered pairs is *not* a function?

(1) {(3,1), (2,1), (1,2), (3,2)}
(2) {(4,1), (5,1), (6,1), (7,1)}
(3) {(1,2), (3,4), (4,5), (5,6)}
(4) {(0,0), (1,1), (2,2), (3,3)}

4 A circle has the equation $(x + 1)^2 + (y - 3)^2 = 16$. What are the coordinates of its center and the length of its radius?

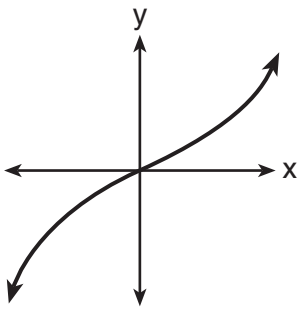
(1) (–1,3) and 4
(2) (1,–3) and 4
(3) (–1,3) and 16
(4) (1,–3) and 16

5 The mean of a normally distributed set of data is 56, and the standard deviation is 5. In which interval do approximately 95.4% of all cases lie?

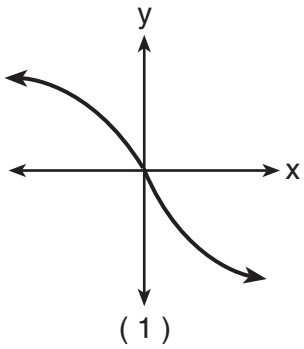
(1) 46–56
(2) 46–66
(3) 51–61
(4) 56–71

6 The graph below represents f(x).

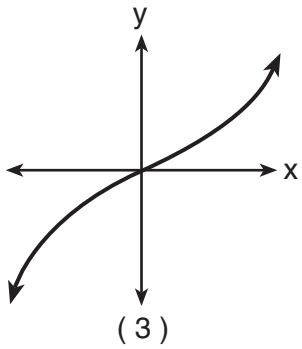
Use this space for computations.



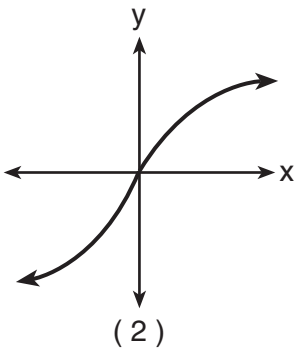
Which graph best represents f(–x)?



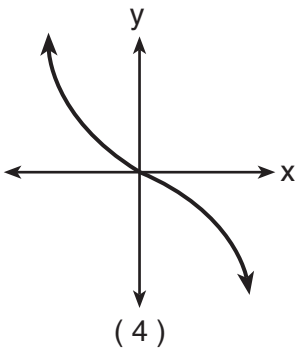
(1)



(3)



(2)



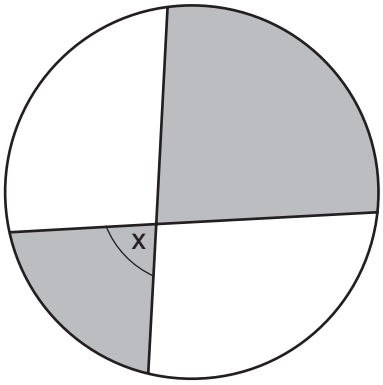
(4)

7 When simplified, $i^{27} + i^{34}$ is equal to

(1) i
(2) i^{61}
(3) $-i - 1$
(4) $i - 1$

Use this space for computations.

8 The accompanying diagram shows a child's spin toy that is constructed from two chords intersecting in a circle. The curved edge of the larger shaded section is one-quarter of the circumference of the circle, and the curved edge of the smaller shaded section is one-fifth of the circumference of the circle.



What is the measure of angle x?

(1) 40°
(2) 72°
(3) 81°
(4) 108°

9 If $\sin A = \frac{4}{5}$, $\tan B = \frac{5}{12}$, and angles A and B are in Quadrant I, what is the value of $\sin (A + B)$?

(1) $\frac{63}{65}$
(2) $-\frac{63}{65}$
(3) $\frac{33}{65}$
(4) $-\frac{33}{65}$

10 If the tangent of an angle is negative and its secant is positive, in which quadrant does the angle terminate?

(1) I
(2) II
(3) III
(4) IV

11 The equation $2x^2 + 8x + n = 0$ has imaginary roots when n is equal to

(1) 10
(2) 8
(3) 6
(4) 4

12 What is the middle term in the expansion of $(x + y)^4$?

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

Use this space for computations.

13 What is the image of point (1,1) under $r_{x\text{-axis}} \circ R_{0,90°}$?

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

14 How many distinct triangles can be formed if m$\angle A$ = 30, side b = 12, and side a = 8?

(1) 1
(2) 2
(3) 3
(4) 0

15 The expression $\frac{\left(b^{2n+1}\right)^3}{b^n \cdot b^{4n+3}}$ is equivalent to

(1) $\frac{b^n}{2}$
(2) b^n
(3) b^{-3n}
(4) b^{-3n+1}

16 What is the inverse of the function $y = \log_4 x$?

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

17 Which angle is coterminal with an angle of 125°?

(1) –125°
(2) –235°
(3) 235°
(4) 425°

18 A ball is dropped from a height of 8 feet and allowed to bounce. Each time the ball bounces, it bounces back to half its previous height. The vertical distance the ball travels, d, is given by the formula $d = 8 + 16\sum_{k=1}^{n}\left(\frac{1}{2}\right)^k$, where n is the number of bounces. Based on this formula, what is the total vertical distance that the ball has traveled after four bounces?

