

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

# MATHEMATICS B

Thursday, June 19, 2008 — 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

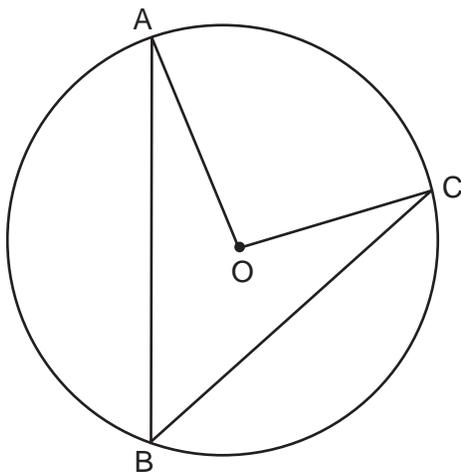
Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question. [40]

Use this space for computations.

1 For which value of  $x$  is  $f(x) = \frac{1}{27 - 3^x}$  undefined?

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

2 In the accompanying diagram of circle  $O$ ,  $\overline{AB}$  and  $\overline{BC}$  are chords and  $m\angle AOC = 96$ . What is  $m\angle ABC$ ?



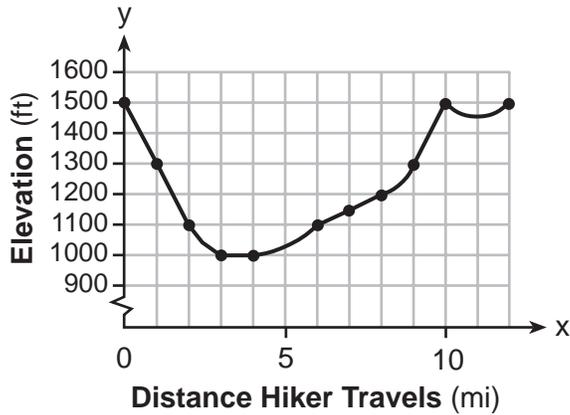
- (1) 32  
(2) 48  
(3) 96  
(4) 192

3 Kathy deposits \$25 into an investment account with an annual rate of 5%, compounded annually. The amount in her account can be determined by the formula  $A = P(1 + R)^t$ , where  $P$  is the amount deposited,  $R$  is the annual interest rate, and  $t$  is the number of years the money is invested. If she makes no other deposits or withdrawals, how much money will be in her account at the end of 15 years?

- (1) \$25.75  
(2) \$43.75  
(3) \$51.97  
(4) \$393.97

Use this space for  
computations.

- 4 The accompanying graph shows the elevation of a certain region in New York State as a hiker travels along a trail.



What is the domain of this function?

- (1)  $1,000 \leq x \leq 1,500$       (3)  $0 \leq x \leq 12$   
(2)  $1,000 \leq y \leq 1,500$       (4)  $0 \leq y \leq 12$
- 5 Which relation is a function?
- (1)  $x^2 + y^2 = 16$       (3)  $y^2 = x^2 + 3x - 4$   
(2)  $2x^2 + 6y^2 = 1$       (4)  $y = x^2 + 3x - 4$

- 6 If  $f(x) = x^2 + 4$  and  $g(x) = \sqrt{1 - x}$ , what is the value of  $f(g(-3))$ ?

- (1)  $2i\sqrt{3}$       (3) 8  
(2) 2      (4) 13

Use this space for  
computations.

7 Which expression represents the sum of the sequence 3, 5, 7, 9, 11?

(1)  $\sum_{n=0}^5 (2n + 1)$

(3)  $\sum_{n=1}^5 (3n + 1)$

(2)  $\sum_{n=1}^5 3n$

(4)  $\sum_{n=1}^5 (2n + 1)$

8 Which value of  $a$  does *not* satisfy the inequality  $|a| > 2a - 3$ ?

(1)  $-1$

(3)  $3$

(2)  $0$

(4)  $-5$

9 If point  $(5,2)$  is rotated counterclockwise  $90^\circ$  about the origin, its image will be point

(1)  $(2,5)$

(3)  $(-2,5)$

(2)  $(2,-5)$

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

10 What is the sum of  $5 - 3i$  and the conjugate of  $3 + 2i$ ?

(1)  $2 + 5i$

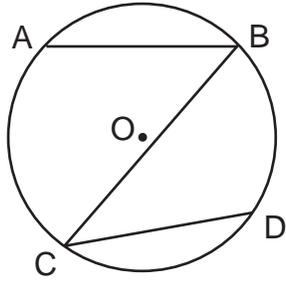
(3)  $8 + 5i$

(2)  $2 - 5i$

(4)  $8 - 5i$

Use this space for  
computations.

