

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

# MATHEMATICS B

Thursday, June 14, 2007 — 1:15 to 4:15 p.m., only

Print Your Name:

Print Your School's Name:

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

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

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

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

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

Notice . . .

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

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

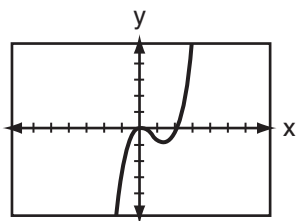
**DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.**

**Part I**

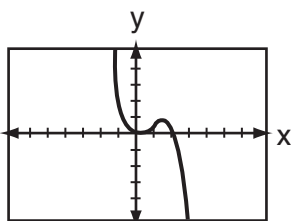
Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question. [40]

Use this space for computations.

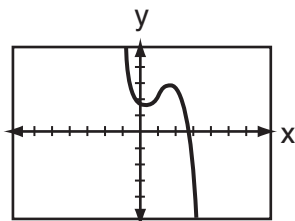
1 The accompanying graph represents the equation  $y = f(x)$ .



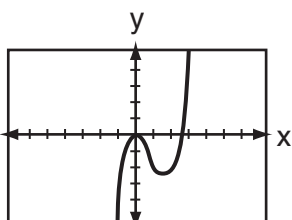
Which graph represents  $g(x)$ , if  $g(x) = -f(x)$ ?



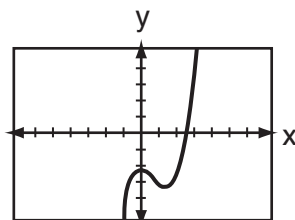
(1)



(3)



(2)



(4)

2 During a single day at radio station WMZH, the probability that a particular song is played is .38. Which expression represents the probability that this song will be played on *exactly* 5 days out of 7 days?

(1)  ${}_{7}C_{5}(.38)^2(.62)^5$

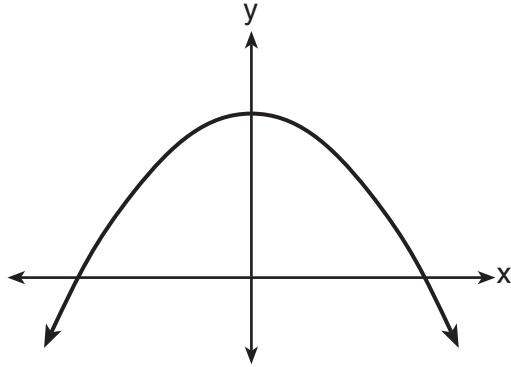
(3)  ${}_{7}P_{5}(.38)^5(.62)^2$

(2)  ${}_{7}C_{5}(.38)^5(.62)^2$

(4)  ${}_{5}C_{2}(.38)^5(.62)^2$

Use this space for  
computations.

3 Which equation is best represented by the accompanying graph?

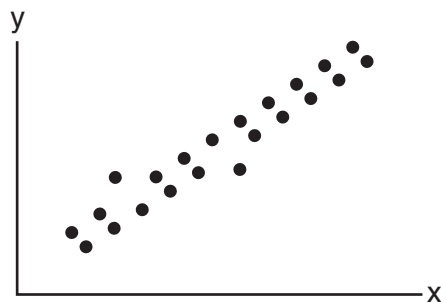


- (1)  $y = 6^x$                       (3)  $y = 6x + 1$   
(2)  $y = 6x^2$                     (4)  $y = -x^2 + 1$

4 Jack is planting a triangular rose garden. The lengths of two sides of the plot are 8 feet and 12 feet, and the angle between them is  $87^\circ$ . Which expression could be used to find the area of this garden?

- (1)  $8 \cdot 12 \cdot \sin 87^\circ$             (3)  $\frac{1}{2} \cdot 8 \cdot 12 \cdot \cos 87^\circ$   
(2)  $8 \cdot 12 \cdot \cos 87^\circ$             (4)  $\frac{1}{2} \cdot 8 \cdot 12 \cdot \sin 87^\circ$

5 What could be the approximate value of the correlation coefficient for the accompanying scatter plot?



- (1)  $-0.85$                           (3)  $0.21$   
(2)  $-0.16$                           (4)  $0.90$

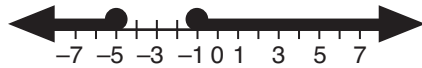
Use this space for  
computations.

6 What is one solution of the accompanying system of equations?

$$\begin{aligned}y &= -x^2 + 5 \\y &= -0.5x^2 + 3\end{aligned}$$

- (1) (3,5)                      (3) (-2,1)  
(2) (0,5)                      (4) (0,3)

7 Which inequality is represented by the accompanying graph?



- (1)  $|x + 2| > 5$                       (3)  $|x - 1| \leq 5$   
(2)  $|x + 3| \geq 2$                       (4)  $|x - 5| \geq 2$

8 The volume of a soap bubble is represented by the equation  $V = 0.094\sqrt{A^3}$ , where  $A$  represents the surface area of the bubble. Which expression is also equivalent to  $V$ ?

- (1)  $0.094A^{\frac{3}{2}}$                       (3)  $0.094A^6$   
(2)  $0.094A^{\frac{2}{3}}$                       (4)  $(0.094A^3)^{\frac{1}{2}}$

9 The fraction  $\frac{3}{\sqrt{6}-1}$  is equivalent to

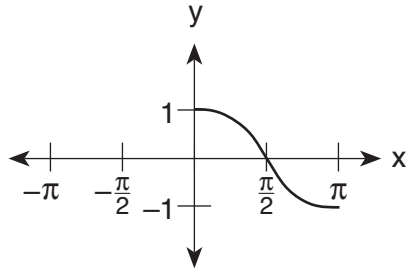
- (1)  $3\sqrt{6} + 3$                       (3)  $\frac{3\sqrt{6} + 3}{5}$   
(2)  $3\sqrt{6} - 3$                       (4)  $\frac{3\sqrt{6} - 3}{5}$

Use this space for  
computations.

10 A function,  $f$ , is defined by the set  $\{(2,3), (4,7), (-1,5)\}$ . If  $f$  is reflected in the line  $y = x$ , which point will be in the reflection?

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

11 Which equation is represented by the accompanying graph?



- (1)  $y = \cos x$                       (3)  $y = \cos 2x$   
(2)  $y = \cos \frac{1}{2}x$                       (4)  $y = \frac{1}{2} \cos x$

12 Which expression is in simplest form?

- (1)  $\frac{x}{x^2}$                                   (3)  $\frac{x^2 - 4}{x + 2}$   
(2)  $\frac{9}{x^2 + 9}$                               (4)  $\frac{x^2 - 6x + 9}{x^2 - x - 6}$

13 The expression  $\frac{\frac{1}{3} - \frac{1}{x}}{\frac{3}{x} - 1}$  is equivalent to

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

Use this space for  
computations.

