

The University of the State of New York  
REGENTS HIGH SCHOOL EXAMINATION

# MATHEMATICS B

Wednesday, August 13, 2008 — 8:30 to 11:30 a.m., only

Print Your Name:

Print Your School's Name:

Print your name and the name of your school in the boxes above. Then turn to the last page of this booklet, which is the answer sheet for Part I. Fold the last page along the perforations and, slowly and carefully, tear off the answer sheet. Then fill in the heading of your answer sheet.

Scrap paper is not permitted for any part of this examination, but you may use the blank spaces in this booklet as scrap paper. A perforated sheet of scrap graph paper is provided at the end of this booklet for any question for which graphing may be helpful but is not required. You may remove this sheet from this booklet. Any work done on this sheet of scrap graph paper will *not* be scored. Write all your work in pen, except graphs and drawings, which should be done in pencil.

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

This examination has four parts, with a total of 34 questions. You must answer all questions in this examination. Write your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in Parts II, III, and IV directly in this booklet. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc.

When you have completed the examination, you must sign the statement printed at the end of the answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet cannot be accepted if you fail to sign this declaration.

Notice . . .

A graphing calculator, a straightedge (ruler), and a compass must be available for you to use while taking this examination.

The use of any communications device is strictly prohibited when taking this examination. If you use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

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

### Part I

Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question. [40]

Use this space for computations.

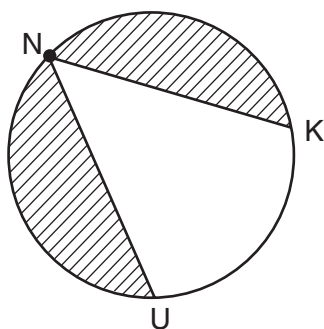
1 Which transformation of  $y = 2^x$  results in the function  $y = 2^x - 2$ ?

- (1)  $T_{0,-1}$                       (3)  $r_{y\text{-axis}}$   
(2)  $T_{0,-2}$                       (4)  $r_{x\text{-axis}}$

2 Tanner and Robbie discovered that the means of their grades for the first semester in Mrs. Merrell's mathematics class are identical. They also noticed that the standard deviation of Tanner's scores is 20.7, while the standard deviation of Robbie's scores is 2.7. Which statement must be true?

- (1) In general, Robbie's grades are lower than Tanner's grades.  
(2) Robbie's grades are more consistent than Tanner's grades.  
(3) Robbie had more failing grades during the semester than Tanner had.  
(4) The median for Robbie's grades is lower than the median for Tanner's grades.

3 The NUK Energy Company is designing a new logo, as shown in the accompanying diagram, with  $m\widehat{NK} = 130$  and  $m\widehat{NK} = m\widehat{NU}$ .



What is the measure of  $\angle KNU$ ?

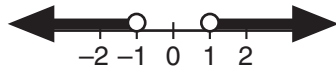
- (1)  $50^\circ$                       (3)  $80^\circ$   
(2)  $65^\circ$                       (4)  $100^\circ$

- 4 What is the graph of the function  $y = \sqrt{4 - x^2}$ ?
- (1) a circle whose radius is 2 and whose center is at the origin
  - (2) a circle whose radius is 4 and whose center is at the origin
  - (3) the upper half of a circle whose radius is 2 and whose center is at the origin
  - (4) the upper half of a circle whose radius is 4 and whose center is at the origin

- 5 The expression  $\frac{6}{y-5} - \frac{y+5}{y^2-25}$  is equivalent to

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

- 6 Which inequality is represented by the accompanying graph?

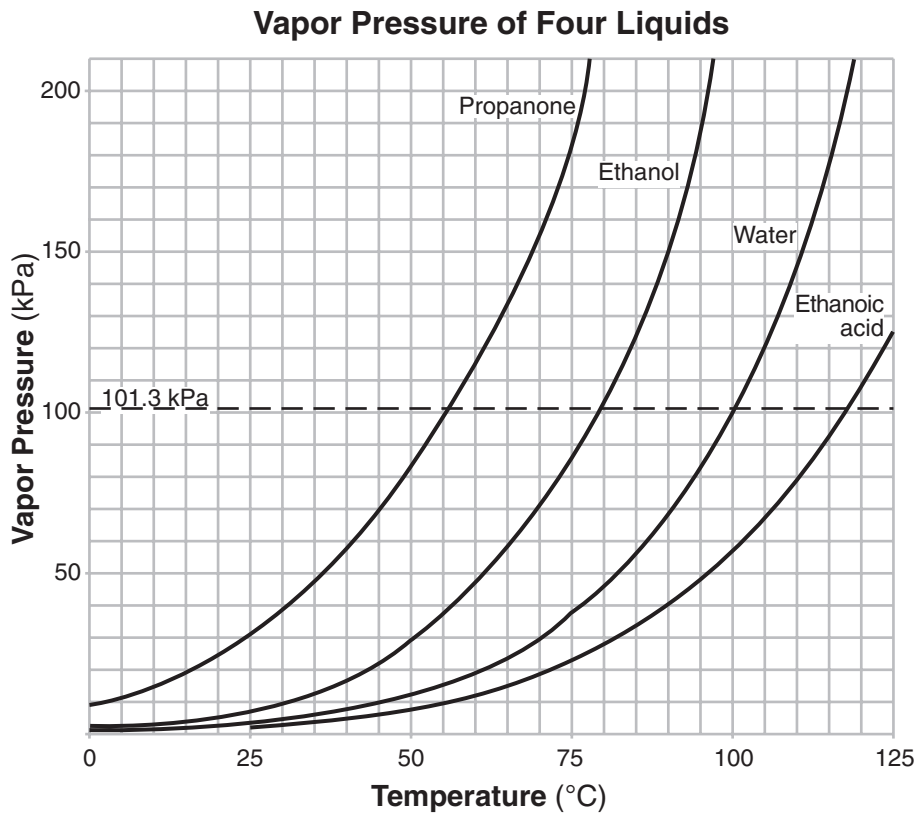


- (1)  $|x| > 1$
  - (2)  $|x| \geq 1$
  - (3)  $|x| < 1$
  - (4)  $|x| \leq 1$
- 7 If  $n > 0$ , the expression  $\left(\frac{1}{n}\right)^{-\frac{2}{3}}$  is equal to

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

Use this space for computations.

