The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Tuesday, August 16, 2005 — 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.

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.

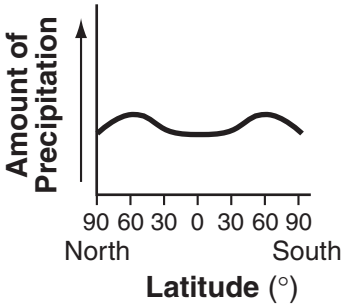
1 What is the turning point, or vertex, of the parabola whose equation is $y = 3x^2 + 6x - 1$?

(1) (1,8)
(2) (–1,–4)
(3) (–3,8)
(4) (3,44)

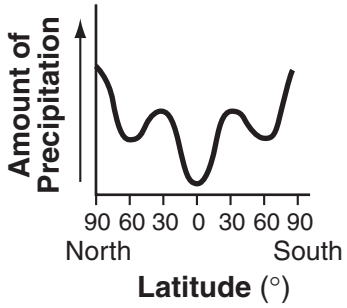
2 The growth of bacteria in a dish is modeled by the function $f(t) = 2^{\frac{t}{3}}$. For which value of t is $f(t) = 32$?

(1) 8
(2) 2
(3) 15
(4) 16

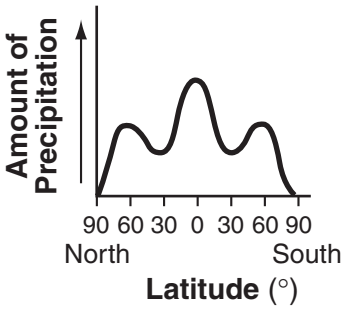
3 The graphs below show the average annual precipitation received at different latitudes on Earth. Which graph is a translated cosine curve?



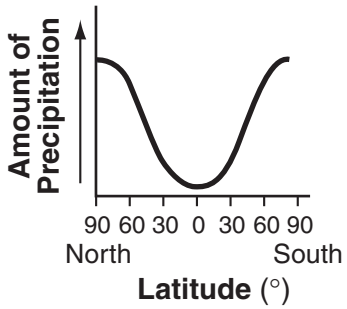
(1)



(3)



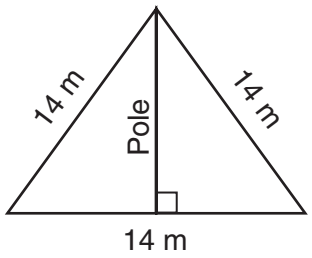
(2)



(4)

4 The accompanying diagram shows two cables of equal length supporting a pole. Both cables are 14 meters long, and they are anchored to points in the ground that are 14 meters apart.

Use this space for computations.



What is the exact height of the pole, in meters?

(1) 7

(2) $7\sqrt{2}$

(3) $7\sqrt{3}$

(4) 14

5 What is the sum of $(y - 5) + \frac{3}{y + 2}$?

(1) $y - 5$

(2) $\frac{y^2 - 7}{y + 2}$

(3) $\frac{y - 2}{y + 2}$

(4) $\frac{y^2 - 3y - 7}{y + 2}$

6 The expression $\frac{1}{5 - \sqrt{13}}$ is equivalent to

(1) $\frac{5 + \sqrt{13}}{12}$

(2) $\frac{5 + \sqrt{13}}{-12}$

(3) $\frac{5 + \sqrt{13}}{8}$

(4) $\frac{5 + \sqrt{13}}{-8}$

7 When expressed as a monomial in terms of i, $2\sqrt{-32} - 5\sqrt{-8}$ is equivalent to

(1) $2\sqrt{2i}$

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

(3) $-2i\sqrt{2}$

(4) $18i\sqrt{2}$

Use this space for computations.

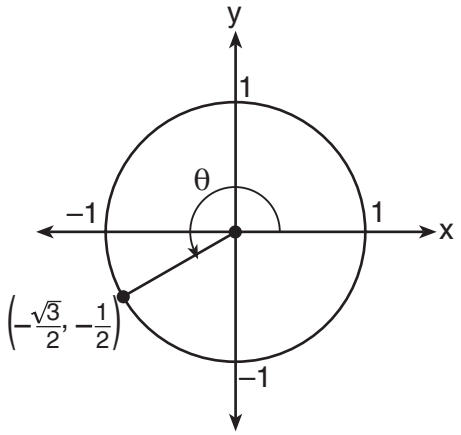
8 The image of the origin under a certain translation is the point (2,–6). The image of point (–3,–2) under the same translation is the point

(1) (–6,12)
(2) (–5,4)
(3) $\left(-\frac{3}{2}, \frac{1}{3}\right)$
(4) (–1,–8)

9 The solution of $|2x - 3| < 5$ is

(1) $x < -1$ or $x > 4$
(2) $-1 < x < 4$
(3) $x > -1$
(4) $x < 4$

10 In the accompanying diagram of a unit circle, the ordered pair $\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ represents the point where the terminal side of θ intersects the unit circle.



What is m∠θ?