14 The expression  $1 + \sqrt{2} + \sqrt[3]{3}$  is equivalent to

(1)  $\sum_{n=1}^3 \sqrt{n}$

(3)  $\sum_{n=1}^3 n^{-n}$

(2)  $\sum_{n=0}^3 n^n$

(4)  $\sum_{n=1}^3 n^{\frac{1}{n}}$

15 Which set of ordered pairs does *not* represent a function?

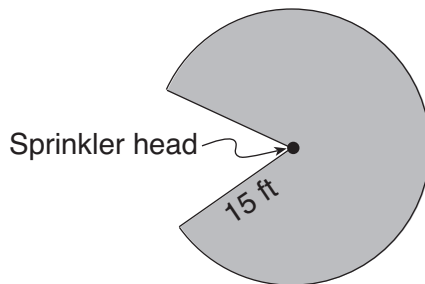
(1)  $\{(3,-2), (-2,3), (4,-1), (-1,4)\}$

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

(3)  $\{(3,-2), (4,-3), (5,-4), (6,-5)\}$

(4)  $\{(3,-2), (5,-2), (4,-2), (-1,-2)\}$

16 Cerise waters her lawn with a sprinkler that sprays water in a circular pattern at a distance of 15 feet from the sprinkler. The sprinkler head rotates through an angle of  $300^\circ$ , as shown by the shaded area in the accompanying diagram.



What is the area of the lawn, to the *nearest square foot*, that receives water from this sprinkler?

(1) 79

(3) 589

(2) 94

(4) 707

17 Which number is the discriminant of a quadratic equation whose roots are real, unequal, and irrational?

(1) 0

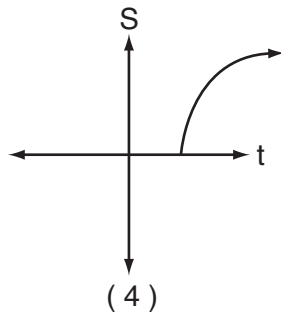
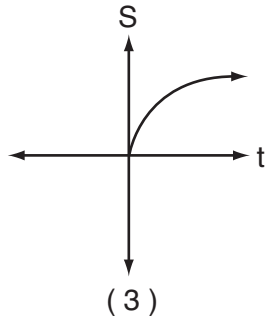
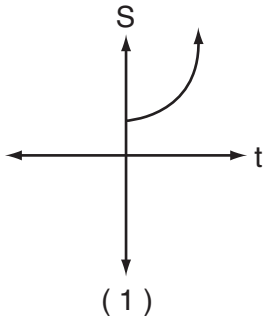
(3) 7

(2) -5

(4) 4

Use this space for  
computations.

- 18 The formula  $S = 20\sqrt{t + 273}$  is used to determine the speed of sound,  $S$ , in meters per second, near Earth's surface, where  $t$  is the surface temperature, in degrees Celsius. Which graph best represents this function?



- 19 If  $2 + i$  and  $2 - i$  are the roots of the equation  $x^2 - 4x + c = 0$ , what is the value of  $c$ ?
- (1)  $-5$                       (3)  $-4$   
(2)  $5$                          (4)  $4$

- 20 The expression  $\sin A + \frac{\cos^2 A}{\sin A}$  is equivalent to
- (1)  $1$                               (3)  $\sec A$   
(2)  $\sin A$                         (4)  $\csc A$
-

## Part II

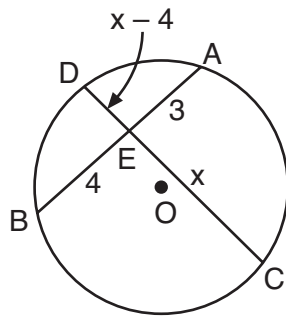
Answer all questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [12]

- 21 A population of wolves in a county is represented by the equation  $P(t) = 80(0.98)^t$ , where  $t$  is the number of years since 1998. Predict the number of wolves in the population in the year 2008.

- 22 The accompanying table shows the enrollment of a preschool from 1980 through 2000. Write a linear regression equation to model the data in the table.

Year ( $x$ )	Enrollment ( $y$ )
1980	14
1985	20
1990	22
1995	28
2000	37

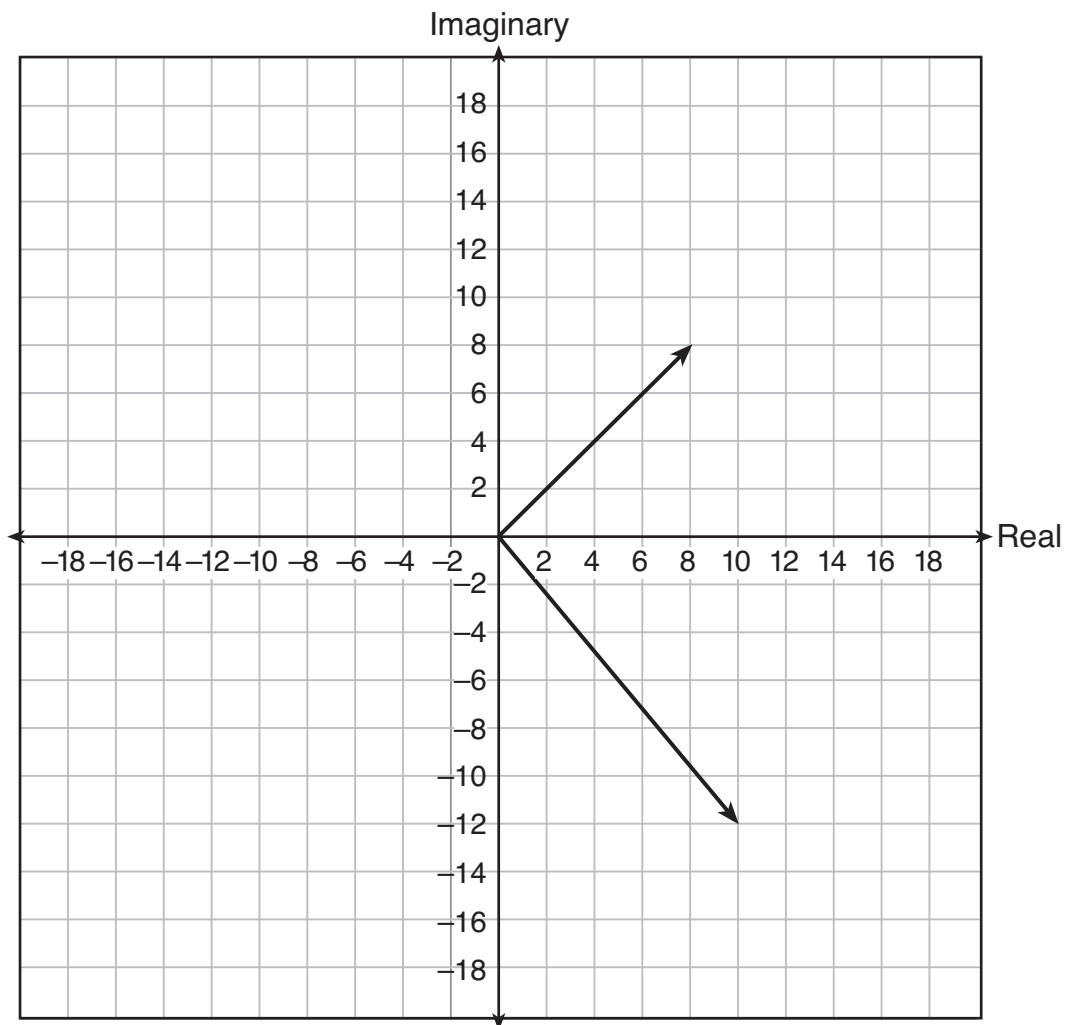
23 In the accompanying diagram of circle  $O$ , chords  $\overline{AB}$  and  $\overline{CD}$  intersect at  $E$ . If  $AE = 3$ ,  $EB = 4$ ,  $CE = x$ , and  $ED = x - 4$ , what is the value of  $x$ ?