(1) 8.9 ft
(2) 15.0 ft
(3) 22.0 ft
(4) 23.0 ft

Use this space for computations.

19 The path traveled by a roller coaster is modeled by the equation $y = 27 \sin 13x + 30$. What is the maximum altitude of the roller coaster?

(1) 13
(2) 27
(3) 30
(4) 57

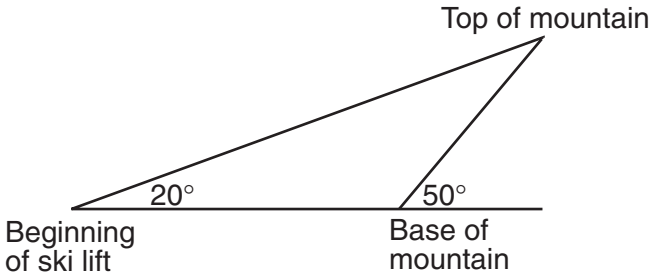
20 The expression $\frac{11}{\sqrt{3}-5}$ is equivalent to

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

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]

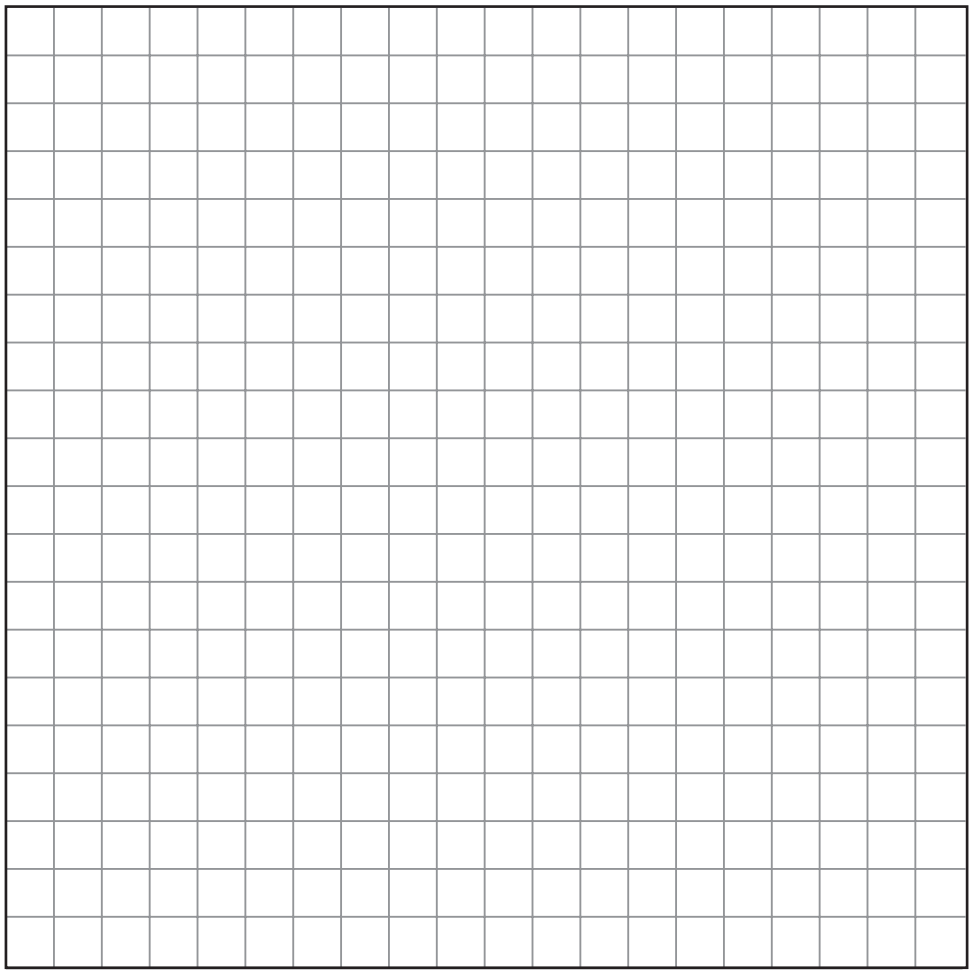
21 A ski lift begins at ground level 0.75 mile from the base of a mountain whose face has a 50° angle of elevation, as shown in the accompanying diagram. The ski lift ascends in a straight line at an angle of 20°. Find the length of the ski lift from the beginning of the ski lift to the top of the mountain, to the *nearest hundredth of a mile*.