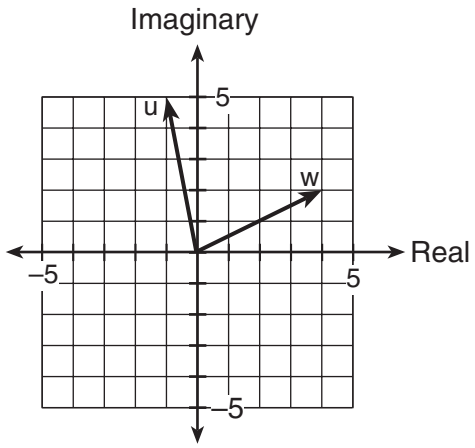
(1) 210
(2) 225
(3) 233
(4) 240

11 Two straight roads intersect at an angle whose measure is 125°. Which expression is equivalent to the cosine of this angle?

(1) cos 35°
(2) –cos 35°
(3) cos 55°
(4) –cos 55°

12 Two complex numbers are graphed below.

Use this space for computations.



What is the sum of w and u, expressed in standard complex number form?

(1) $7 + 3i$
(2) $3 + 7i$
(3) $5 + 7i$
(4) $-5 + 3i$

13 When simplified, the complex fraction $\frac{1+\frac{1}{x}}{\frac{1}{x}-x}$, $x \neq 0$, is equivalent to

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

14 A certain radio wave travels in a path represented by the equation $y = 5 \sin 2x$. What is the period of this wave?

(1) 5
(2) 2
(3) π
(4) 2π

15 The mean score on a normally distributed exam is 42 with a standard deviation of 12.1. Which score would be expected to occur *less than* 5% of the time?

(1) 25
(2) 32
(3) 60
(4) 67

16 For which positive value of m will the equation $4x^2 + mx + 9 = 0$ have roots that are real, equal, and rational?

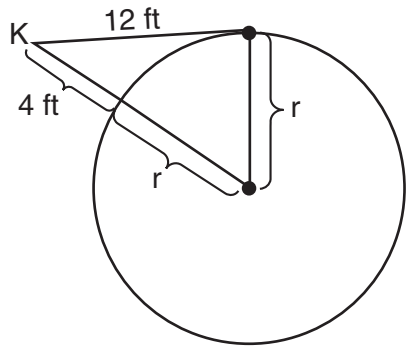
Use this space for computations.

(1) 12
(2) 9
(3) 3
(4) 4

17 An object orbiting a planet travels in a path represented by the equation $3(y + 1)^2 + 5(x + 4)^2 = 15$. In which type of pattern does the object travel?

(1) hyperbola
(2) ellipse
(3) circle
(4) parabola

18 Kimi wants to determine the radius of a circular pool without getting wet. She is located at point K, which is 4 feet from the pool and 12 feet from the point of tangency, as shown in the accompanying diagram.



What is the radius of the pool?

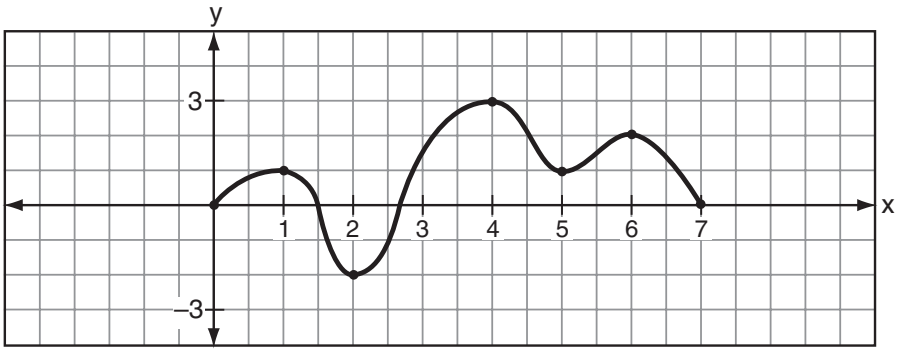
(1) 16 ft
(2) 20 ft
(3) 32 ft
(4) $4\sqrt{10}$ ft

19 What is the total number of distinct triangles that can be constructed if $AC = 13$, $BC = 8$, and $m\angle A = 36$?

Use this space for computations.

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

20 The accompanying graph is a sketch of the function $y = f(x)$ over the interval $0 \leq x \leq 7$.



What is the value of $(f \circ f)(6)$?

(1) 1
(2) 2
(3) 0
(4) –2

Part II

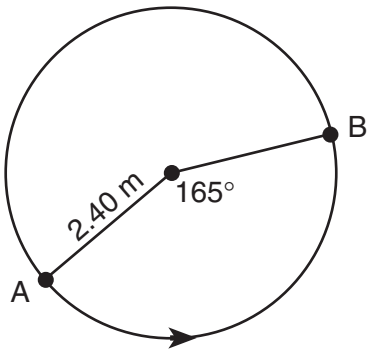
Answer all questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [12]

21 Evaluate: $\sum_{n=1}^{5}(n^2 + n)$

22 The Coolidge family's favorite television channels are 3, 6, 7, 10, 11, and 13. If the Coolidge family selects a favorite channel at random to view each night, what is the probability that they choose *exactly* three even-numbered channels in five nights? Express your answer as a fraction or as a decimal rounded to *four decimal places*.

23 Boyle's Law states that the pressure of compressed gas is inversely proportional to its volume. The pressure of a certain sample of a gas is 16 kilopascals when its volume is 1,800 liters. What is the pressure, in kilopascals, when its volume is 900 liters?