- 8 The family of curves shown in the accompanying graph illustrates the transformations of a function.



Which type of function could be the original function?

- (1) linear  
(2) tangent  
(3) exponential  
(4) sinusoidal
- 9 The expression  $\frac{1}{2} \log m - 3 \log n$  is equivalent to

- (1)  $\log \sqrt{m} + \log n^3$   
(2)  $\log \frac{1}{2}m - 3 \log n$   
(3)  $\log \frac{m^2}{3\sqrt{n}}$   
(4)  $\log \frac{\sqrt{m}}{n^3}$

**Use this space for  
computations.**

**10** Under the transformation  $(x,y) \rightarrow (2x,2y)$ , which property is *not* preserved?

- (1) distance
- (2) orientation
- (3) parallelism
- (4) angle measure

**11** If  $10^k = x$ , then  $10^{3k}$  is equal to

- (1)  $x^3$
- (2)  $3 + x$
- (3)  $3x$
- (4)  $1,000x$

**12** Which equation is *not* a function?

- (1)  $y = 3x^2 - 4$
- (2)  $y = \sin x$
- (3)  $y = \sec x$
- (4)  $x^2 = 16 - y^2$

**13** The expression  $1 - \sec x$  is equivalent to

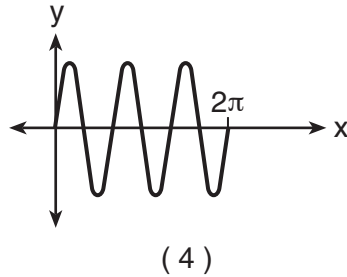
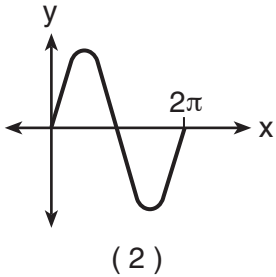
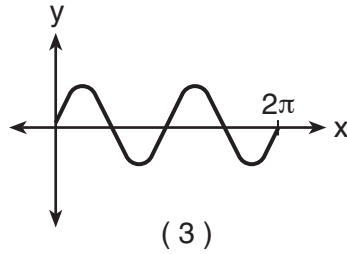
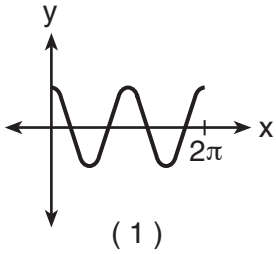
- (1)  $-\tan x$
- (2)  $\frac{\cos x - 1}{\cos x}$
- (3)  $\frac{\sin x - 1}{\sin x}$
- (4)  $\frac{\tan x}{\sec x - 1}$

**14** The roots of the equation  $5x^2 - 2x + 1 = 0$  are

- (1) real, rational, and unequal
- (2) real, rational, and equal
- (3) real, irrational, and unequal
- (4) imaginary

Use this space for  
computations.

15 Which graph represents a sound wave that follows a curve whose period is  $\pi$  and that is in the form  $y = a \sin bx$ ?



16 The expression  $\frac{\sqrt{-50}}{\sqrt{2}}$  is equivalent to

(1)  $-5i$

(3)  $5i$

(2)  $-5$

(4)  $5$

17 What is the value of  $\csc\left(\text{Arc sin } \frac{3}{4}\right)$ ?

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

(3)  $\frac{\sqrt{7}}{4}$

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

(4)  $\frac{4}{\sqrt{7}}$

Use this space for computations.

18 One root of the equation  $\frac{3x}{2} + \frac{1}{x} = -\frac{3x}{4}$  is

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

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

(2)  $\frac{4i}{9}$

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

19 If  $2^{(16x^2 - 8x - 3)} = 1$ , what does  $x$  equal?

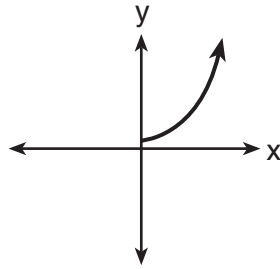
(1)  $\frac{1}{4}$ , only

(3)  $\frac{1}{4}$  and  $-\frac{3}{4}$

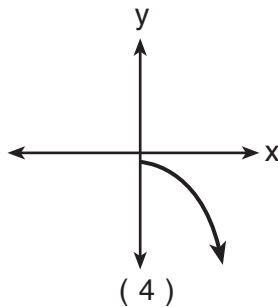
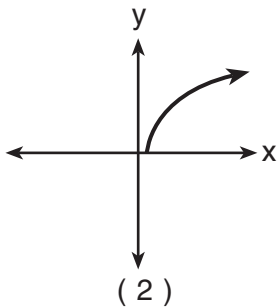
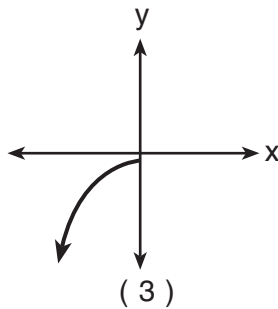
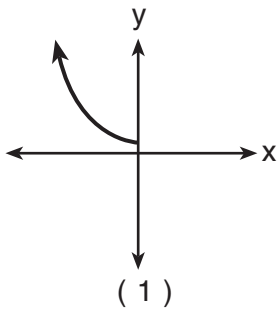
(2)  $\frac{3}{4}$ , only

(4)  $-\frac{1}{4}$  and  $\frac{3}{4}$

20 The accompanying graph shows the relationship between kinetic energy,  $y$ , and velocity,  $x$ .



The reflection of this graph in the line  $y = x$  is



## 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 The number of dogs,  $D$ , housed at a county animal shelter is modeled by the function  $D = 4\sqrt{2M} + 50$ , where  $M$  is the number of months the shelter has been open. How many months will it take for 74 dogs to be housed at the shelter?