22 Express $\sqrt{-48} + 3.5 + \sqrt{25} + \sqrt{-27}$ in simplest $a + bi$ form.

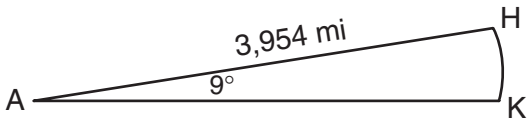
23 Solve for x: $x^{-3} = \frac{27}{64}$

24 The profit a coat manufacturer makes each day is modeled by the equation $P(x) = -x^2 + 120x - 2{,}000$, where P is the profit and x is the price for each coat sold. For what values of x does the company make a profit? [The use of the accompanying grid is optional.]



25 Express in simplest form: $\dfrac{\frac{1}{r} - \frac{1}{s}}{\frac{r^2}{s^2} - 1}$

26 Cities H and K are located on the same line of longitude and the difference in the latitude of these cities is 9°, as shown in the accompanying diagram. If Earth's radius is 3,954 miles, how many miles north of city K is city H along arc HK? Round your answer to the *nearest tenth of a mile*.



(Not drawn to scale)

Part III

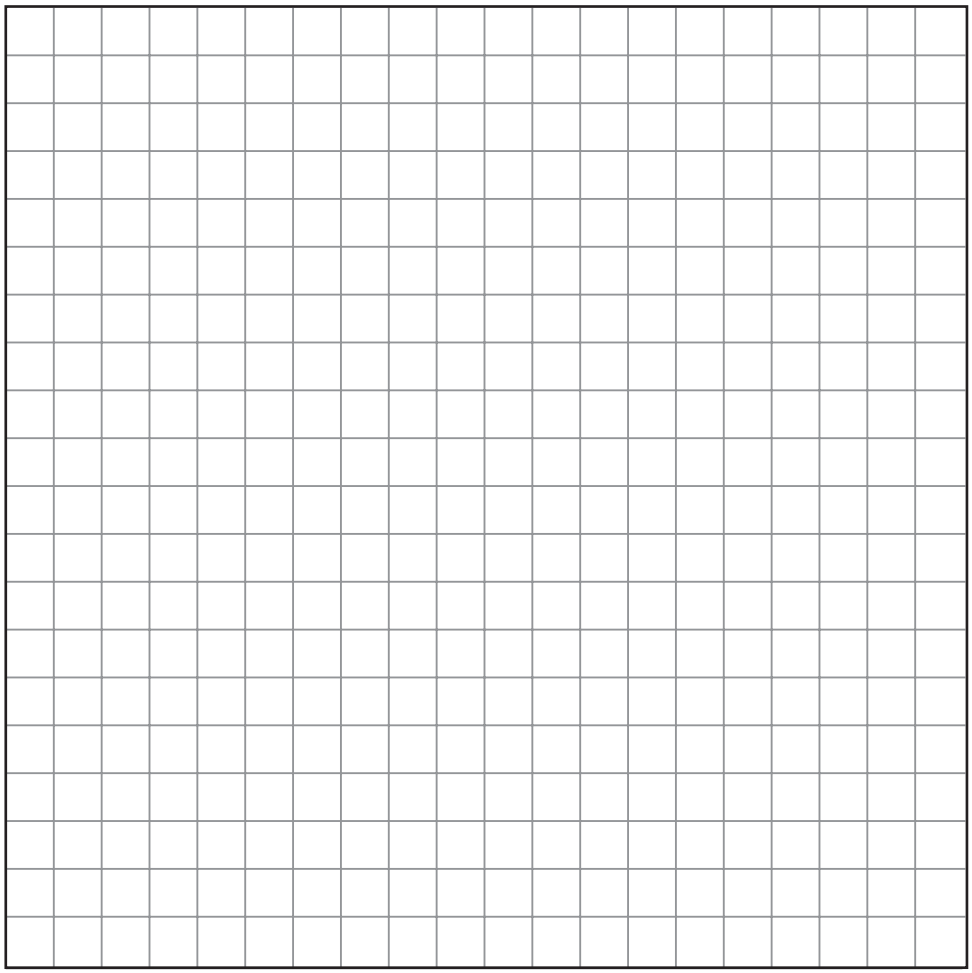
Answer all questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [24]

27 A depth finder shows that the water in a certain place is 620 feet deep. The difference between d, the actual depth of the water, and the reading is $|d - 620|$ and must be less than or equal to $0.05d$. Find the minimum and maximum values of d, to the *nearest tenth of a foot*.

28 An amount of P dollars is deposited in an account paying an annual interest rate r (as a decimal) compounded n times per year. After t years, the amount of money in the account, in dollars, is given by the equation $A = P\left(1 + \frac{r}{n}\right)^{nt}$.

Rachel deposited \$1,000 at 2.8% annual interest, compounded monthly. In how many years, to the *nearest tenth of a year*, will she have \$2,500 in the account? [The use of the grid on the next page is optional.]

Question 28 continued



29 A box containing 1,000 coins is shaken, and the coins are emptied onto a table. Only the coins that land heads up are returned to the box, and then the process is repeated. The accompanying table shows the number of trials and the number of coins returned to the box after each trial.

Trial	0	1	3	4	6
Coins Returned	1,000	610	220	132	45

Write an exponential regression equation, rounding the calculated values to the *nearest ten-thousandth*.

Use the equation to predict how many coins would be returned to the box after the eighth trial.