24 The accompanying diagram shows the path of a cart traveling on a circular track of radius 2.40 meters. The cart starts at point *A* and stops at point *B*, moving in a counterclockwise direction. What is the length of minor arc *AB*, over which the cart traveled, to the *nearest tenth of a meter*?



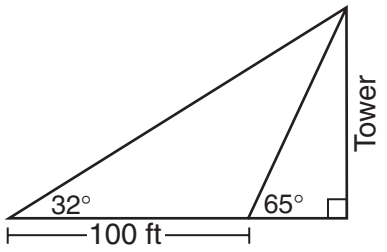
25 Given the function $y = f(x)$, such that the entire graph of the function lies above the x-axis. Explain why the equation $f(x) = 0$ has no real solutions.

26 Express in simplest terms: $\frac{2 - 2\ \sin^2 x}{\cos\ x}$

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 accompanying diagram shows the plans for a cell-phone tower that is to be built near a busy highway. Find the height of the tower, to the *nearest foot*.

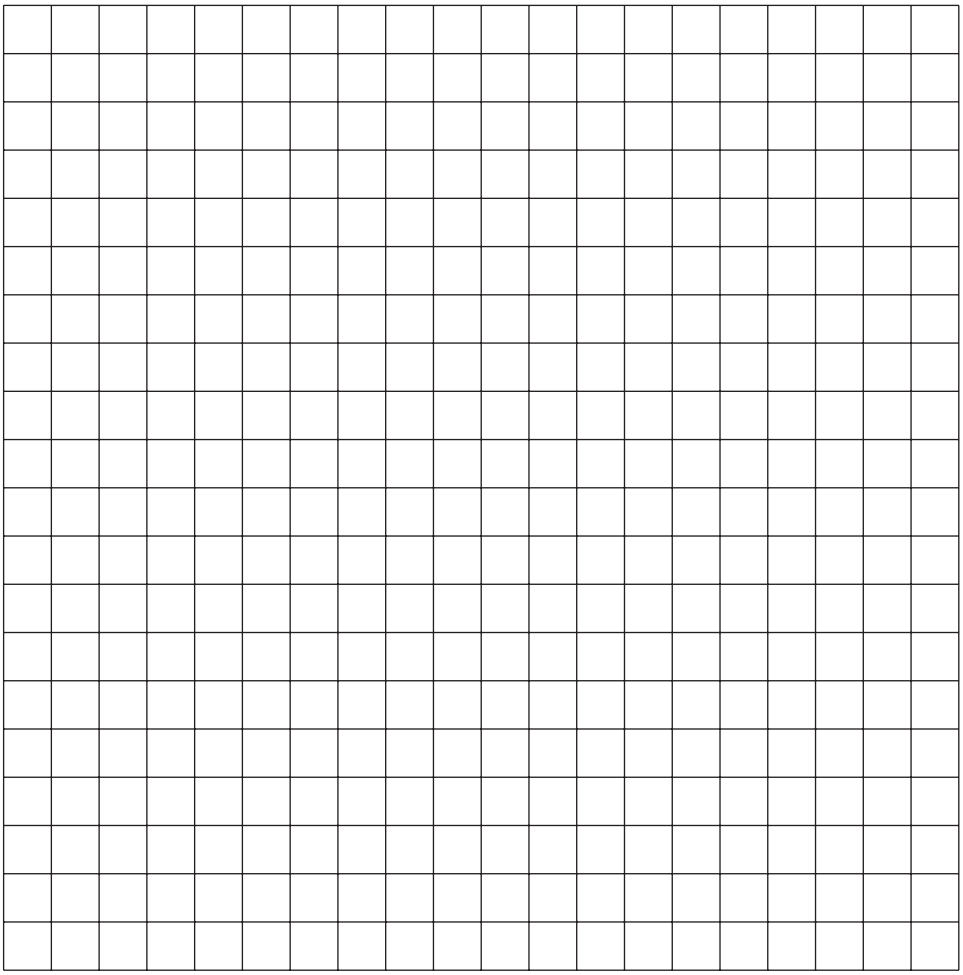


28 The lateral surface area of a right circular cone, s, is represented by the equation $s = \pi r \sqrt{r^2 + h^2}$, where r is the radius of the circular base and h is the height of the cone. If the lateral surface area of a large funnel is 236.64 square centimeters and its radius is 4.75 centimeters, find its height, to the *nearest hundredth of a centimeter*.

29 Solve for all values of x: $\frac{9}{x} + \frac{9}{x-2} = 12$

30 A hotel finds that its total annual revenue and the number of rooms occupied daily by guests can best be modeled by the function $R = 3 \log (n^2 + 10n)$, $n > 0$, where R is the total annual revenue, in millions of dollars, and n is the number of rooms occupied daily by guests. The hotel needs an annual revenue of \$12 million to be profitable. Graph the function on the accompanying grid over the interval $0 < n \leq 100$.