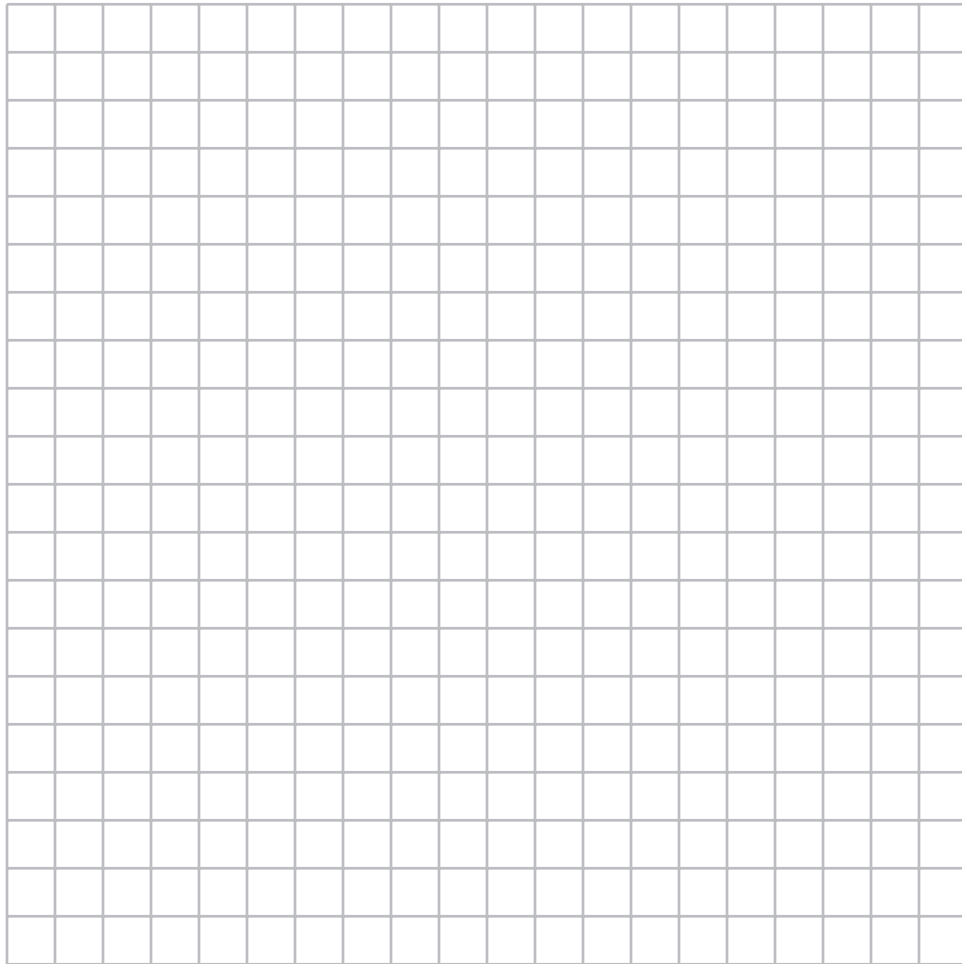
22 Solve for all values of  $x$ :  $|3x - 2| = 6$



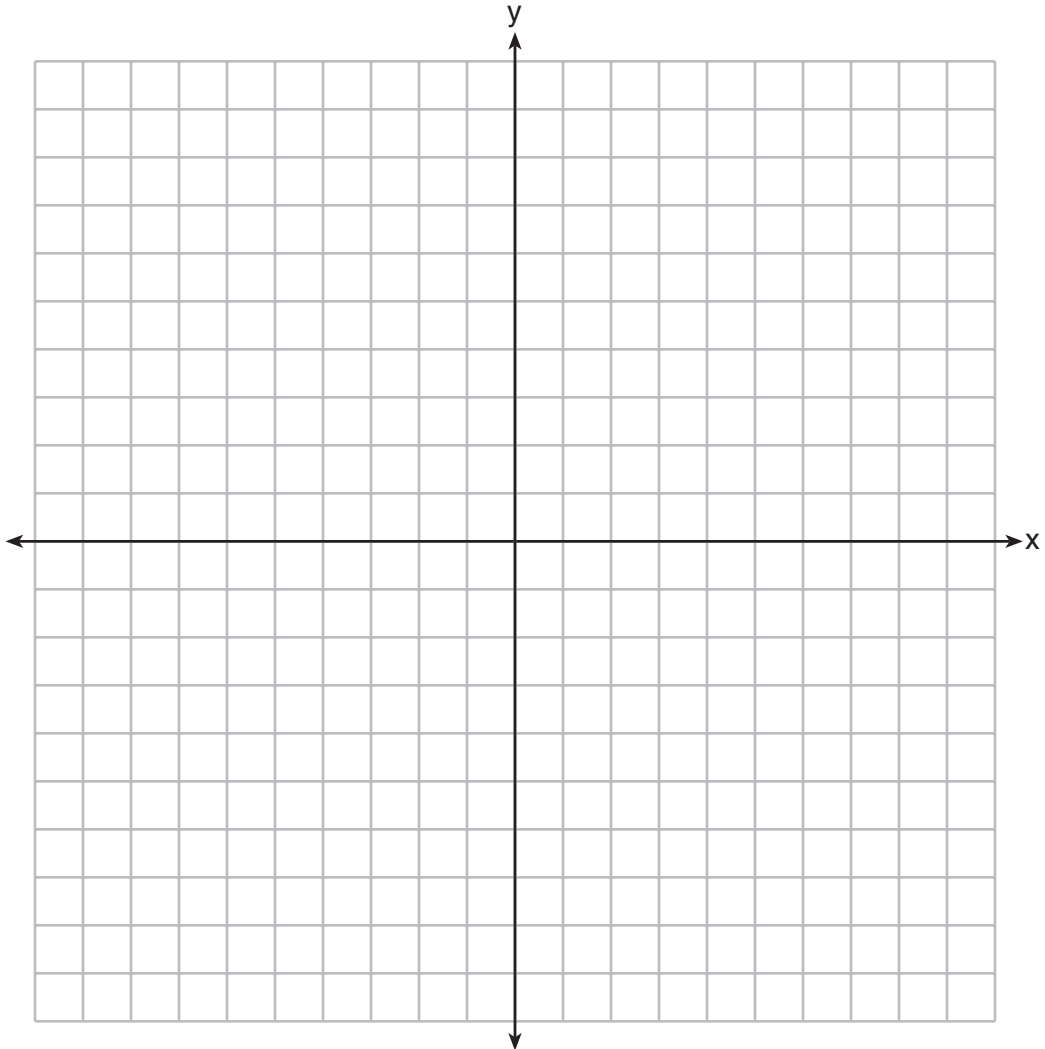
**23** Evaluate:  $3 \sum_{x=2}^4 (x^2 - 5)$