30 Tim Parker, a star baseball player, hits one home run for every ten times he is at bat. If Parker goes to bat five times during tonight's game, what is the probability that he will hit *at least* four home runs?

31 A rectangular piece of cardboard is to be formed into an uncovered box. The piece of cardboard is 2 centimeters longer than it is wide. A square that measures 3 centimeters on a side is cut from each corner. When the sides are turned up to form the box, its volume is 765 cubic centimeters. Find the dimensions, in centimeters, of the original piece of cardboard.

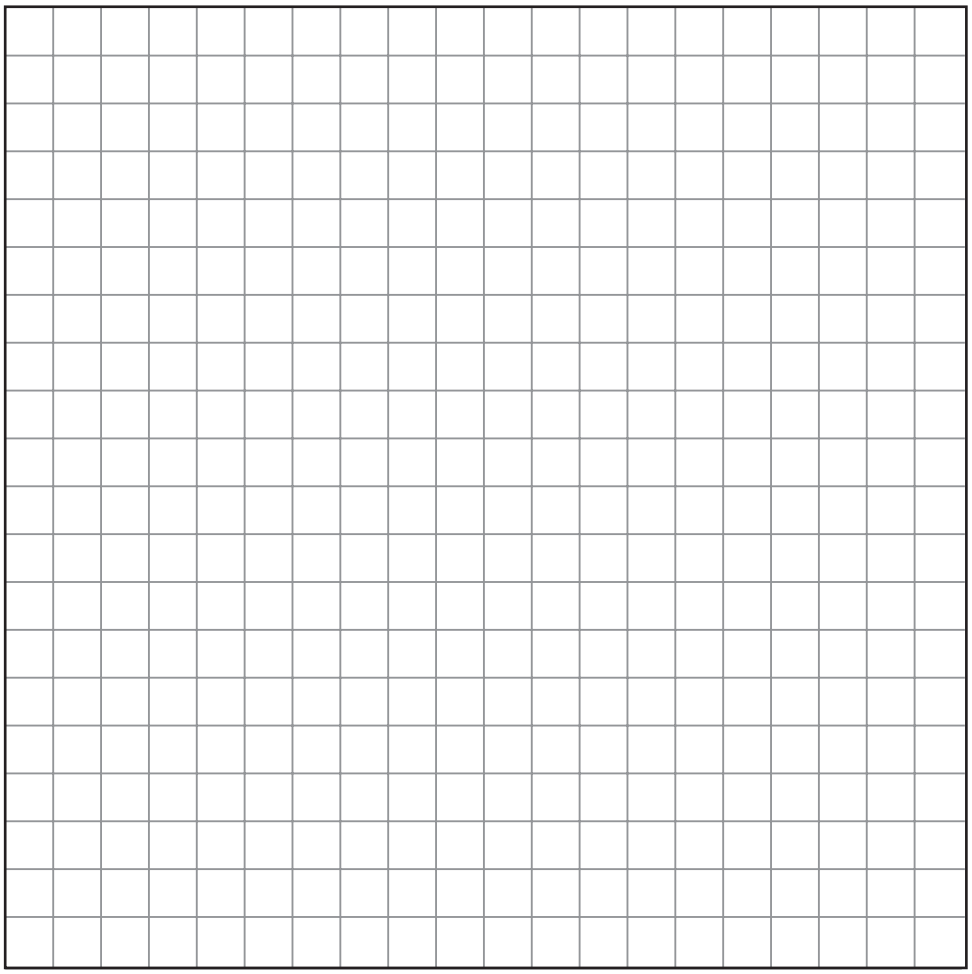
32 Solve algebraically for all values of θ in the interval $0° \leq \theta < 360°$ that satisfy the equation $\frac{\sin^2 \theta}{1 + \cos \theta} = 1$.

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]