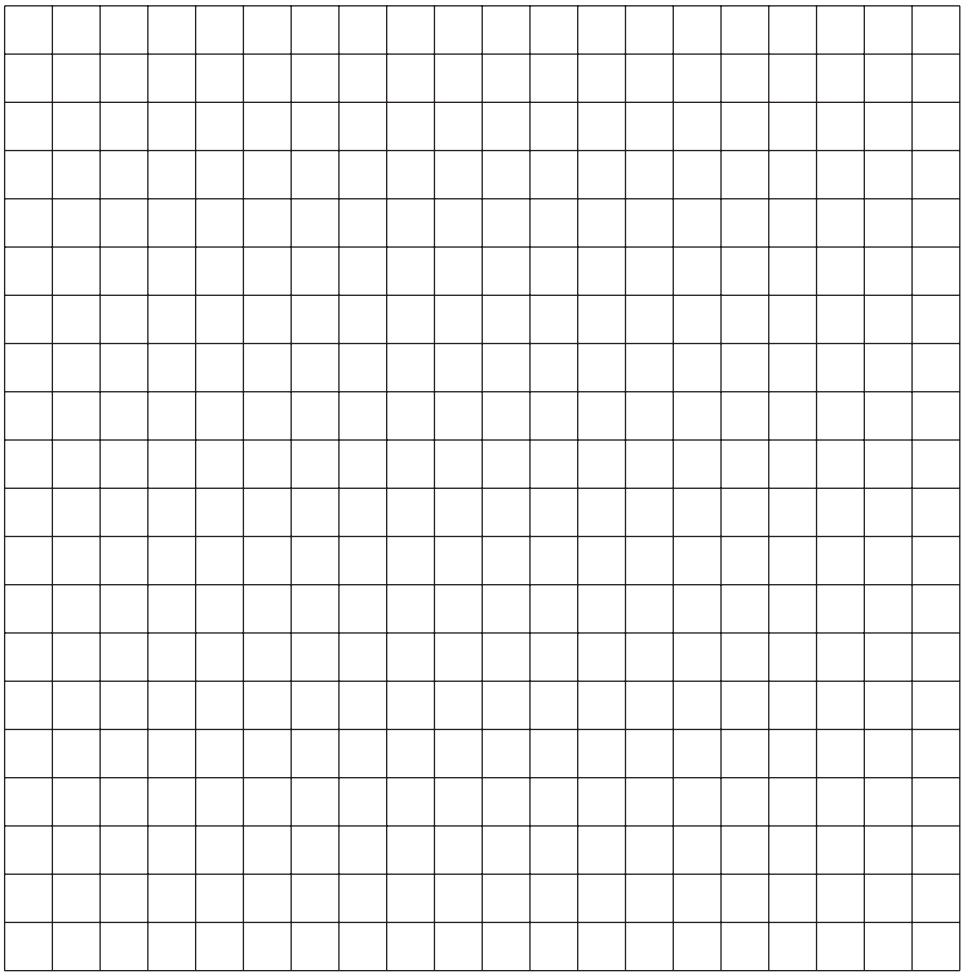
Calculate the minimum number of rooms that must be occupied daily for the hotel to be profitable. [Additional space is provided on the next page for your calculations.]



Question 30 continued

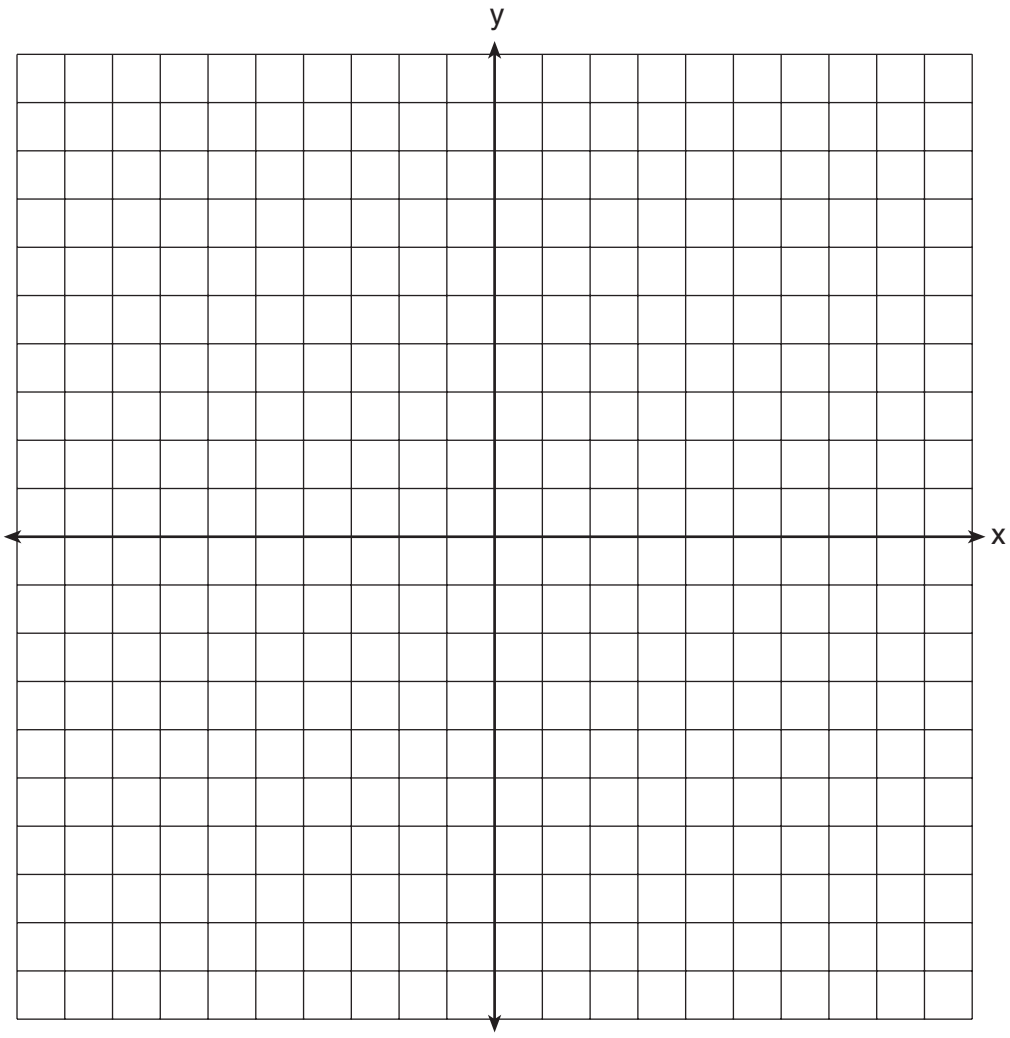
31 The profit, P, for manufacturing a wireless device is given by the equation $P = -10x^2 + 750x - 9{,}000$, where x is the selling price, in dollars, for each wireless device. What range of selling prices allows the manufacturer to make a profit on this wireless device? [The use of the grid on the next page is optional.]