11 In the accompanying diagram of circle  $O$ ,  $\widehat{AB} \cong \widehat{CD}$ .



Which statement is true?

- (1)  $\overline{AB} \cong \overline{CD}$                       (3)  $\overline{AB} \parallel \overline{CD}$   
(2)  $\widehat{AC} \cong \widehat{BD}$                       (4)  $\angle ABC \cong \angle BCD$

12 The expression  $\cos^2 4\theta + \sin^2 4\theta$  is equivalent to

- (1) 1    (3)  $\cos \theta$   
(2) 2    (4)  $\cos 8\theta$

13 The value of  $\sqrt{x^2 - 9}$  is a real and irrational number when  $x$  is equal to

- (1) 5    (3) -3  
(2) 0    (4) 4

14 If  $2^{4x+1} = 8^{x+a}$ , which expression is equivalent to  $x$ ?

- (1)  $a - 1$                                   (3)  $\frac{a-1}{15}$   
(2)  $3a - 1$                                   (4)  $\frac{a-1}{3}$

Use this space for  
computations.

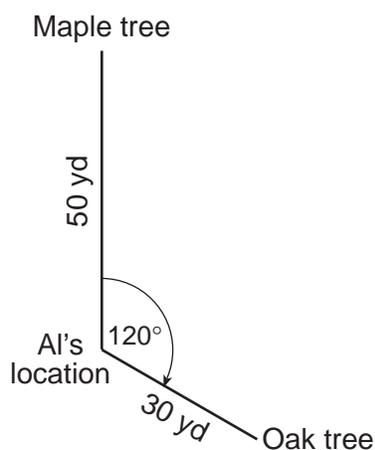
15 In 1995, the federal government paid off one-third of its debt. If the original amount of the debt was \$4,920,000,000,000, which expression represents the amount that was *not* paid off?

- (1)  $1.64 \times 10^4$                       (3)  $3.28 \times 10^8$   
(2)  $1.64 \times 10^{12}$                     (4)  $3.28 \times 10^{12}$

16 The expression  $\frac{2}{\sin x} - \frac{5}{\sin x - 1}$  is equivalent to

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

17 Al is standing 50 yards from a maple tree and 30 yards from an oak tree in the park. His position is shown in the accompanying diagram. If he is looking at the maple tree, he needs to turn his head  $120^\circ$  to look at the oak tree.

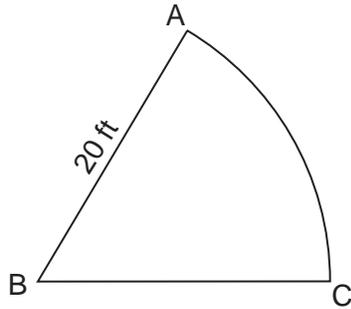


How many yards apart are the two trees?

- (1) 58.3                                  (3) 70  
(2) 65.2                                  (4) 75

Use this space for  
computations.

- 18 A sprinkler system is set up to water the sector shown in the accompanying diagram, with angle  $ABC$  measuring 1 radian and radius  $AB = 20$  feet.



What is the length of arc  $AC$ , in feet?

- (1) 63                                      (3) 20  
(2) 31                                      (4) 10
- 19 The expression  $i^{100} + i^{101} + i^{102}$  equals

- (1) 1                                      (3)  $-i$   
(2)  $-1$                                       (4)  $i$

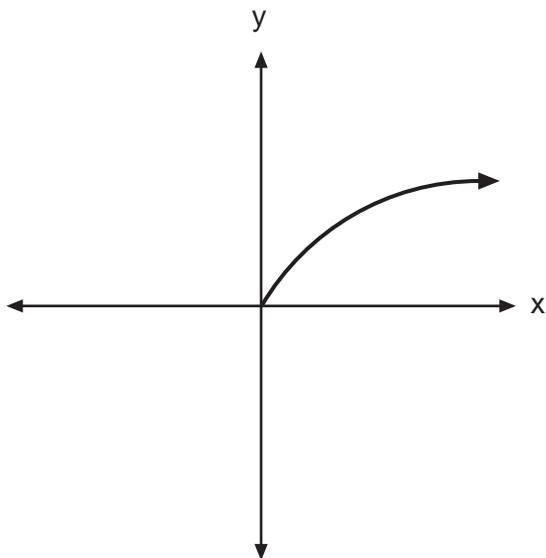
- 20 Which equation has roots whose sum is 3 and whose product is  $-4$ ?