**24** Express in simplest form:  $\frac{1 - \frac{1}{x}}{x - 2 + \frac{1}{x}}$

**25** Each year, the student council at Briarwood High School sponsors a community talent show to raise money. In previous years, the council has discovered that profit from ticket sales,  $P(x)$ , is a function of the amount charged per ticket,  $x$ , in dollars, as modeled by the equation  $P(x) = 120x - 12x^2$ . What amount should the council charge for a ticket to make the greatest profit? [The use of the accompanying grid is optional.]



**26** On the accompanying set of axes, graph the function  $f(x) = 2x + 4$  and its inverse,  $f^{-1}(x)$ .



### 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 table shows the number of bacteria present in a certain culture over a 5-hour period, where  $x$  is the time, in hours, and  $y$  is the number of bacteria.

$x$	$y$
0	1,000
1	1,049
2	1,100
3	1,157
4	1,212
5	1,271

Write an exponential regression equation for this set of data, rounding all values to *four decimal places*.

Using this equation, determine the number of whole bacteria present when  $x$  equals 6.5 hours.

**28** During a training exercise in the Mojave Desert, two military vehicles left the base camp at the same time, one traveling at an average speed of 25 miles per hour and the other at an average speed of 50 miles per hour. Each vehicle traveled along a level, straight route.

If the exercise requires the two vehicles to be 65 miles apart after traveling for 1 hour, what must the angle between the two routes be, to the *nearest degree*?

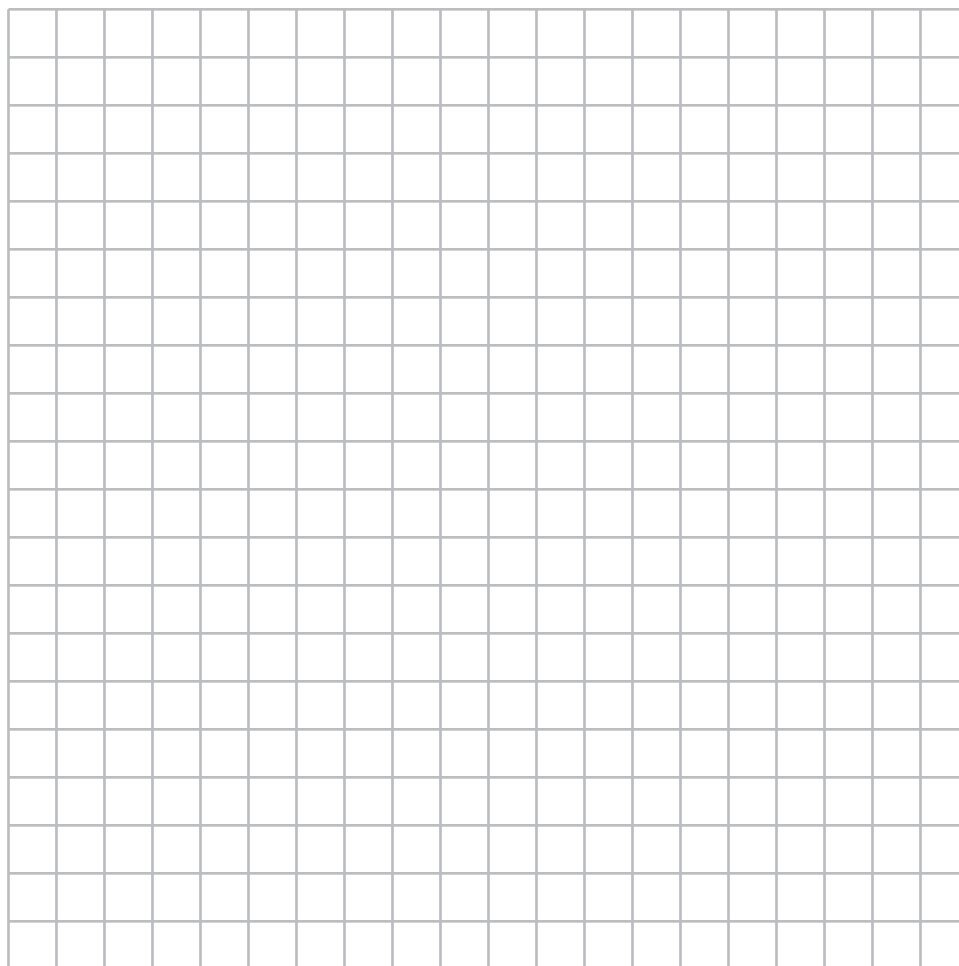
**29** A parcel of land is in the shape of an isosceles triangle. The base has a length of 673 feet and the two equal legs meet at an angle of  $43^\circ$ . Find, to the *nearest square foot*, the area of the parcel of land.