Question 31 continued



32 On the accompanying set of axes, graph the equations $y = 4 \cos x$ and $y = 2$ in the domain $-\pi \leq x \leq \pi$.

Express, in terms of π, the interval for which $4 \cos x \geq 2$.



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 accompanying table illustrates the number of movie theaters showing a popular film and the film's weekly gross earnings, in millions of dollars.

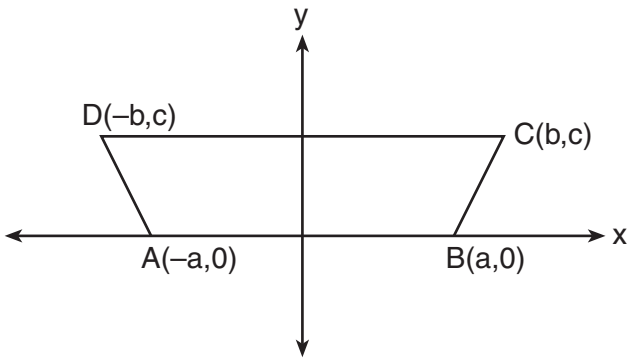
Number of Theaters (*x*)	443	455	493	530	569	657	723	1,064
Gross Earnings (*y*) (millions of dollars)	2.57	2.65	3.73	4.05	4.76	4.76	5.15	9.35

Write the linear regression equation for this set of data, rounding values to *five decimal places*.

Using this linear regression equation, find the approximate gross earnings, in millions of dollars, generated by 610 theaters. Round your answer to *two decimal places*.

Find the minimum number of theaters that would generate at least 7.65 million dollars in gross earnings in one week.

34 In the accompanying diagram of *ABCD*, where $a \neq b$, prove *ABCD* is an isosceles trapezoid.



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

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

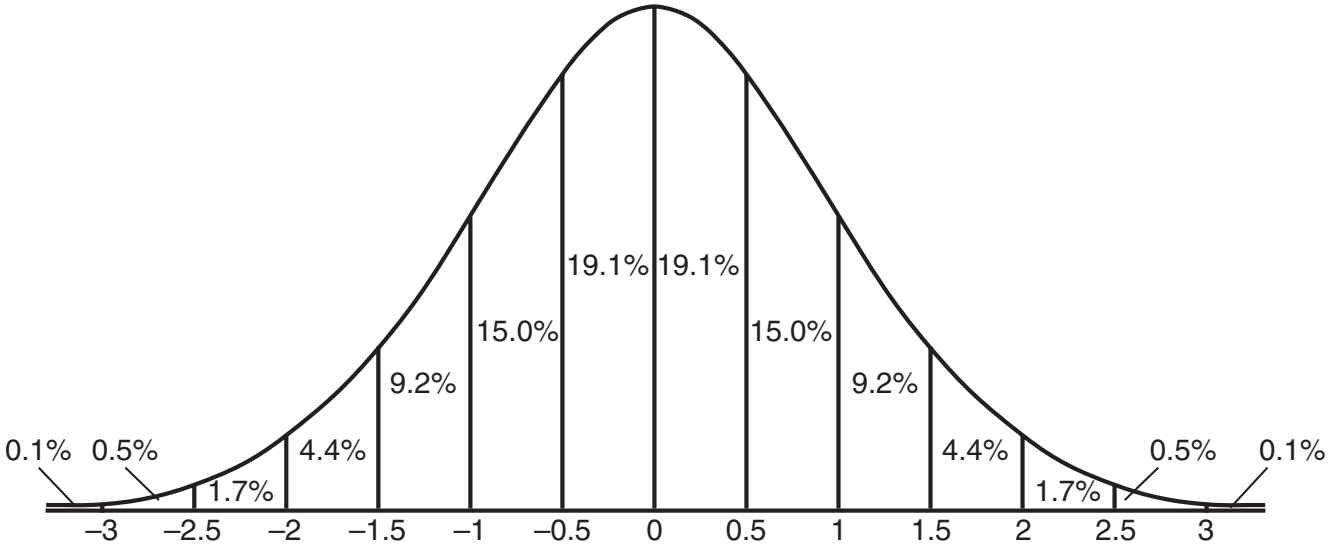
$\cos \frac{1}{2}A = \pm\sqrt{\frac{1 + \cos A}{2}}$