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

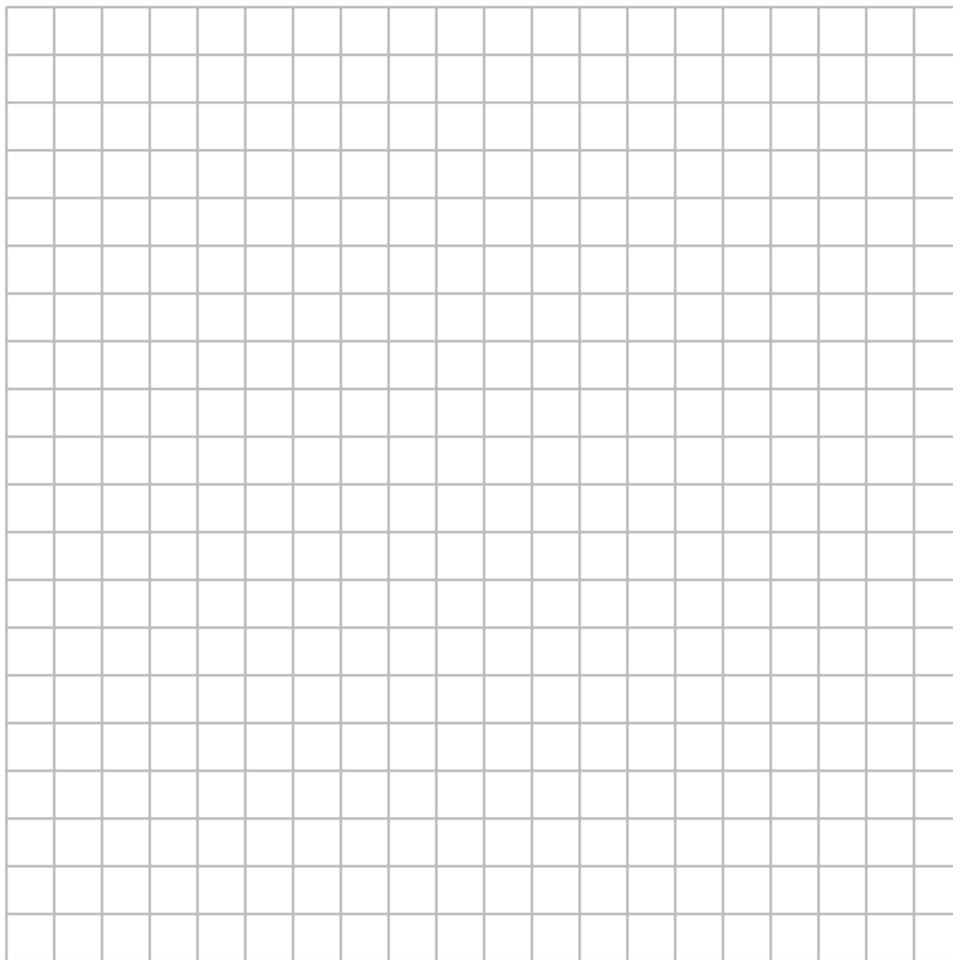
## Part II

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 entire graph of  $f(x)$  is symmetric with respect to the origin. If the accompanying graph represents  $f(x)$  for  $x \geq 0$ , sketch, on the same set of axes, the graph of  $f(x)$  for  $x \leq 0$ .



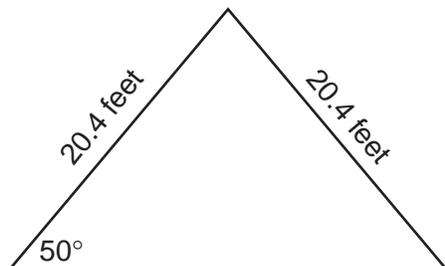
**22** A laundry owner's estimate of her weekly profits,  $p$ , in dollars, is given by the equation  $p = -4w^2 + 160w$ , where  $w$  represents the number of workers she hires. What is the number of workers she should hire in order to earn the greatest profit? [The use of the accompanying grid is optional.]



23 Simplify:  $\frac{\frac{x-3}{3} - \frac{x}{x-3}}{x}$

**24** The coordinates of quadrilateral  $PRAT$  are  $P(a,b)$ ,  $R(a,b + 3)$ ,  $A(a + 3,b + 4)$ , and  $T(a + 6,b + 2)$ . Prove that  $\overline{RA}$  is parallel to  $\overline{PT}$ .

- 25 The accompanying diagram shows the peak of a roof that is in the shape of an isosceles triangle. A base angle of the triangle is  $50^\circ$  and each side of the roof is 20.4 feet. Determine, to the *nearest tenth of a square foot*, the area of this triangular region.



**26** The weights of the boxes of animal crackers coming off an assembly line differ slightly and form a normal distribution whose mean is 9.8 ounces and whose standard deviation is 0.6 ounce. Determine the number of boxes of animal crackers in a shipment of 5,000 boxes that are expected to weigh *more than* 11 ounces.