**24** Denise is designing a storage box in the shape of a cube. Each side of the box has a length of 10 inches. She needs more room and decides to construct a larger box in the shape of a cube with a volume of 2,000 cubic inches. By how many inches, to the *nearest tenth*, should she *increase* the length of each side of the original box?

**25** If  $f(x) = \log_2 x$  and  $g(x) = 2x^2 + 14$ , determine the value of  $(f \circ g)(5)$ .

26 On a stamp honoring the German mathematician Carl Gauss, several complex numbers appear. The accompanying graph shows two of these numbers. Express the sum of these numbers in  $a + bi$  form.



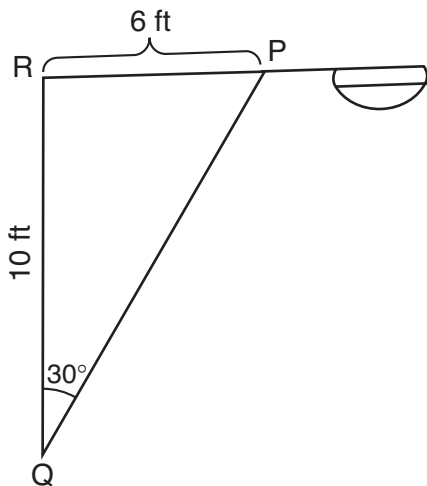
### Part III

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 If  $f(x) = \frac{3x^2 - 27}{18x + 30}$  and  $g(x) = \frac{x^2 - 7x + 12}{3x^2 - 7x - 20}$ , find  $f(x) \div g(x)$  for all values of  $x$  for which the expression is defined and express your answer in simplest form.

28 In the accompanying diagram of a streetlight, the light is attached to a pole at  $R$  and supported by a brace,  $\overline{PQ}$ ,  $RQ = 10$  feet,  $RP = 6$  feet,  $\angle PRQ$  is an obtuse angle, and  $m\angle PQR = 30$ .

Find the length of the brace,  $\overline{PQ}$ , to the nearest foot.



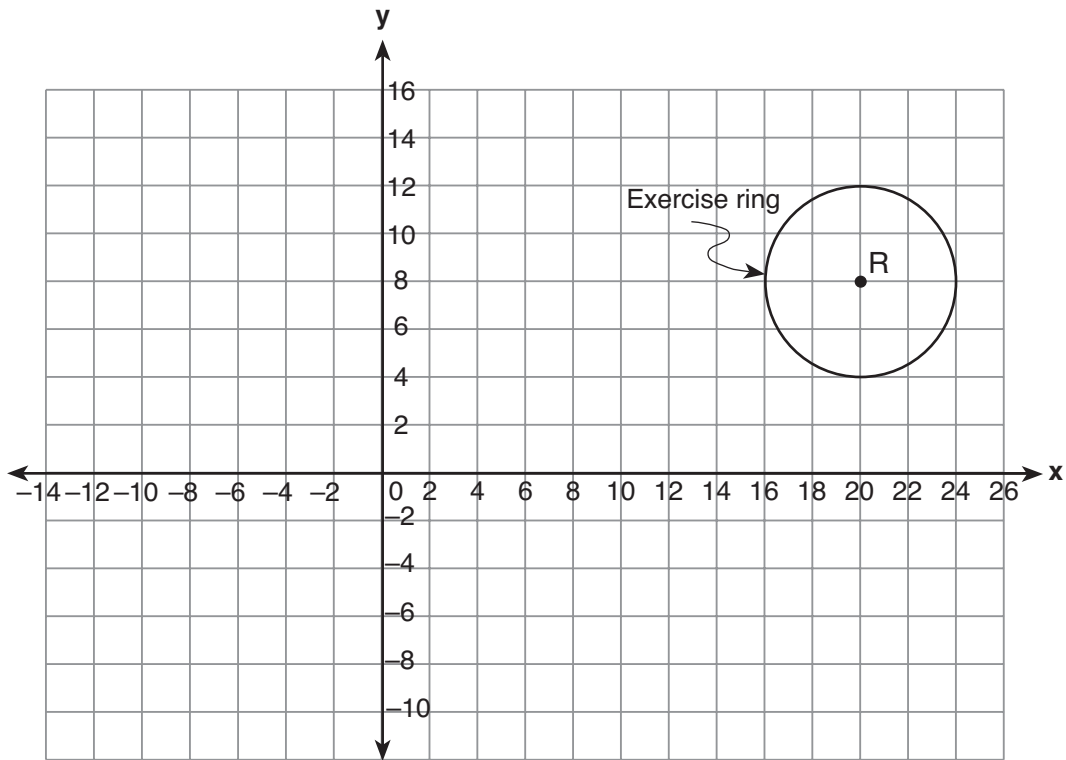
**29** Conant High School has 17 students on its championship bowling team. Each student bowled one game. The scores are listed in the accompanying table.

<b>Score (<math>x_i</math>)</b>	<b>Frequency (<math>f_i</math>)</b>
140	4
145	3
150	2
160	3
170	2
180	2
194	1

Find, to the *nearest tenth*, the population standard deviation of these scores.

How many of the scores fall within one standard deviation of the mean?

- 30 A landscape architect is working on the plans for a new horse farm. He is laying out the exercise ring and racetrack on the accompanying graph. The location of the circular exercise ring, with point  $R$  as its center, has already been plotted.