**30** East West Airlines has a good reputation for being on time. The probability that one of its flights will be on time is .91. If Mrs. Williams flies East West for her next five flights, what is the probability that *at least* three of them will be on time? Round your answer to the *nearest thousandth*.

**31** A landscape architect's designs for a town park call for two parabolic-shaped walkways. When the park is mapped on a Cartesian coordinate plane, the pathways intersect at two points. If the equations of the curves of the walkways are  $y = 11x^2 + 23x + 210$  and  $y = -19x^2 - 7x + 390$ , determine the coordinates of the two points of intersection. [Only an algebraic solution can receive full credit.]



**32** Kristen invests \$5,000 in a bank. The bank pays 6% interest compounded monthly. To the *nearest tenth of a year*, how long must she leave the money in the bank for it to double? (Use the formula  $A = P(1 + \frac{r}{n})^{nt}$ , where  $A$  is the amount accrued,  $P$  is the principal,  $r$  is the interest rate,  $n = 12$ , and  $t$  is the length of time, in years.) [The use of the accompanying grid is optional.]

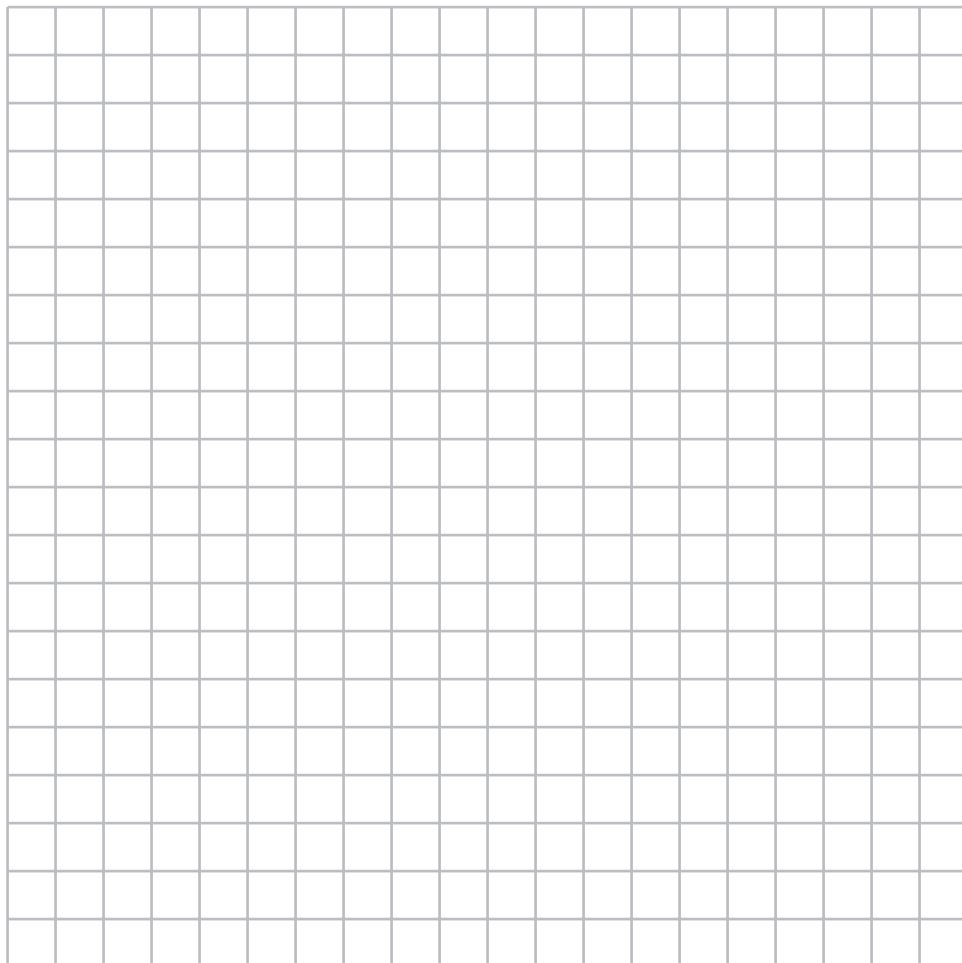


### Part IV

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 Find all values of  $x$  in the interval  $0^\circ \leq x < 360^\circ$  that satisfy the equation  $3 \cos 2x = \cos x + 2$ . Express your answers to the *nearest degree*. [The use of the grid on the next page is optional.]

**Question 33 continued**



34 A tricolored flag is made out of a rectangular piece of cloth whose corners are labeled  $A$ ,  $B$ ,  $C$ , and  $D$ . The colored regions are separated by two line segments,  $\overline{BM}$  and  $\overline{CM}$ , that meet at point  $M$ , the midpoint of side  $\overline{AD}$ . Prove that the two line segments that separate the regions will always be equal in length, regardless of the size of the flag.