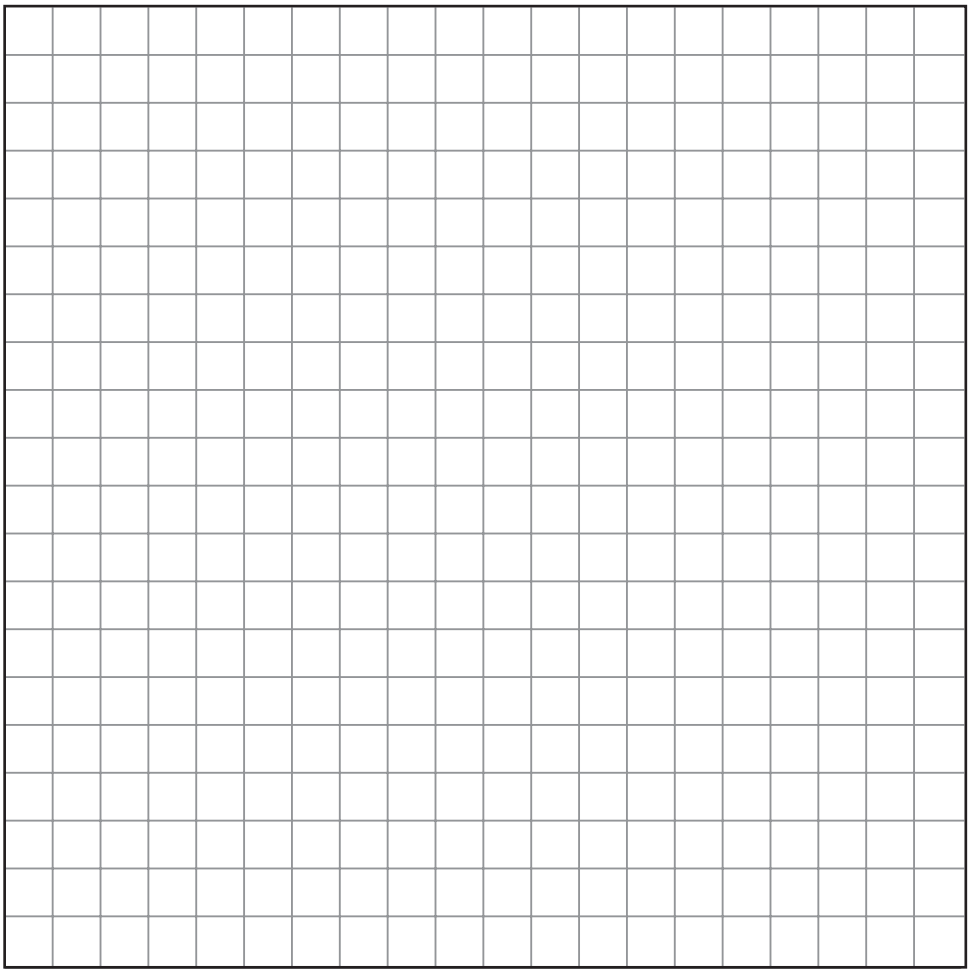
33 The tide at a boat dock can be modeled by the equation $y = -2\cos\left(\frac{\pi}{6}t\right) + 8$, where t is the number of hours past noon and y is the height of the tide, in feet. For how many hours between $t = 0$ and $t = 12$ is the tide at least 7 feet? [The use of the grid on the next page is optional.]

Question 33 continued



34 The coordinates of quadrilateral *JKLM* are *J*(1,–2), *K*(13,4), *L*(6,8), and *M*(–2,4). Prove that quadrilateral *JKLM* is a trapezoid but *not* an isosceles trapezoid. [The use of the grid on the next page is optional.]