### 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 amount of water vapor,  $y$ , that will saturate 1 cubic meter of air at different temperatures,  $x$ .

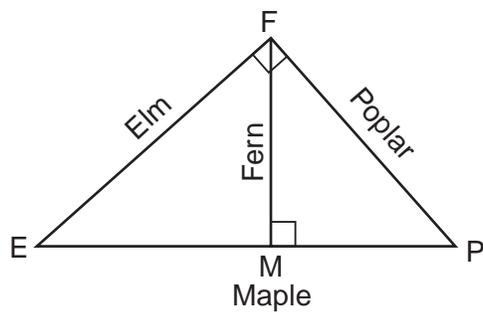
**Amount of Water Vapor That Will Saturate  
1 Cubic Meter of Air at Different Temperatures**

Air Temperature ( $x$ ) (°C)	Water Vapor ( $y$ ) (g)
-20	1
-10	2
0	5
10	9
20	17
30	29
40	50

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

Using this equation, predict the amount of water vapor that will saturate 1 cubic meter of air at a temperature of 50°C, and round your answer to the *nearest tenth of a gram*.

- 28 Four streets in a town are illustrated in the accompanying diagram. If the distance on Poplar Street from  $F$  to  $P$  is 12 miles and the distance on Maple Street from  $E$  to  $M$  is 10 miles, find the distance on Maple Street, in miles, from  $M$  to  $P$ .



**29** Find all values of  $\theta$  in the interval  $0^\circ \leq \theta < 360^\circ$  that satisfy the equation  $3 \cos 2\theta + 2 \sin \theta + 1 = 0$ , and round all answers to the *nearest hundredth of a degree*. [Only an algebraic solution can receive full credit.]

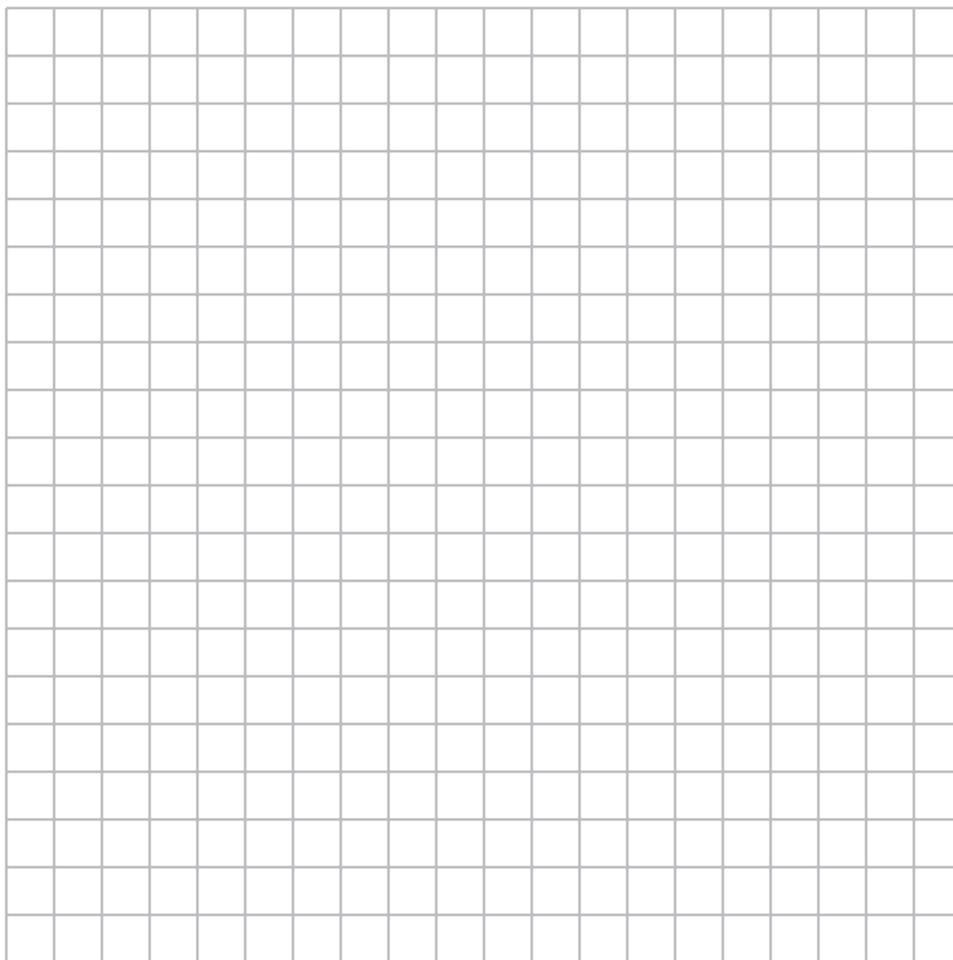
**30** The probability of rain on the last day of July is 90%. If the probability remains constant for the first seven days of August, what is the probability that it will rain *at least* six of those seven days in August?