Law of Sines

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

Normal Curve

Standard Deviation



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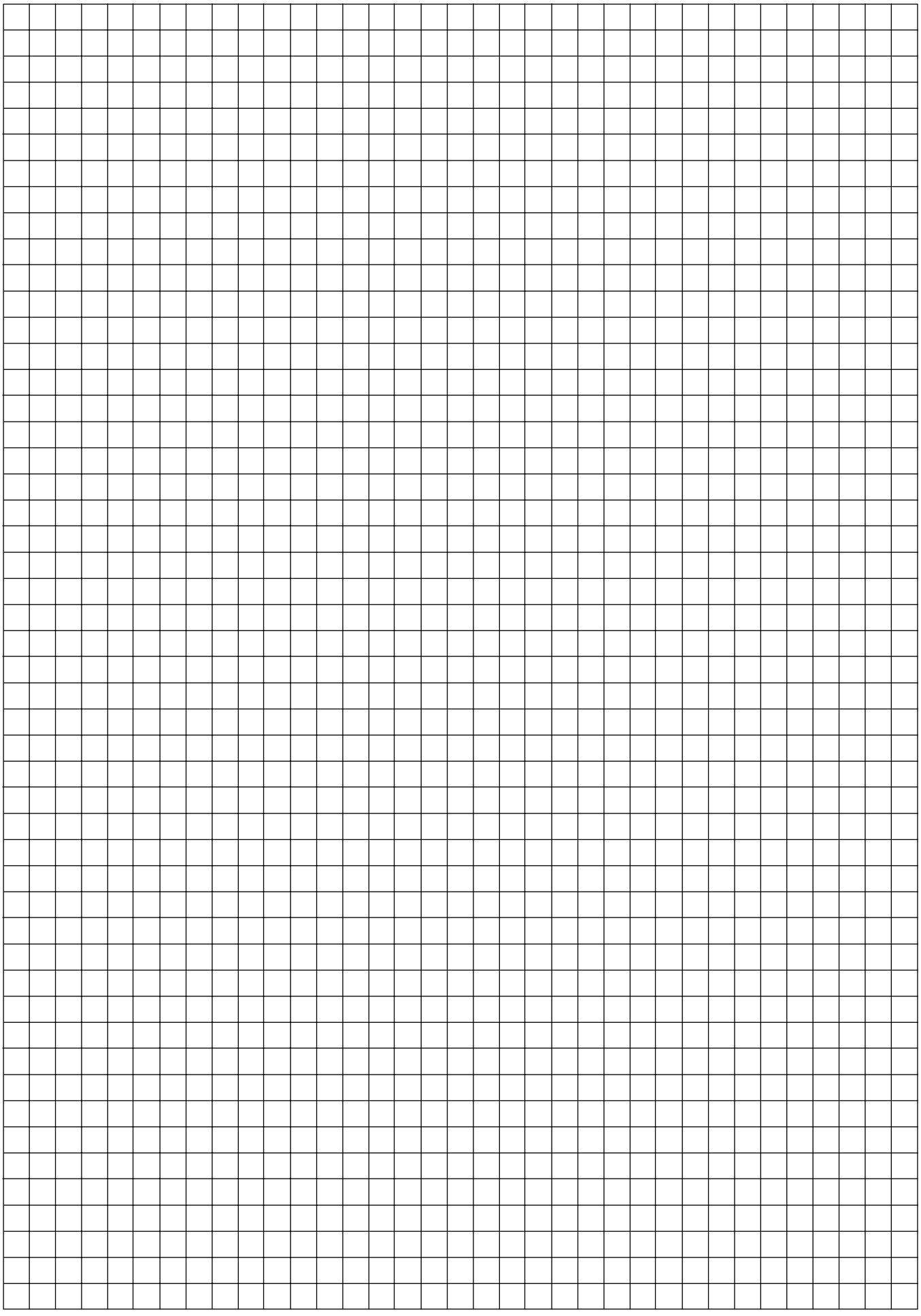
Scrap Graph Paper — This sheet will *not* be scored.