Write an equation that represents the outside edge of the exercise ring.

The equation of the outside edge of the racetrack is  $\frac{x^2}{144} + \frac{y^2}{36} = 1$ .

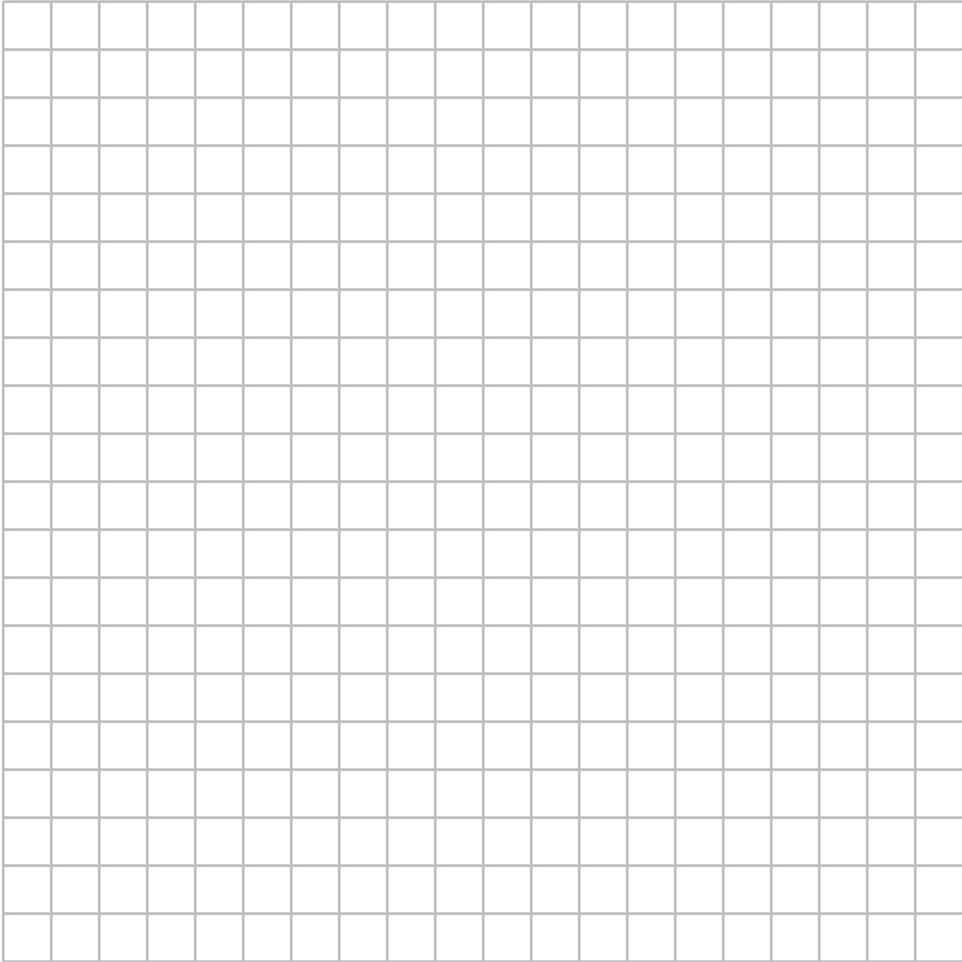
Sketch the outside edge of the racetrack on the graph.

**31** The average annual snowfall in a certain region is modeled by the function  $S(t) = 20 + 10 \cos\left(\frac{\pi}{5}t\right)$ , where  $S$  represents the annual snowfall, in inches, and  $t$  represents the number of years since 1970.

What is the minimum annual snowfall, in inches, for this region?

In which years between 1970 and 2000 did the minimum amount of snow fall? [The use of the grid on the next page is optional.]

**Question 31 continued**

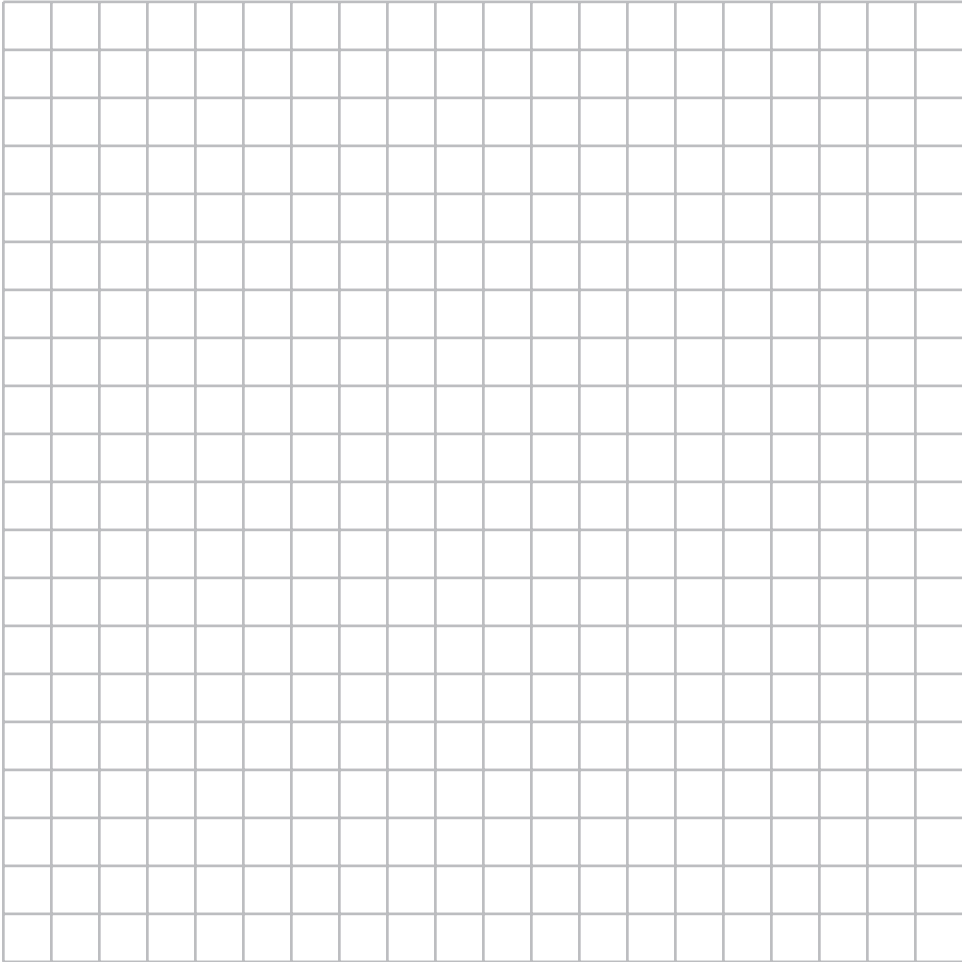


**32** The path of a rocket fired during a fireworks display is given by the equation  $s(t) = 64t - 16t^2$ , where  $t$  is the time, in seconds, and  $s$  is the height, in feet.