## 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

$$\sin 2A = 2 \sin A \cos A$$

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

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

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

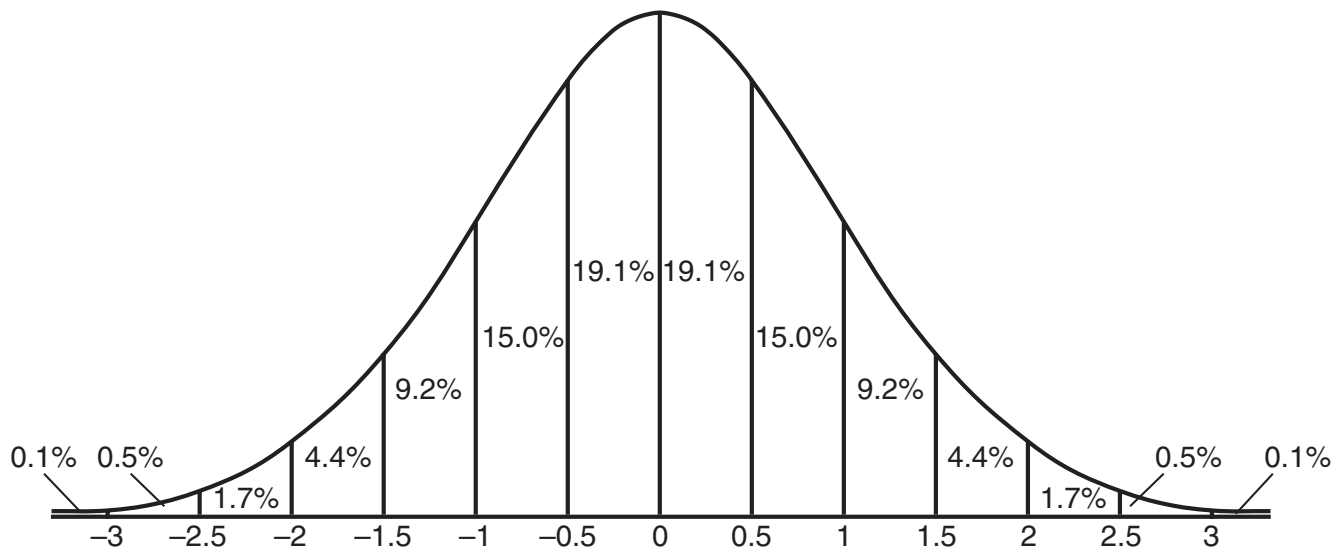
### Functions of the Half Angle

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

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

## Normal Curve

### Standard Deviation



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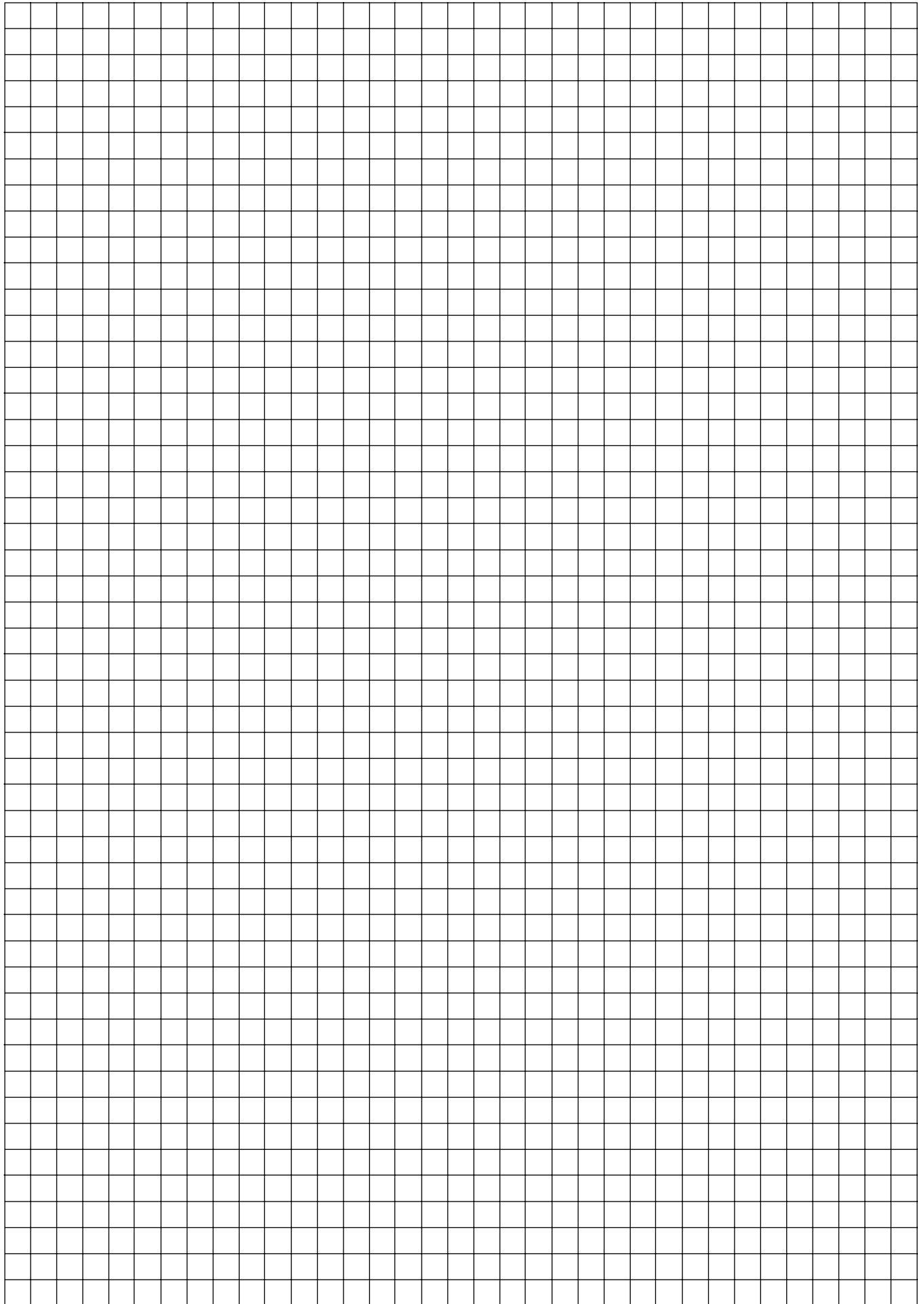
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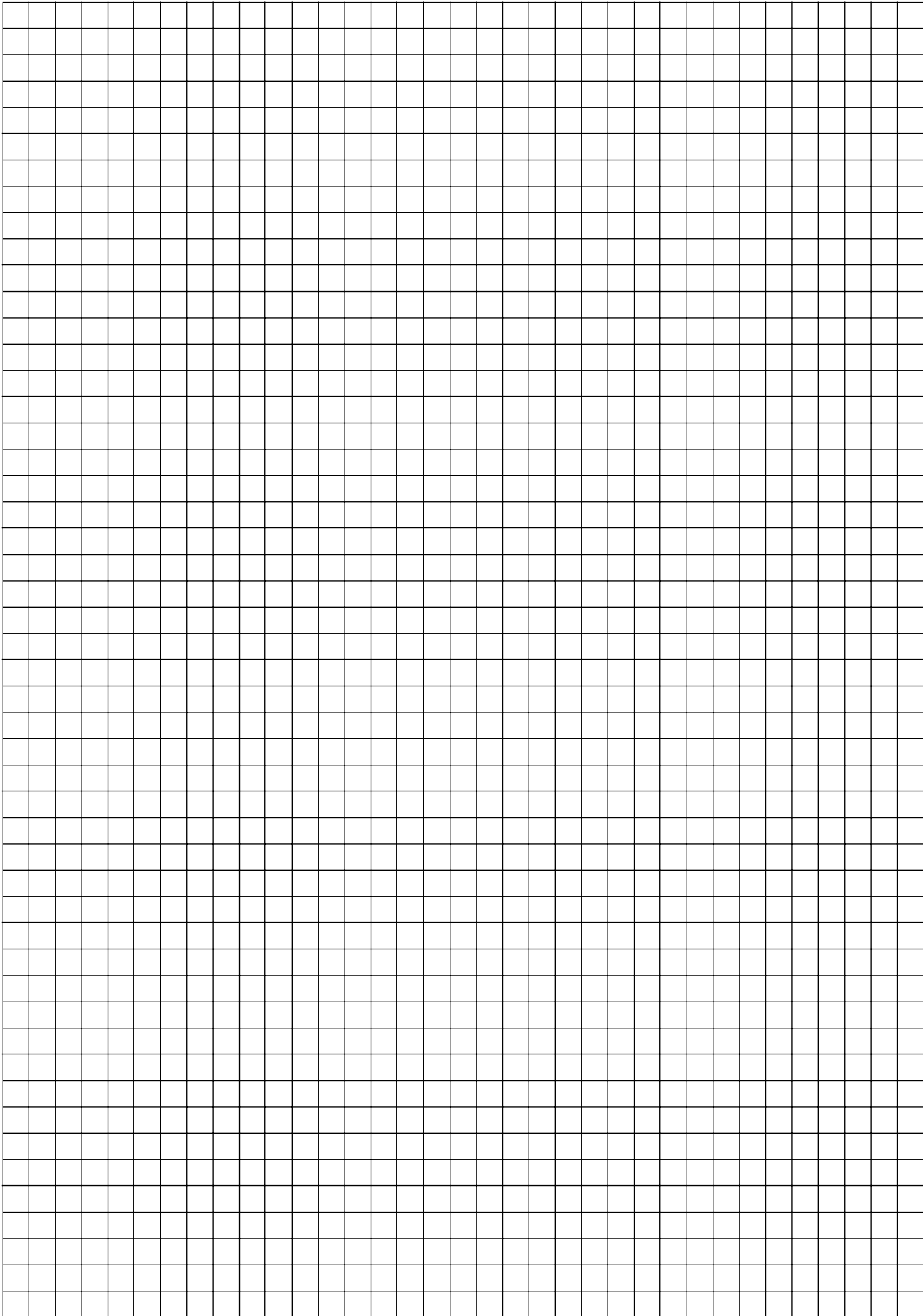
Scrap Graph Paper — This sheet will *not* be scored.