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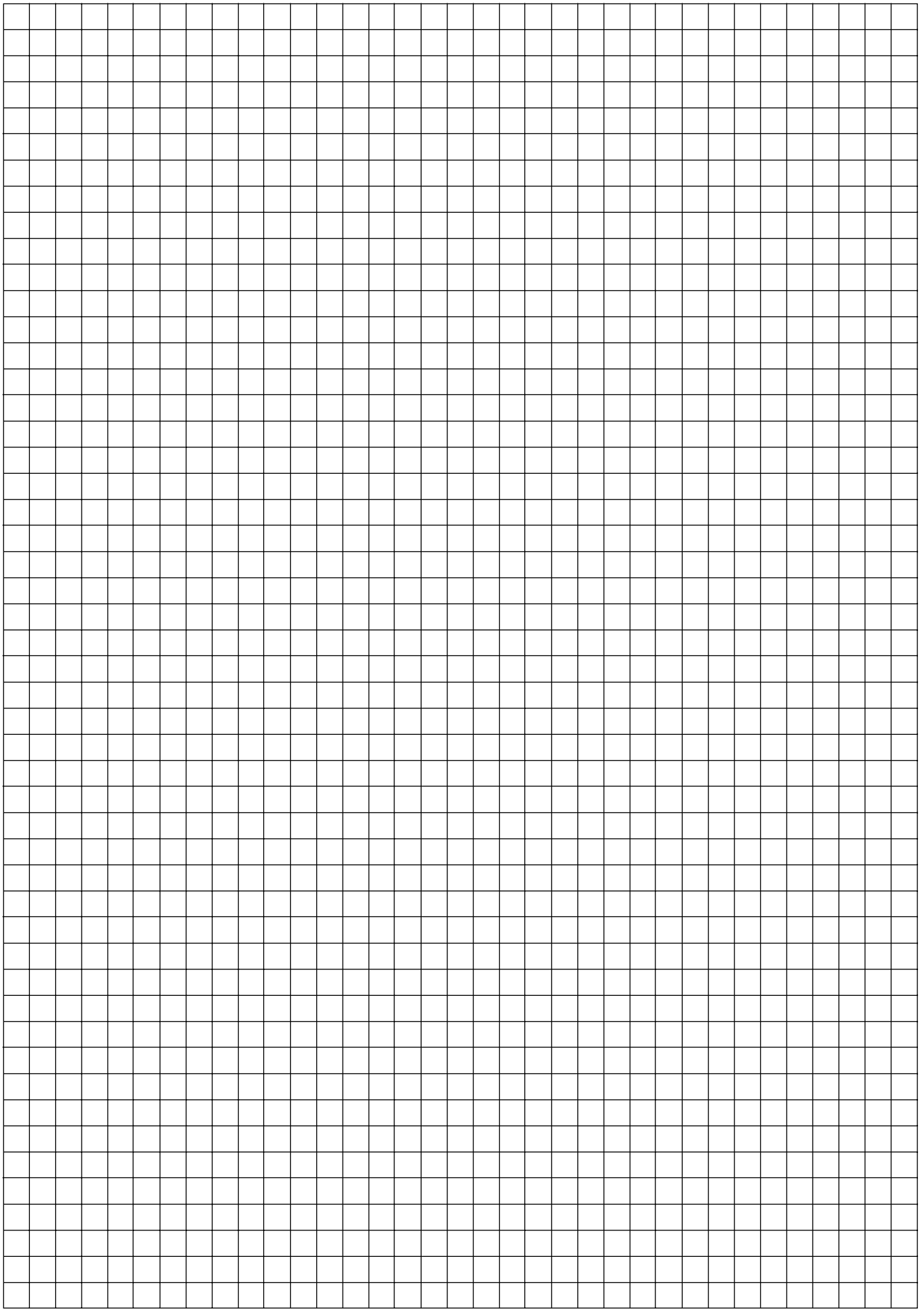

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Tuesday, August 16, 2005 — 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.

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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 table)

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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 16, 2005 — 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 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 16, 2005. 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) 1	(11) 4	(16) 1
(2) 3	(7) 3	(12) 2	(17) 2
(3) 4	(8) 4	(13) 3	(18) 1
(4) 3	(9) 2	(14) 3	(19) 2
(5) 4	(10) 1	(15) 4	(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. 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 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]** 70, 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] The values for $n = 1$ through $n = 5$ are computed correctly, but they are not added.

or

[1] 70, 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]** $\frac{40}{243}$ or an equivalent fraction or .1646, and appropriate work is shown, such as ${}_5C_3\left(\frac{1}{3}\right)^3\left(\frac{2}{3}\right)^2$.

[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 finding the probability of choosing at least three even-numbered channels.

or

[1] $\frac{40}{243}$ or an equivalent fraction or .1646, 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]** 32, and appropriate work is shown.

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

or

[1] Only the constant of variation, 28,800, is found.

or

[1] 32, but no work is shown.

[0] Direct variation is used.

or

[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]** 6.9, and appropriate work is shown, such as $2.4 \bullet 165 \bullet \frac{\pi}{180}$.

[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] Appropriate work is shown, but the calculations are performed in radians.

or

[1] Correct substitution is made into the equation for the length of the arc, but no further correct work is shown.

or

[1] 6.9, 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.

(25) **[2]** A complete and correct explanation is written, such as stating that since the graph lies entirely above the x-axis, there is no point on the graph where $y = 0$.

[1] An incomplete or partially correct explanation is written, such as stating that the equation has imaginary roots.

[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]** $2 \cos x$, and appropriate work is shown, such as factoring the numerator and substituting $\cos^2 x$ for $1 - \sin^2 x$.

[1] Appropriate work is shown, but one factoring or substitution error is made, or the expression is not simplified completely.

or

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

or

[1] $2 \cos x$, 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]** 88, and appropriate work is shown, such as $\frac{y}{\sin 32} = \frac{100}{\sin 33}$ and $\sin 65 = \frac{x}{y}$.

[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 setting up an incorrect proportion.

or

[2] The hypotenuse of one of the right triangles is found correctly, but no further correct work is shown.

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

or

[1] The obtuse triangle is treated as a right triangle, but an appropriate height is found for the tower.

or

[1] 88, 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]** 15.13, and appropriate work is shown, such as solving the equation $236.64 = \pi(4.75)\sqrt{(4.75)^2 + h^2}$.

[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] Correct substitution of values is made into the equation, but no further correct work is shown.

or

[1] 15.13, but no work is shown.