What is the maximum height, in feet, the rocket will reach?

In how many seconds will the rocket hit the ground? [The use of the grid on the next page is optional.]

**Question 32 continued**

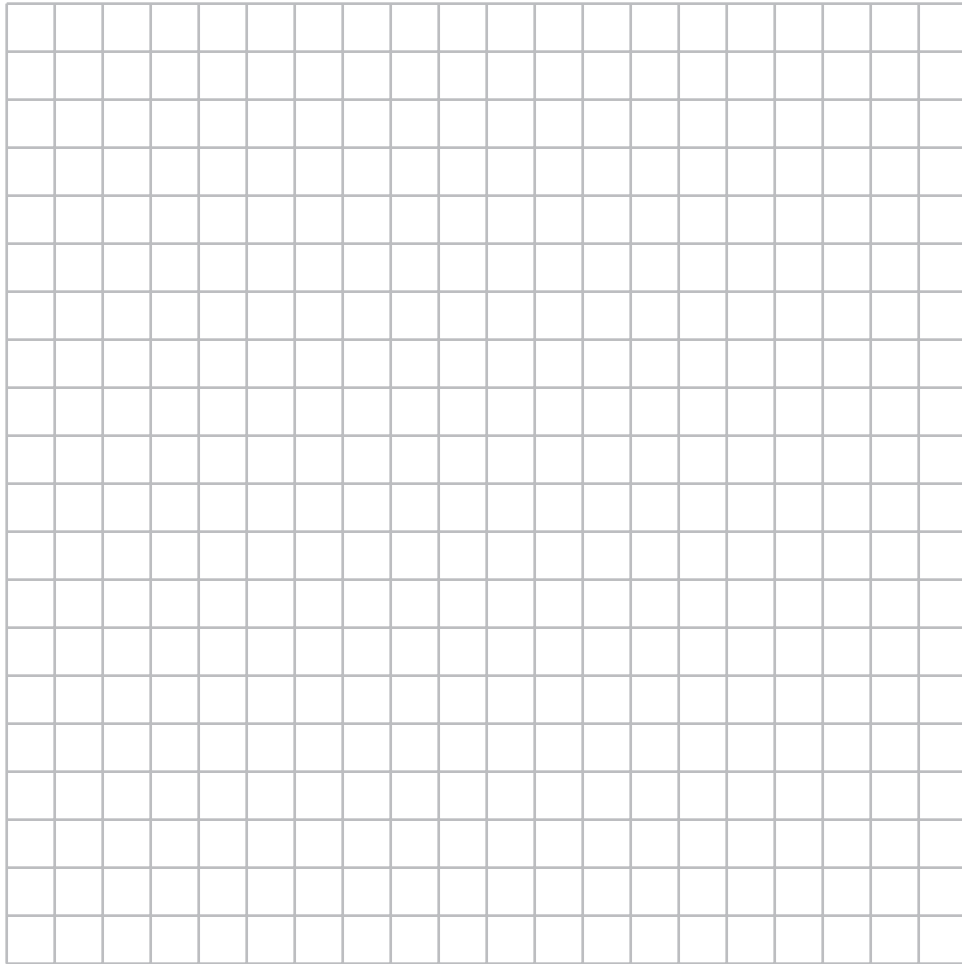


### Part IV

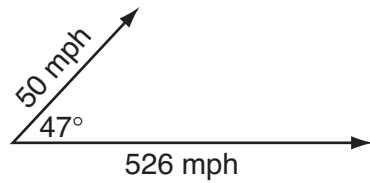
Answer all questions in this part. Each correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [12]

- 33 Given: quadrilateral  $ABCD$  with vertices  $A(-2,2)$ ,  $B(8,-4)$ ,  $C(6,-10)$ , and  $D(-4,-4)$ . State the coordinates of  $A'B'C'D'$ , the image of quadrilateral  $ABCD$  under a dilation of factor  $\frac{1}{2}$ . Prove that  $A'B'C'D'$  is a parallelogram. [The use of the grid on the next page is optional.]

**Question 33 continued**



- 34 A jet is flying at a speed of 526 miles per hour. The pilot encounters turbulence due to a 50-mile-per-hour wind blowing at an angle of  $47^\circ$ , as shown in the accompanying diagram.



Find the resultant speed of the jet, to the *nearest tenth of a mile per hour*.

Use this answer to find the measure of the angle between the resultant force and the wind vector, to the *nearest tenth of a degree*.