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



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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Wednesday, August 13, 2008 — 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

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MATHEMATICS B

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

<b>Rater's/Scorer's Name</b> (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

Wednesday, August 13, 2008 — 8:30 to 11:30 a.m., only

### SCORING KEY

#### Mechanics of Rating

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

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

Unless otherwise specified, mathematically correct variations in the answers will be allowed. Units need not be given when the wording of the questions allows such omissions.

Each student's answer paper is to be scored by a minimum of three mathematics teachers. On the back of the student's detachable answer sheet, raters must enter their initials in the boxes next to the questions they have scored and also write their name in the box under the heading "Rater's/Scorer's Name."

Raters should record the student's scores for all questions and the total raw score on the student's detachable answer sheet. Then the student's total raw score should be converted to a scaled score by using the conversion chart that will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Wednesday, August 13, 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) 2	(6) 1	(11) 1	(16) 3
(2) 2	(7) 3	(12) 4	(17) 2
(3) 1	(8) 3	(13) 2	(18) 3
(4) 3	(9) 4	(14) 4	(19) 4
(5) 1	(10) 1	(15) 3	(20) 2

Updated information regarding the rating of this examination may be posted on the New York State Education Department’s web site during the rating period. Check this web site <http://www.emsc.nysed.gov/osa/> and select the link “Examination Scoring Information” for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents examination period.

### General Rules for Applying Mathematics Rubrics

#### I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents 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] 18, and appropriate work is shown, such as an algebraic or a graphic solution or trial and error with at least three trials and appropriate checks.

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

*or*

[1] 18, but no work or fewer than three trials with appropriate checks are 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]  $\frac{8}{3}$  and  $-\frac{4}{3}$ , 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]  $3x - 2 = 6$  and  $3x - 2 = -6$ , but no further correct work is shown.

*or*

[1]  $\frac{8}{3}$  or  $-\frac{4}{3}$ , and appropriate work is shown.

*or*

[1]  $\frac{8}{3}$  and  $-\frac{4}{3}$ , but no work is shown.

[0]  $\frac{8}{3}$  or  $-\frac{4}{3}$ , 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.