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

(29) **[4]** 3 and $\frac{1}{2}$, and appropriate work is shown.

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

or

[3] Appropriate work is shown, but only one of the values 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 correct quadratic equation is written in standard form, but no further correct work is shown.

or

[2] An incorrect quadratic equation of equal difficulty is solved appropriately.

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

or

[1] An incorrect equation of a lesser degree of difficulty is solved appropriately.

or

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

[0] 3 *or* $\frac{1}{2}$, 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.

(30) **[4]** The function is graphed over the specified interval, and 96, and appropriate work is shown, such as calculating the revenue at 95 and 96 to show that 96 will make the hotel profitable or writing an explanation.

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

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

or

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

or

[2] 96, and appropriate work is shown, but no graph is drawn.

or

[2] The function is graphed correctly, but no further correct work is shown.

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

or

[1] 96, but no work is shown and 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.

(31) **[4]** $15 < x < 60$, and appropriate work is shown, such as solving the algebraic inequality $-10x^2 + 750x - 9000 > 0$ or a graphic solution.

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

or

[3] $15 \leq x \leq 60$, and appropriate work is shown.

[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, such as solving the equation $-10x^2 + 750x - 9000 = 0$ for 15 and 60.

or

[2] An incorrect inequality of equal difficulty is solved appropriately.

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

or

[1] $15 < x < 60$, but no work is shown.

[0] $15 \leq x \leq 60$, and 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]** Both equations are graphed correctly over the specified domain and the interval $-\frac{\pi}{3} \le x \le \frac{\pi}{3}$ is identified.

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

or

[3] Both equations are graphed correctly over the specified domain, but the interval is not identified or is written as $-1.0472 \le x \le 1.0472$ or $-60° \le x \le 60°$ or $-\frac{\pi}{3} < x < \frac{\pi}{3}$.

[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, such as graphing $y = 4 \sin x$.

or

[2] The equation $y = 4 \cos x$ is graphed correctly over the specified domain, 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] $-\frac{\pi}{3} \le x \le \frac{\pi}{3}$, but no work is shown and no graphs are drawn.

[0] The equation $y = 2$ is graphed correctly, but no further correct work is shown.

or

[0] $-1.0472 \le x \le 1.0472$ or $-60° \le x \le 60°$ or $-\frac{\pi}{3} < x < \frac{\pi}{3}$, and 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]** $y = 0.01021x - 1.66787$, 4.56, and 913, and appropriate work is shown.

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

or

[5] The expression $0.01021x - 1.66787$ is written and 4.56 and 913 are found, and appropriate work is shown.

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

or

[4] A correct equation is written, but either the gross earnings or the number of theaters is not found, but appropriate work is shown.

or

[4] An incorrect equation of equal difficulty is written, but appropriate answers are found, and appropriate work is shown.

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

or

[3] $y = 0.01021x - 1.66787$, 4.56, and 913, but no work is shown.

or

[3] The expression $0.01021x - 1.66787$ is written and either 4.56 or 913 is found, and appropriate work is shown.

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

or

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

[1] 4.56 and 913, but no work is shown.

or

[1] The expression $0.01021x - 1.66787$ is written, but no further correct work is shown.

[0] Either 4.56 or 913, 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.

(34) **[6]** A complete and correct proof that includes a concluding statement is written, such as showing that $\overline{AB}$ is parallel to $\overline{CD}$ and that $\overline{BC}$ is not parallel to $\overline{AD}$ by finding their slopes and using the distance formula to show that the two nonparallel sides are equal.

[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 one conceptual error is made, such as using an incorrect formula.

or

[4] The slopes of all four sides are found correctly and the lengths of $\overline{AD}$ and $\overline{BC}$ are found correctly, and appropriate work is shown, but no conclusion is stated.

or

[4] A proof is written that correctly shows *ABCD* is a trapezoid, but it is not proved to be isosceles.

[3] The slopes of only one pair of sides are found correctly, but the lengths of $\overline{AD}$ and $\overline{BC}$ are found correctly, and appropriate work is shown, and an appropriate conclusion is stated.

or

[3] A correct numerical illustration is given in lieu of a proof of the general case.

[2] The slopes of only one pair of sides are found correctly, but the lengths of $\overline{AD}$ and $\overline{BC}$ are found correctly, and appropriate work is shown, but no conclusion is stated.

[1] Either the slopes or the lengths of $\overline{AD}$ and $\overline{BC}$ are found correctly, but no conclusion is stated.

or

[1] The correct definition of an isosceles trapezoid is written, but no further correct work is shown.

[0] The slopes of $\overline{AB}$ and $\overline{DC}$ are found correctly, but no further correct 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	34
Number and Numeration	6, 13
Operations	5, 7, 8, 12
Modeling/Multiple Representation	1, 2, 10, 17, 23, 30, 31, 32
Measurement	4, 11, 14, 18, 19, 24, 27
Uncertainty	15, 21, 22, 33
Patterns/Functions	3, 9, 16, 20, 25, 26, 28, 29

Regents Examination in Mathematics B

August 2005

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

The *Chart for Determining the Final Examination Score for the August 2005 Regents Examination in Mathematics B* will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Tuesday, August 16, 2005. Conversion charts provided for previous administrations of the Mathematics B examination must NOT be used to determine students' final scores for this administration.