# 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

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

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

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

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

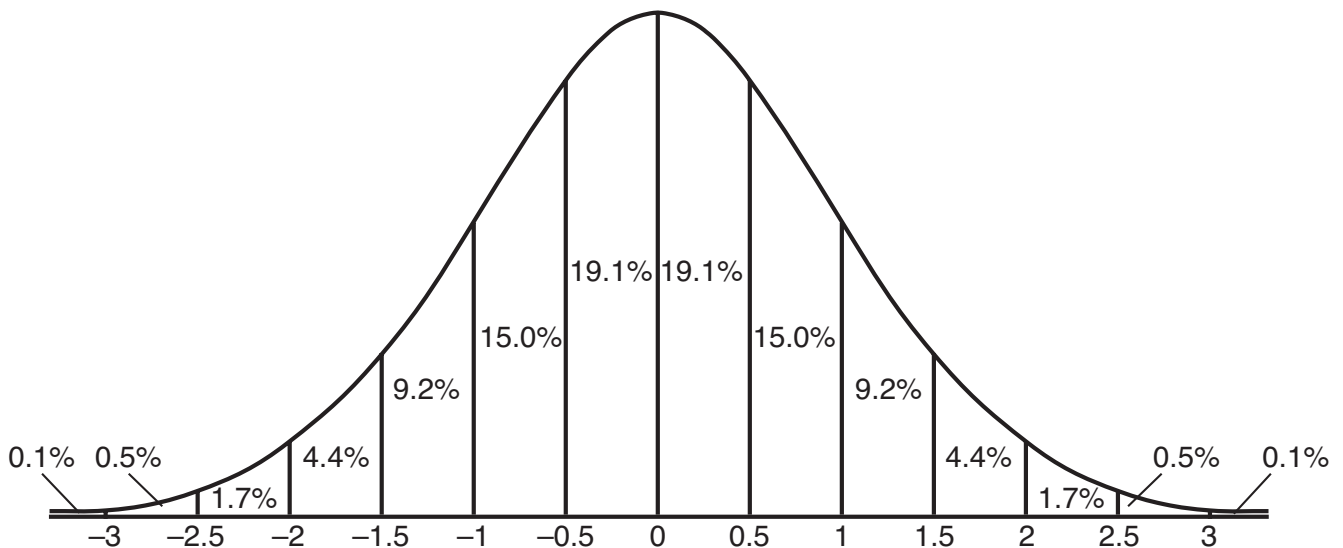
## Functions of the Half Angle

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

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

## Normal Curve

### Standard Deviation



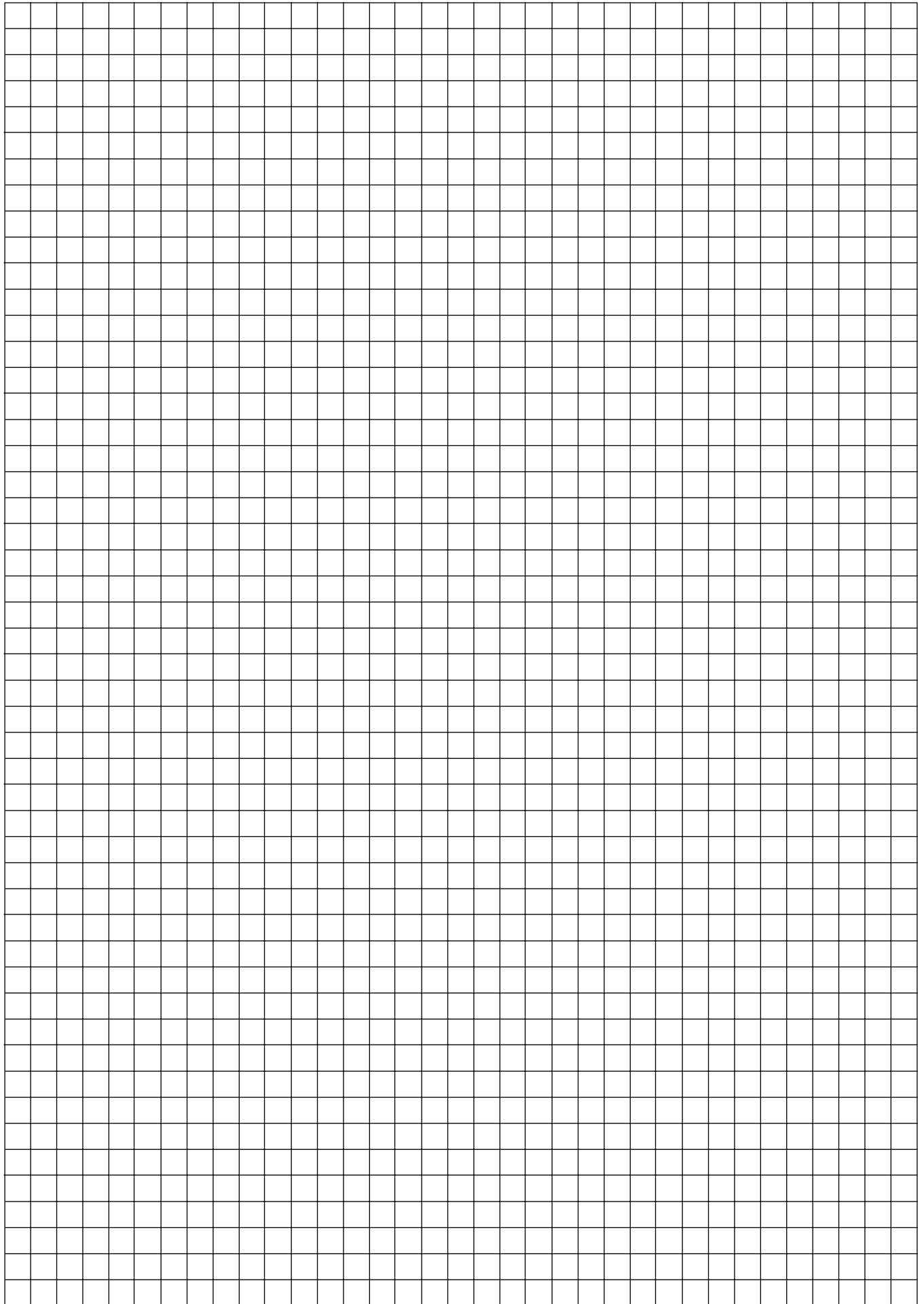
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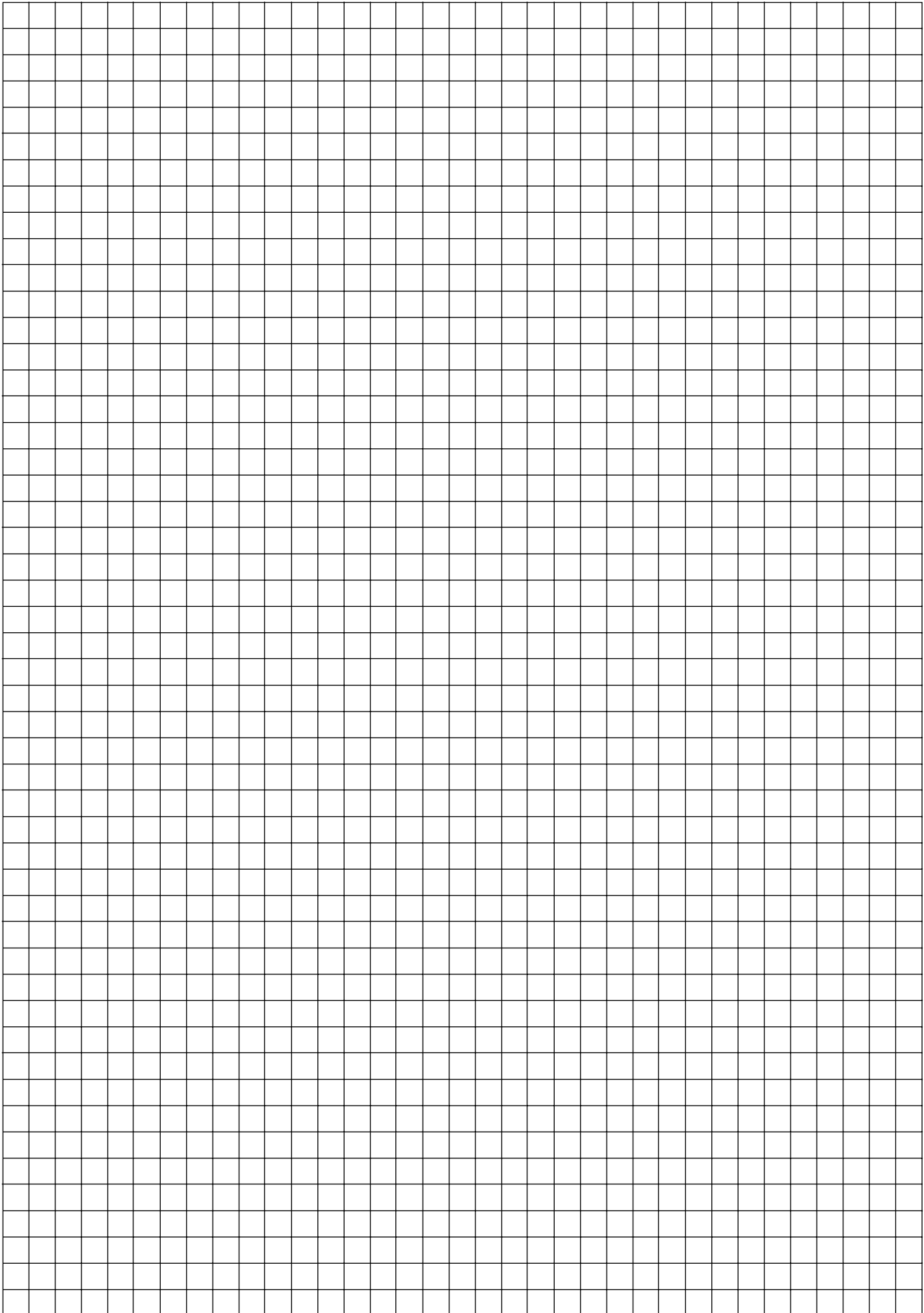
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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Thursday, June 14, 2007 — 1:15 to 4:15 p.m., only