**31** The engineering office in the village of Whitesboro has a map of the village that is laid out on a rectangular coordinate system. A traffic circle located on the map is represented by the equation  $(x + 4)^2 + (y - 2)^2 = 81$ . The village planning commission asks that the transformation  $D_2$  be applied to produce a new traffic circle, where the center of dilation is at the origin.

Find the coordinates of the center of the new traffic circle.

Find the length of the radius of the new traffic circle.

- 32 A radio wave has an amplitude of 3 and a wavelength (period) of  $\pi$  meters. On the accompanying grid, using the interval 0 to  $2\pi$ , draw a possible sine curve for this wave that passes through the origin.



### 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 Solve for  $x$ :  $\log_3(x^2 - 4) - \log_3(x + 2) = 2$

**34** Gerardo and Bennie are pushing a box. Gerardo pushes with a force of 50 pounds in an easterly direction, and Bennie pushes with a force of 39 pounds in a northeasterly direction. The resultant force forms an angle of  $32^\circ$  with the 39-pound force.

Find the angle between the 50-pound force and the 39-pound force, to the *nearest tenth of a degree*.

Find the magnitude of the resultant force, to the *nearest pound*.

## 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

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

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

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

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

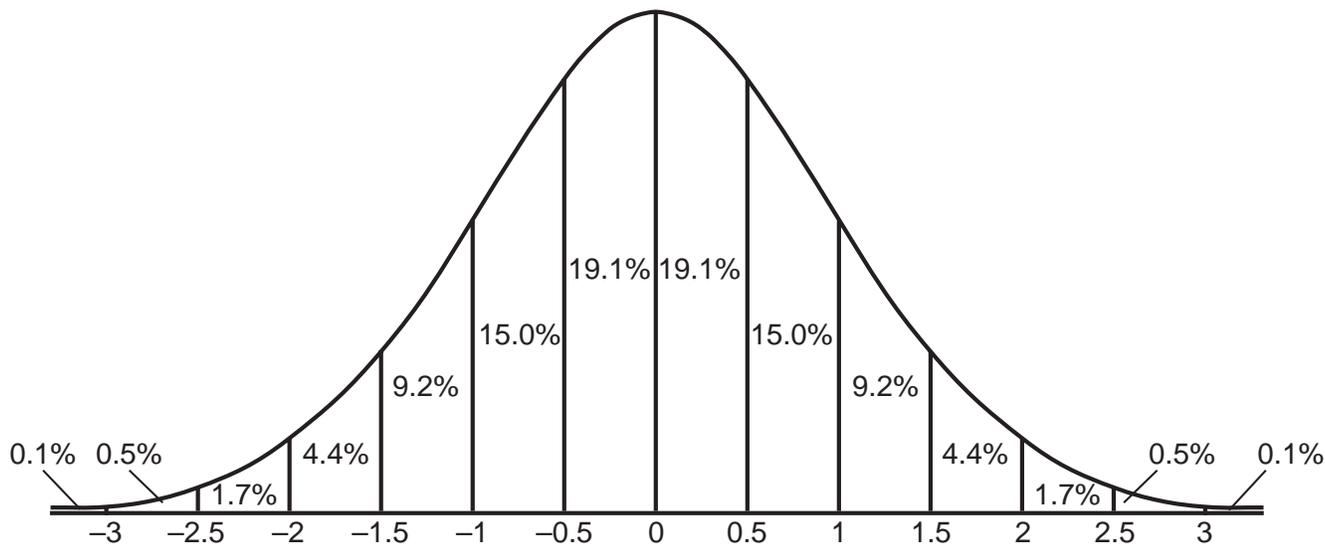
### Functions of the Half Angle

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

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