MATHEMATICS B – *continued*

- (23) [2] 42, 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] 42, 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]  $\frac{1}{x-1}$ , and appropriate work is shown.
- [1] Appropriate work is shown, but one computational or factoring error is made.
- or***
- [1] Appropriate work is shown, but one conceptual error is made.
- or***
- [1]  $\frac{1}{x-1}$ , 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.
- 
- (25) [2] 5, 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] 5, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.



MATHEMATICS B – *continued*

(26) [2] Both  $f(x)$  and  $f^{-1}(x)$  are graphed correctly and at least one is labeled.

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

*or*

[1] Appropriate work is shown, but one conceptual error is made, such as graphing the inverse as a reflection over an axis.

*or*

[1]  $f(x)$  is graphed incorrectly, but an appropriate graph is drawn for  $f^{-1}(x)$ .

*or*

[1] A correct equation for  $f^{-1}(x)$  is written, but no graphs are drawn.

[0]  $f(x)$  is graphed 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.

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**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]  $y = 999.9725(1.0493)^x$  and 1,367, and appropriate work is shown.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or**
- [3]  $y = 999.9725(1.0493)^x$  and 1,367, but no substitution is shown.
- or**
- [3] The expression  $999.9725(1.0493)^x$  is written and 1,367, and an appropriate 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.
- or**
- [2] An incorrect equation of equal difficulty is solved appropriately.
- or**
- [2]  $y = 999.9725(1.0493)^x$ , 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 expression  $999.9725(1.0493)^x$  is written, but no further correct work is shown.
- or**
- [1] An incorrect equation of a lesser degree of difficulty is solved appropriately.
- or**
- [1] 1,367, 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.

MATHEMATICS B – *continued*

- (28) [4] 116, and appropriate work is shown, such as the use of the Law of Cosines.
- [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] Correct substitution is made into the Law of Cosines, 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] A complete and correctly labeled diagram is drawn, but no further correct work is shown.
- or***
- [1] 116, 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.

MATHEMATICS B – *continued*

(29) [4] 287,457, and appropriate work is shown, such as using trigonometry and the area formula or the Law of Sines and the area formula.

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

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

***or***

[2] Appropriate work is shown, but one conceptual error is made, such as using an incorrect trigonometric function.

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

***or***

[1] The length of the altitude or the length of a leg is found correctly, but no further correct work is shown.

***or***

[1] Correct substitutions are made into the Law of Sines, but no further correct work is shown.

***or***

[1] 287,457, 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.

MATHEMATICS B – *continued*

- (30) [4] .994, and appropriate work is shown.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or**
- [3] The probabilities are calculated correctly, but they are not added.
- [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 the probability of *at most* three flights will be on time.
- [1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
- or**
- [1] Appropriate work is shown to find *exactly* three flights will be on time.
- or**
- [1] .994, 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.

MATHEMATICS B – *continued*

- (31) [4] (2,300) and (–3,240), and appropriate algebraic work is shown.
- [3] Appropriate work is shown, but one computational or factoring error is made.
- or***
- [3] The  $x$ -values of 2 and –3 are found correctly, but only one  $y$ -value is found correctly.
- [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] The  $x$ -values of 2 and –3 are found correctly, but no further correct work is shown.
- or***
- [2] (2,300) or (–3,240), and appropriate algebraic work is shown.
- or***
- [2] (2,300) and (–3,240), but a method other than an algebraic solution is used.
- [1] Appropriate work is shown, but one conceptual error and one computational or factoring error are made.
- or***
- [1] A method other than an algebraic solution is used, and one error is made.
- or***
- [1] (2,300) and (–3,240), but no work is shown.
- [0] (2,300) or (–3,240), 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] 11.6, and appropriate work is shown, such as the use of logarithms, graphing, or trial and error with at least three trials and appropriate checks.
- [3] Appropriate work is shown, but one computational, rounding, or graphing error is made.
- [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.
- 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.
- or***
- [2] A correct logarithmic equation is written, but no further correct work is shown.
- [1] Appropriate work is shown, but one conceptual error and one computational, rounding, or graphing error are made.
- or***
- [1] A correct substitution is made into the compound interest formula, but no further correct work is shown.
- or***
- [1] A correct graph is drawn, but no further correct work is shown.
- or***
- [1] 11.6, 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.
-

**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] 0, 146, and 214, and appropriate work is shown.
- [5] Appropriate work is shown, but one computational, rounding, factoring, or graphing error is made.
- or***
- [5] Appropriate work is shown, and the equation is solved for 0 and 146, but 214 is not found.
- or***
- [5] Appropriate work is shown to find the correct solutions, but 360 is included.
- [4] Appropriate work is shown, but two or more computational, rounding, factoring, or graphing errors are made.
- or***
- [4] Appropriate work is shown, but the equation is solved for 0, 146, and 360.
- [3] Appropriate work is shown, but one conceptual error is made.
- or***
- [3] Appropriate work is shown, and the equation is factored correctly, but no further correct work is shown.
- [2] Appropriate work is shown, but one conceptual error and one computational, rounding, factoring, or graphing error are made.
- or***
- [2]  $6 \cos^2 x - \cos x - 5 = 0$  is written, but no further correct work is shown.
- [1]  $2 \cos^2 x - 1$  is substituted for  $\cos 2x$ , but no further correct work is shown.
- or***
- [1] 0, 146, and 214, but no work is shown.
- [0] 0 or 146 or 214, 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 is written.

[5]  $\triangle BAM \cong \triangle CDM$  is proven, but no further correct work is shown.

*or*

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

[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.

[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.

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

*or*

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

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**Map to Learning Standards**

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

**Regents Examination in Mathematics B**

**August 2008**

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

**The *Chart for Determining the Final Examination Score for the August 2008 Regents Examination in Mathematics B* will be posted on the Department’s web site <http://www.emsc.nysed.gov/osa/> on Wednesday, August 13, 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.