ANSWER SHEET

Student ..... Sex:  Male  Female Grade .....

Teacher ..... School .....

Your answers to Part I should be recorded on this answer sheet.

Part I

Answer all 20 questions in this part.

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

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

The declaration below should be signed when you have completed the examination.

I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination and that I have neither given nor received assistance in answering any of the questions during the examination.

Signature

Tear Here



# FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

## MATHEMATICS B

Thursday, June 14, 2007 — 1:15 to 4:15 p.m., only

### SCORING KEY

#### Mechanics of Rating

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

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

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

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

Raters should record the student's scores for all questions and the total raw score on the student's detachable answer sheet. Then the student's total raw score should be converted to a scaled score by using the conversion chart that will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Thursday, June 14, 2007. The student's scaled score should be entered in the box provided on the student's detachable answer sheet. The scaled score is the student's final examination score.

#### Part I

Allow a total of 40 credits, 2 credits for each of the following. Allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

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

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

### General Rules for Applying Mathematics Rubrics

#### I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents Examinations in Mathematics A and Mathematics B are designed to provide a systematic, consistent method for awarding credit. The rubrics are not to be considered all-inclusive; it is impossible to anticipate all the different methods that students might use to solve a given problem. Each response must be rated carefully using the teacher’s professional judgment and knowledge of mathematics; all calculations must be checked. The specific rubrics for each question must be applied consistently to all responses. In cases that are not specifically addressed in the rubrics, raters must follow the general rating guidelines in the publication *Information Booklet for Scoring the Regents Examinations in Mathematics A and Mathematics B*, use their own professional judgment, confer with other mathematics teachers, and/or contact the consultants at the State Education Department for guidance. During each Regents examination administration period, rating questions may be referred directly to the Education Department. The contact numbers are sent to all schools before each administration period.

#### II. Full-Credit Responses

A full-credit response provides a complete and correct answer to all parts of the question. Sufficient work is shown to enable the rater to determine how the student arrived at the correct answer.

When the rubric for the full-credit response includes one or more examples of an acceptable method for solving the question (usually introduced by the phrase “such as”), it does **not** mean that there are no additional acceptable methods of arriving at the correct answer. Unless otherwise specified, mathematically correct alternative solutions should be awarded credit. The only exceptions are those questions that specify the type of solution that must be used; e.g., an algebraic solution or a graphic solution. A correct solution using a method other than the one specified is awarded half the credit of a correct solution using the specified method.

#### III. Appropriate Work

*Full-Credit Responses:* The directions in the examination booklet for all the constructed-response questions state: “Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, charts, etc.” The student has the responsibility of providing the correct answer **and** showing how that answer was obtained. The student must “construct” the response; the teacher should not have to search through a group of seemingly random calculations scribbled on the student paper to ascertain what method the student may have used.

*Responses With Errors:* Rubrics that state “Appropriate work is shown, but ...” are intended to be used with solutions that show an essentially complete response to the question but contain certain types of errors, whether computational, rounding, graphing, or conceptual. If the response is incomplete, i.e., an equation is written but not solved or an equation is solved but not all of the parts of the question are answered, appropriate work has **not** been shown. Other rubrics address incomplete responses.

#### IV. Multiple Errors

*Computational Errors, Graphing Errors, and Rounding Errors:* Each of these types of errors results in a 1-credit deduction. Any combination of two of these types of errors results in a 2-credit deduction. No more than 2 credits should be deducted for such mechanical errors in any response. The teacher must carefully review the student’s work to determine what errors were made and what type of errors they were.

*Conceptual Errors:* A conceptual error involves a more serious lack of knowledge or procedure. Examples of conceptual errors include using the incorrect formula for the area of a figure, choosing the incorrect trigonometric function, or multiplying the exponents instead of adding them when multiplying terms with exponents. A response with one conceptual error can receive no more than half credit.

If a response shows repeated occurrences of the same conceptual error, the student should not be penalized twice. If the same conceptual error is repeated in responses to other questions, credit should be deducted in each response.

If a response shows two (or more) different major conceptual errors, it should be considered completely incorrect and receive no credit.

If a response shows one conceptual error and one computational, graphing, or rounding error, the teacher must award credit that takes into account both errors: i.e., awarding half credit for the conceptual error and deducting 1 credit for each mechanical error (maximum of two deductions for mechanical errors).

**Part II**

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

- (21) [2] 65, and appropriate work is shown, such as  $P(10) = 80(0.98)^{10}$ .
- [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] 65, 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]  $y = 1.08x - 2125$  or an equivalent equation is written.
- [1] One conceptual error is made, such as writing a regression equation that is not linear.
- or*
- [1] The expression  $1.08x - 2125$  is written, but no equation is written.
- or*
- [1] The correct values are identified for  $a$  and  $b$ , but no equation 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.