Question 34 continued



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

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

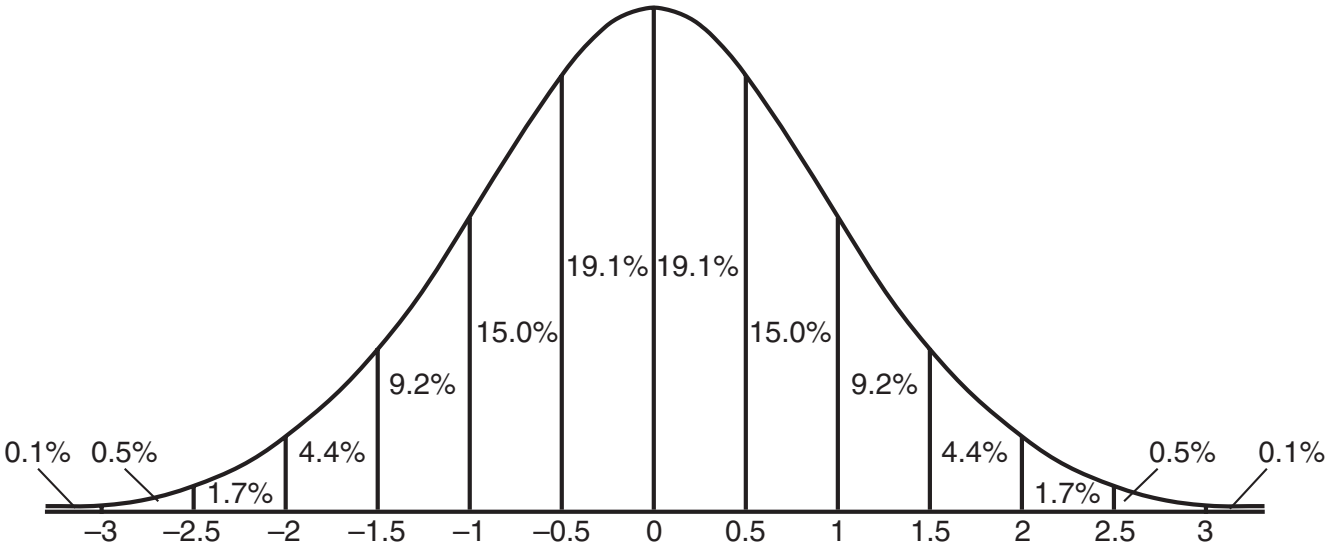
Functions of the Half Angle

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

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

Normal Curve

Standard Deviation



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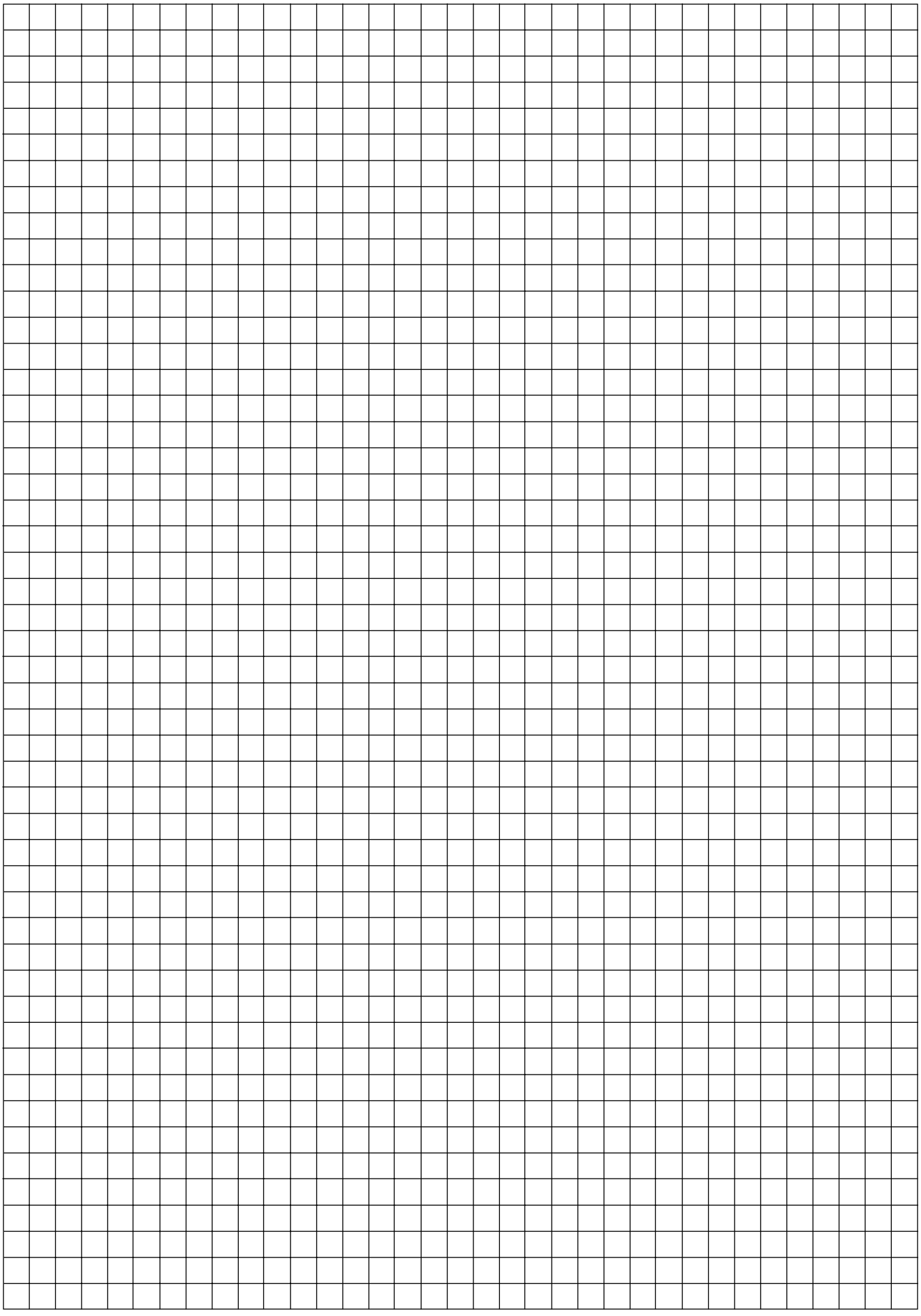
Scrap Graph Paper — This sheet will *not* be scored.