## Normal Curve

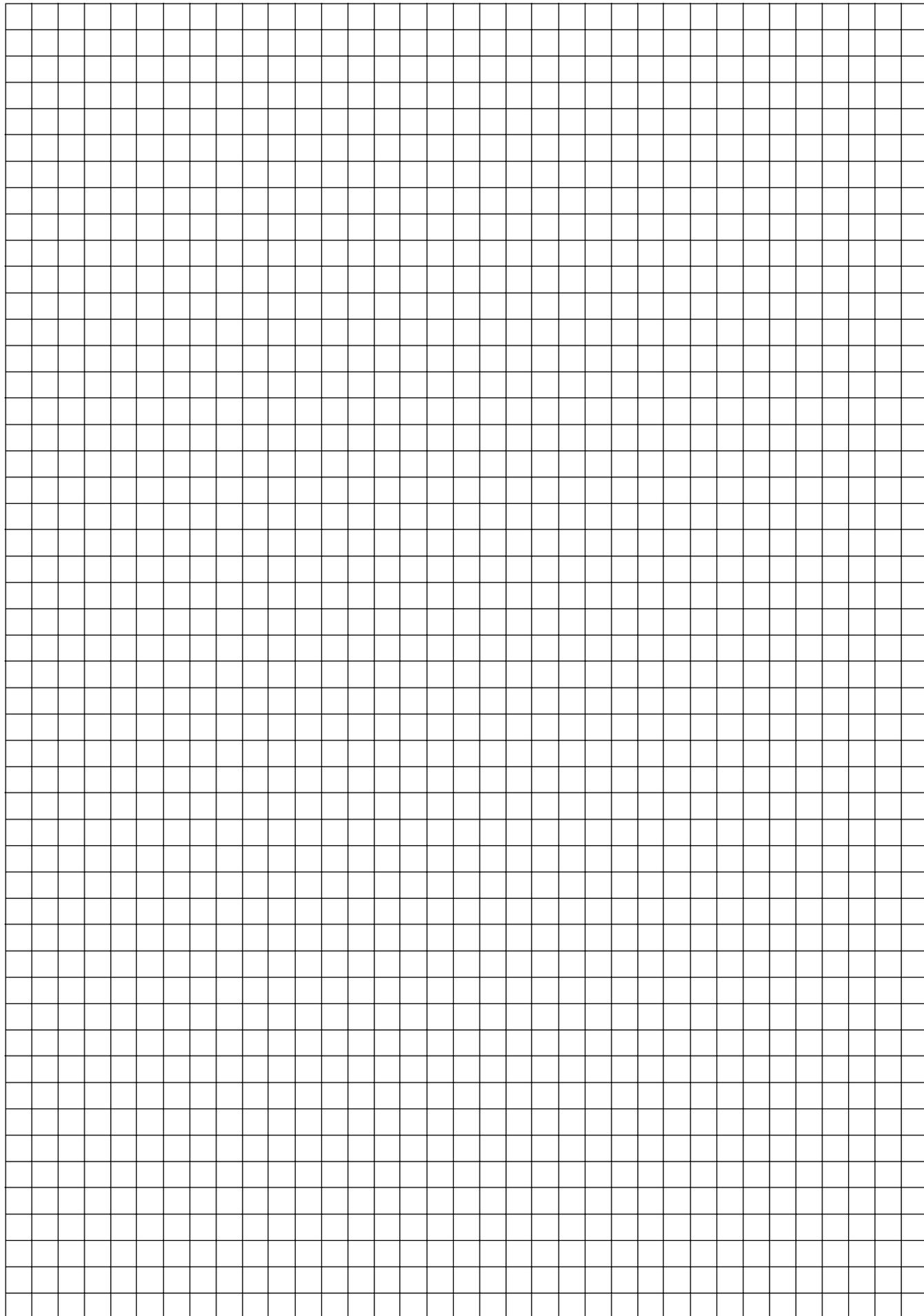
### Standard Deviation



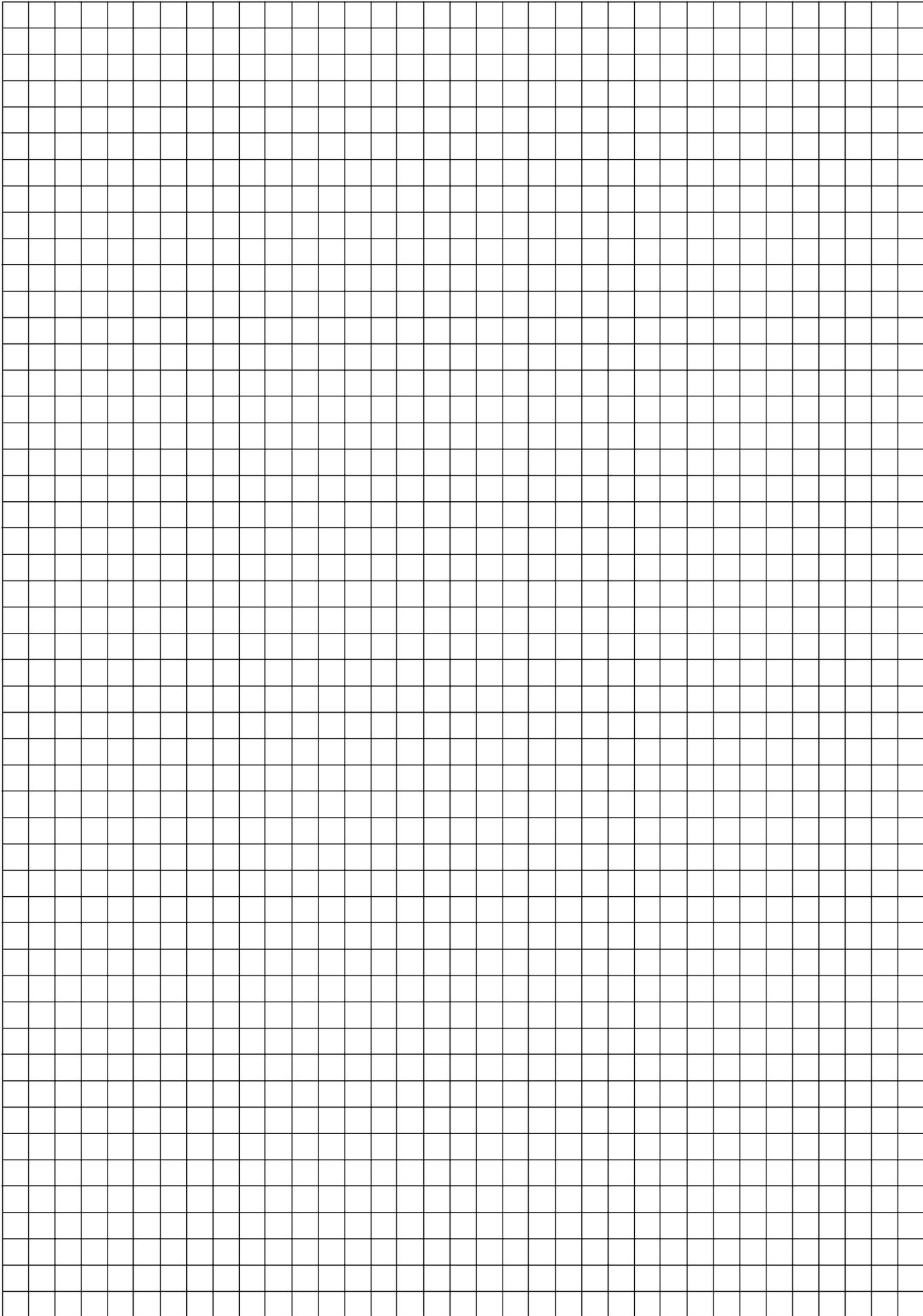
Scrap Graph Paper — This sheet will *not* be scored.

Tear Here

Tear Here



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



Tear Here

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Thursday, June 19, 2008 — 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 19, 2008 — 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 19, 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) 3	(6) 3	(11) 1	(16) 3
(2) 2	(7) 4	(12) 1	(17) 3
(3) 3	(8) 3	(13) 4	(18) 3
(4) 3	(9) 3	(14) 2	(19) 4
(5) 4	(10) 4	(15) 4	(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] A correct graph of  $f(x)$  for  $x < 0$  is drawn.
- [1] One conceptual error is made, such as reflecting  $f(x)$  over an axis.
- [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] 20, and appropriate work is shown, such as finding the turning point or sketching the graph of the equation.
- [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 graph of the equation is sketched correctly, but no further correct work is shown.
- or*
- [1] (20,1600) is identified as the turning point, but the number of workers is not stated.
- or*
- [1] 20, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

(23) [2]  $\frac{x+3}{3}$ , and appropriate work is shown.

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

**or**

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

**or**

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

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

(24) [2] The slopes of  $\overline{RA}$  and  $\overline{PT}$  are calculated correctly, and appropriate work is shown, and the statement is made that since their slopes are equal, the lines are parallel.

[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, and the slopes are shown to be equal, but no concluding statement is written.

[0] A statement is written that lines with equal slopes are parallel, 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*

(25) [2] 204.9, and appropriate work is shown.

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

*or*

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

*or*

[1] 204.9, 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.

(26) [2] 115, 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] 115, 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]  $y = 4.194(1.068)^x$  and 112.5, and appropriate work is shown.

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

***or***

[3]  $y = 4.194(1.068)^x$  and 112.5, but no substitution is shown.

***or***

[3] The expression  $4.194(1.068)^x$  is written and 112.5, and 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]  $y = 4.194(1.068)^x$ , but no further correct work is shown.

***or***

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

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

***or***

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

***or***

[1] The expression  $4.194(1.068)^x$  is written and 112.5, but no work is shown.

***or***

[1] 112.5, 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.

(28) [4] 8, and appropriate work is shown, such as solving the proportion  $\frac{10 + x}{12} = \frac{12}{x}$ .

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

[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 proportion  $\frac{10 + x}{12} = \frac{12}{x}$  is written, but no further correct work is shown.