MATHEMATICS B – *continued*

- (23) [2] 6, 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 negative root is not rejected.
- or***
- [1] A correct equation is written, but no further correct work is shown.
- or***
- [1] An incorrect equation of equal difficulty is solved appropriately.
- or***
- [1] 6, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- (24) [2] 2.6, and appropriate work is shown, such as solving the equation  $(10 + x)^3 = 2000$ .
- [1] Appropriate work is shown, but one computational or rounding error is made.
- or***
- [1] Appropriate work is shown, but one conceptual error is made.
- or***
- [1] The equation  $(10 + x)^3 = 2000$  is written, but no further correct work is shown.
- or***
- [1] An incorrect equation of equal difficulty is solved appropriately.
- or***
- [1] 2.6, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

MATHEMATICS B – *continued*

(25) [2] 6, 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, such as evaluating  $(g \circ f)(5)$ , resulting in an answer of 24.78270016.

*or*

[1] 6, but no work is shown.

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

(26) [2]  $18 - 4i$ , and appropriate work is shown, such as  $(8 + 8i) + (10 - 12i)$ .

[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] A graphic solution is drawn, but the sum is not expressed in  $a + bi$  form.

*or*

[1]  $18 - 4i$ , 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.

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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]  $\frac{x+3}{2}$ , and appropriate work is shown.

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

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

**or**

[2] Appropriate work is shown, but one conceptual error is made, such as failing to multiply by the reciprocal of  $g(x)$  or trying to solve for  $x$ .

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

**or**

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

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

MATHEMATICS B – *continued*

(28) [4] 12, and appropriate work is shown, such as using the Law of Sines twice or the Law of Sines and 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.

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

*or*

[1] 12, but no work is shown.

[0] The Pythagorean theorem is used to solve the problem.

*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*

- (29) [4] 16.2 and 10, and appropriate work is shown.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or***
- [3] Appropriate work is shown, but the sample standard deviation ( $s$ ) is used, resulting in answers of 16.7 and 10.
- [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] 16.2 and 10, but no work is shown.
- [0] 16.2 *or* 10, but no work is shown.
- or***
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- (30) [4]  $(x - 20)^2 + (y - 8)^2 = 16$  and the ellipse is sketched correctly.
- [3] Appropriate work is shown, but one computational or graphing error is made.
- [2] Appropriate work is shown, but two or more computational or graphing errors are made.
- or***
- [2] Appropriate work is shown, but one conceptual error is made.
- or***
- [2] The equation of the circle is written correctly or the ellipse is sketched correctly, but no further correct work is shown.
- [1] Appropriate work is shown, but one conceptual error and one computational or graphing error are made.
- [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] 10 and 1975, 1985, and 1995, and appropriate work is shown or an appropriate explanation is written.

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

*or*

[3] 10, and appropriate work is shown, but only two of the years are found.

[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 an incorrect function.

*or*

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

*or*

[2] 1975, 1985, and 1995, and appropriate work is shown or an appropriate explanation is written, but the minimum snowfall is not found.

*or*

[2] 10, and appropriate work is shown, but only one of the years is found.

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

*or*

[1] 10, and appropriate work is shown or an appropriate explanation is written, but the years are not found.

*or*

[1] 10 and 1975, 1985, and 1995, but no work is shown.

[0] 10 *or* 1975, 1985, and 1995, 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] Maximum height = 64 and time = 4, and appropriate work is shown.
- [3] Appropriate work is shown, but one computational or graphing error is made.
- or***
- [3] The correct time is found, and appropriate work is shown, but the maximum height is not found.
- [2] Appropriate work is shown, but two or more computational or graphing errors are made.
- or***
- [2] Appropriate work is shown, but one conceptual error is made.
- or***
- [2] The maximum height is found correctly, and appropriate work is shown, but an incorrect value is found for  $t$ .
- or***
- [2] Appropriate work is shown, but only the time that the maximum height occurs is found, and the quadratic equation  $64t - 16t^2 = 0$  is factored, 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] Appropriate work is shown, but only the time that the maximum height occurs is found, or the quadratic equation  $64t - 16t^2 = 0$  is factored.
- or***
- [1] Maximum height = 64 and time = 4, but no work is shown.
- [0] Maximum height = 64 *or* time = 4, but no work is shown.
- or***
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
-

**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] The vertices  $A'(-1,1)$ ,  $B'(4,-2)$ ,  $C'(3,-5)$ , and  $D'(-2,-2)$  are stated and a complete and correct proof that includes a conclusion is written.

[5] The vertices are stated, and a proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one reason is missing or is incorrect.

*or*

[5] A complete proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but the vertices of  $A'B'C'D'$  are not stated.

[4] The vertices are stated, and a proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[3] The vertices are stated, and a proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but two reasons are missing or are incorrect.

[2] The vertices are stated, and some correct relevant statements about the proof are made, but three or four statements or reasons are missing or are incorrect.

[1] The vertices  $A'(-1,1)$ ,  $B'(4,-2)$ ,  $C'(3,-5)$ , and  $D'(-2,-2)$  are stated, but no proof is 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.

MATHEMATICS B – *continued*

(34) [6] 561.3 and 43.3, and appropriate work is shown, such as using the Law of Cosines and the Law of Sines.

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

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

***or***

[4] The resultant speed is found correctly, but no further correct work is shown.

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

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

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

***or***

[1] 561.3 and 43.3, but no work is shown.

[0] 561.3 *or* 43.3, 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.

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**Map to Learning Standards**

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

**Regents Examination in Mathematics B**

**June 2007**

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

***The Chart for Determining the Final Examination Score for the June 2007 Regents Examination in Mathematics B will be posted on the Department’s web site <http://www.emsc.nysed.gov/osa/> on Thursday, June 14, 2007. Conversion charts provided for the previous administrations of the Regents Examination in Mathematics B must NOT be used to determine students’ final scores for this administration.***

**Submitting Teacher Evaluations of the Test to the Department**

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to <http://www.emsc.nysed.gov/osa/exameval>.
2. Select the test title.
3. Complete the required demographic fields.
4. Complete each evaluation question and provide comments in the space provided.
5. Click the SUBMIT button at the bottom of the page to submit the completed form.









## Regents Examination in Mathematics B June 2007

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

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

To determine the student’s final examination score, find the student’s total test raw score in the column labeled “Raw Score” and then locate the scaled score that corresponds to that raw score. The scaled score is the student’s final examination score. Enter this score in the space labeled “Scaled Score” on the student’s answer sheet.

All student answer papers that receive a scaled score of 60 through 64 **must** be scored a second time. For the second scoring, a different committee of teachers may score the student’s paper or the original committee may score the paper, except that no teacher may score the same open-ended questions that he/she scored in the first rating of the paper.

Because scaled scores corresponding to raw scores in the conversion chart change from one examination to another, it is crucial that for each administration, the conversion chart provided for that administration be used to determine the student’s final score. The chart above is usable only for this administration of the Mathematics B Examination.