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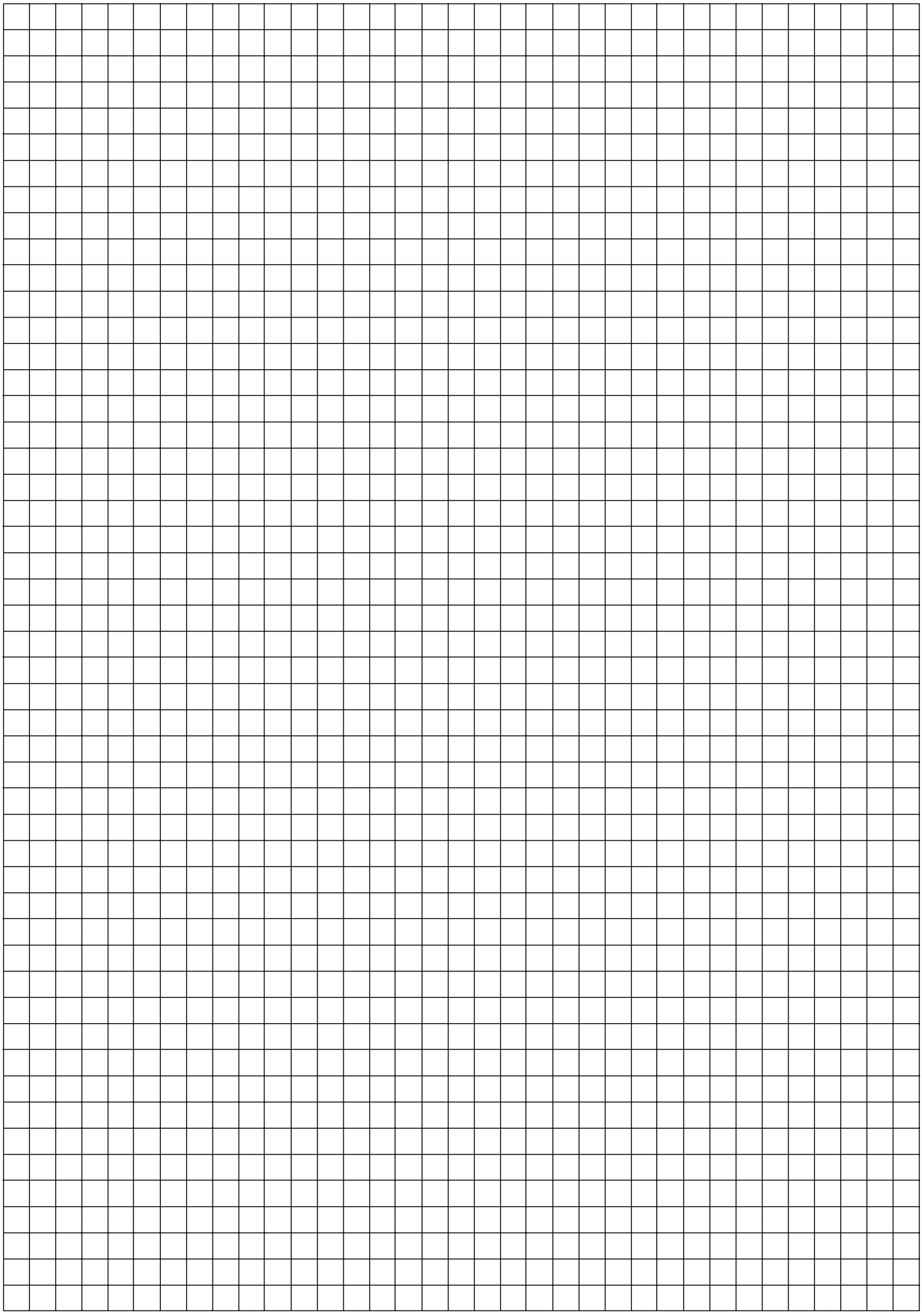

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Tuesday, August 17, 2004 — 8:30 to 11:30 a.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.

Signature

Tear Here

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

Notes to raters. . .

- **Each paper should be scored by a minimum of three raters.**
- **The table for converting the total raw score to the scaled score is provided in the scoring key for this examination.**
- **The scaled score is the student's final examination score.**

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MATHEMATICS B

FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Tuesday, August 17, 2004 — 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 Administering and 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 checkmarks 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 Tuesday, August 17, 2004. 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) 4	(11) 1	(16) 3
(2) 3	(7) 3	(12) 3	(17) 2
(3) 1	(8) 3	(13) 4	(18) 4
(4) 1	(9) 1	(14) 2	(19) 4
(5) 2	(10) 4	(15) 2	(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. Visit the site http://www.emsc.nysed.gov/osa/ and select the link "Latest Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and at least one more time before the final scores for the examination are recorded.

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 Administering and Scoring 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]** 1.15, and appropriate work is shown, such as $\frac{x}{\sin 130} = \frac{0.75}{\sin 30}$.

[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, such as using an incorrect trigonometric function.

or

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

or

[1] 1.15, 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]** $8.5 + 7i\sqrt{3}$, 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] $8.5 + 7i\sqrt{3}$, 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.

(23) **[2]** $\frac{4}{3}$ or $1\frac{1}{3}$ or $1.\overline{3}$, 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] $\frac{4}{3}$ or $1\frac{1}{3}$ or $1.\overline{3}$, 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.

(24) **[2]** $20 < x < 100$, and appropriate work is shown.

[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] Appropriate work is shown to solve for 20 and 100, but the solution is not expressed as a correct inequality or interval.

or

[1] $20 < x < 100$, 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]** $-\frac{s}{r(r+s)}$ or $-\frac{s}{r^2+rs}$, 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 not expressed in simplest form.

or

[1] $-\frac{s}{r(r+s)}$ or $-\frac{s}{r^2+rs}$, 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]** 621.1, 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] A correct formula is written, but incorrect substitutions are made.

or

[1] An incorrect proportion is written, but an appropriate solution is found.

or

[1] The correct circumference is found, but no further correct work is shown.

or

[1] 621.1, but no work is shown.

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

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]** 590.5 and 652.6, and appropriate work is shown, such as $|d - 620| \leq 0.05d$.

[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] 590.5 *or* 652.6, and appropriate work is shown.

[1] 590.5 and 652.6, but no work is shown.

[0] 590.5 *or* 652.6, 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.

(28) **[4]** 32.8, and appropriate work is shown.

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

or

[3] An incorrect substitution is made, but appropriate work is shown and an appropriate solution is found.