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

*or*

[1] 8, but no work is shown.

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

MATHEMATICS B – *continued*

- (29) [4] 90, 221.81, and 318.19, and appropriate work is shown, such as solving the equation  $3 \sin^2 \theta - \sin \theta - 2 = 0$ .
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or***
- [3] The equation is solved correctly for  $\theta$ , but only one or two of the solutions are found.
- [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] 90, 221.81, and 318.19, and appropriate work is shown, but a graphic method is used.
- or***
- [2] Appropriate work is shown to find the values of  $\sin \theta$ , 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 correct quadratic equation in standard form is written, but no further correct work is shown.
- or***
- [1] 90, 221.81, and 318.19, 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] .8503056 or an equivalent answer, and appropriate work is shown, such as  ${}_7C_6(.9)^6(.1)^1 + {}_7C_7(.9)^7(.1)^0$ .

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

**or**

[3] The two individual 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 6 days.

**or**

[2] The expression  ${}_7C_6(.9)^6(.1)^1 + {}_7C_7(.9)^7(.1)^0$  is written, but no further correct work is shown.

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

**or**

[1] Appropriate work is shown to find .3720087, the probability of exactly 6 days, but no further correct work is shown.

**or**

[1] .8503056 or an equivalent answer, but no work is shown.

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

- (31) [4]  $(-8,4)$  and 18, and appropriate work is shown.
- [3] Appropriate work is shown, but one computational error is made.
- [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, such as using an incorrect dilation.
- or***
- [2] The center and radius are found appropriately for an incorrect center and radius of the original equation.
- or***
- [2]  $(-8,4)$ , and appropriate work is shown, but no further correct work is shown.
- [1] Appropriate work is shown, but one conceptual error and one computational error are made.
- or***
- [1] 18, and appropriate work is shown, but no further correct work is shown.
- or***
- [1]  $(-8,4)$  and 18, but no work is shown.
- [0]  $(-8,4)$  *or* 18, 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] The graph of  $y = 3 \sin 2x$  or the graph of  $y = -3 \sin 2x$  is drawn.
- [3] Appropriate work is shown, but one graphing error is made, such as not drawing the graph over the entire interval.
- [2] Appropriate work is shown, but two or more graphing errors are made.
- or**
- [2] Appropriate work is shown, but one conceptual error is made, such as graphing  $y = \sin 2x$  or  $y = 3 \sin x$ .
- [1] Appropriate work is shown, but one conceptual error and one graphing error are made.
- or**
- [1] The equation  $y = 3 \sin 2x$  or  $y = -3 \sin 2x$  is written, but 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.
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**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] 11, and appropriate work is shown.

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

*or*

[5] The given equation is solved correctly for  $x$ , but the extraneous root is not rejected.

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

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

*or*

[3] The equation  $x^2 - 9x - 22 = 0$  is written, but no further correct work is shown.

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

*or*

[2] The equation  $\frac{x^2 - 4}{x + 2} = 9$  is written, but no further correct work is shown.

[1] The equation  $\log_3(x - 2) = 2$  is written, but no further correct work is shown.

*or*

[1] 11, but no work is shown.

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

(34) [6] 56.4 and 79, and appropriate work is shown, such as using the Law of Sines and then the Law of Cosines or the Law of Sines.

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

***or***

[5] Appropriate work is shown, and the angle between the resultant and the 50-pound force is found to be 24.4 and the force is found to be 79, but the angle between the original forces is not stated.

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

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

***or***

[3] Appropriate work is shown to find 56.4, but no further correct work is shown.

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

***or***

[2] Appropriate work is shown to find 24.4, but no further correct work is shown.

***or***

[2] 56.4 and 79, but no work is shown.

[1] A complete and correctly labeled diagram is drawn to illustrate the problem, but no further correct work is shown.

***or***

[1] 56.4 *or* 79, 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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**Map to Learning Standards**

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

**Regents Examination in Mathematics B**

**June 2008**

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

***The Chart for Determining the Final Examination Score for the June 2008 Regents Examination in Mathematics B will be posted on the Department’s web site <http://www.emsc.nysed.gov/osa/> on Thursday, June 19, 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.



## Regents Examination in Mathematics B June 2008

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

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

To determine the student's final examination score, find the student's total test raw score in the column labeled "Raw Score" and then locate the scale score that corresponds to that raw score. The scale score is the student's final examination score. Enter this score in the space labeled "Scale Score" on the student's answer sheet.

All student answer papers that receive a scale 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 scale scores corresponding to raw scores in the conversion chart change from one examination to another, it is crucial that for each administration, the conversion chart provided for that administration be used to determine the student's final score. The chart above is usable only for this administration of the Regents Examination in Mathematics B.