[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, such as incorrect application of a logarithm rule.

[1] Correct substitutions are made, but no further correct work is shown.

or

[1] 32.8, 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.

(29) **[4]** $y = 1{,}018.2839(0.5969)^x$ and 16, and appropriate work is shown.

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

or

[3] $y = 1{,}018.2839(0.5969)^x$ and 16, but the substitution is not shown.

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

or

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

or

[2] An appropriate regression equation is written, but the number of coins returned after the eighth trial is not found.

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

or

[1] An incorrect regression equation is written, but the number of coins returned after the eighth trial is found appropriately.

or

[1] $y = 1{,}018.2839(0.5969)^x$ and 16, but no work is shown.

[0] $y = 1{,}018.2839(0.5969)^x$ *or* 16, 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]** .00046 or $\frac{46}{100,000}$ or an equivalent answer, and appropriate work is shown.

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

or

[3] Appropriate work is shown, but the probability of hitting *at most* four home runs is found.

[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] The probabilities of hitting *exactly* four and *exactly* five home runs are found, but the probabilities are not added.

[1] Appropriate work is shown, but the probability of hitting *exactly* four home runs is found.

or

[1] Correct substitution into the Bernoulli equation for *exactly* four and *exactly* five home runs is made, but no further correct work is shown.

or

[1] .00046 or $\frac{46}{100,000}$ 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.

(31) **[4]** 21 by 23, and appropriate work is shown, such as solving the equation $765 = 3(x - 4)(x - 6)$.

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

or

[3] Appropriate work is shown, but only one dimension is found.

[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] An incorrect equation of equal difficulty is solved appropriately, and appropriate dimensions are found.

or

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

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

or

[1] An incorrect equation of equal difficulty is written, and one computational error is made, but appropriate dimensions are found.

or

[1] An incorrect equation of equal difficulty is solved appropriately, but one computational error is made when finding the length.

or

[1] 21 by 23, but no work is shown.

[0] 21 *or* 23, 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.

(32) **[4]** 90 and 270, and appropriate work is shown, such as solving $\sin^2 \theta = 1 + \cos \theta$.

[3] Appropriate work is shown, but one computational error is made or the answers are expressed in radians.

or

[3] Appropriate work is shown, but 180 is not rejected as a solution.

or

[3] Appropriate work is shown, but only one solution is found.

[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] An incorrect trigonometric substitution is made, but the equation is solved appropriately.

or

[2] A trigonometric equation set equal to zero is written, but no further correct work is shown.

or

[2] 90 and 270, but a graphic solution is provided.

[1] The equation $\sin^2 \theta - \cos \theta - 1 = 0$ is found, but no further correct work is shown.

or

[1] A graphic solution is provided, and one computational or graphing error is made.

or

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

[0] 90 *or* 270, but no work is shown.

or

[0] 90, 180, and 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.

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]** 8, and appropriate work is shown, such as a correctly labeled graph, a table of values, or an algebraic solution.

[5] Appropriate work is shown, 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] Appropriate work is shown, and the correct values of t where the height of the tide is 7 are identified (2 and 10), but the correct number of hours is not stated.

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

or

[3] A correct table or graph is constructed, but no further correct work is shown.

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

or

[2] The correct values of t (2 and 10) and 8 are written, but no work is shown.

[1] 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.

(34) **[6]** $\overline{JK} \parallel \overline{ML}, \overline{MJ} \nparallel \overline{KL}$, and $\overline{MJ} \neq \overline{KL}$, and appropriate work is shown or a complete and correct proof is written, and a concluding statement is written.

[5] Appropriate work is shown and a correct concluding statement is written, but one computational error is made in determining the slopes or the lengths of the legs.

or

[5] Appropriate work is shown, but the concluding statement is missing or is incomplete.

[4] Appropriate work is shown and a correct concluding statement is written, but two or more computational errors are made.

or

[4] The quadrilateral is proved to be a trapezoid, but the two nonparallel sides are not proved to be unequal.

or

[4] A proof is written that shows that $\overline{JK} \parallel \overline{ML}$ and $\overline{MJ} \neq \overline{KL}$, but the difference between a quadrilateral and a trapezoid is not addressed.

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

[2] The quadrilateral is proved to be a trapezoid, but one conceptual error is made, and the two nonparallel sides are not proved to be unequal.

or

[2] The lengths of all four sides are found correctly, but no further correct work is shown.

or

[2] The two nonparallel sides are proved to be unequal, but no further correct work is shown.

[1] The proof shows that the first set of sides is parallel, but no further correct work is shown.

or

[1] *JKLM* is graphed correctly and the definition of an isosceles trapezoid is written, but no proof 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.

Map to Learning Standards

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

Regents Examination in Mathematics B

August 2004

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

The *Chart for Determining the Final Examination Score for the August 2004 Regents Examination in Mathematics B*, normally located on this page, will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Tuesday, August 17, 2004. Conversion charts provided for previous administrations of the Mathematics B examination must NOT be used to determine students' final scores for this administration.

University of the State of New York
State Education Department

Regents Examination in Mathematics B
August 2004

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

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 may 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.