

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

# MATHEMATICS B

Thursday, June 23, 2005 — 9:15 a.m. to 12:15 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. Any work done on this sheet of scrap graph paper will *not* be scored. Write all your work in pen, except graphs and drawings, which should be done in pencil.

This examination has four parts, with a total of 34 questions. You must answer all questions in this examination. Write your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in Parts II, III, and IV directly in this booklet. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. The formulas that you may need to answer some questions in this examination are found on page 19.

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.**

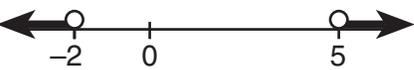


Use this space for computations.

4 Written in simplest form, the expression  $\frac{x^2 - 9x}{45x - 5x^2}$  is equivalent to

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

5 Which graph represents the solution set for the expression  $|2x + 3| > 7$ ?

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

6 What are the coordinates of the center of the circle represented by the equation  $(x + 3)^2 + (y - 4)^2 = 25$ ?

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

7 What is the mean of the data in the accompanying table?

Scores ( $x_i$ )	Frequency ( $f_i$ )
25	3
20	2
11	5
10	4

- (1) 11    (3) 15  
(2) 14.5    (4) 16

**Use this space for computations.**

**8** In a given rectangle, the length varies inversely as the width. If the length is doubled, the width will

- (1) be divided by 2                      (3) be multiplied by 2  
(2) remain the same                    (4) increase by 2

**9** Impedance measures the opposition of an electrical circuit to the flow of electricity. The total impedance in a particular circuit is given by the formula  $Z_T = \frac{Z_1 Z_2}{Z_1 + Z_2}$ . What is the total impedance of a circuit,  $Z_T$ , if

$Z_1 = 1 + 2i$  and  $Z_2 = 1 - 2i$ ?

- (1) 1    (3)  $\frac{5}{2}$   
(2) 0    (4)  $-\frac{3}{2}$

**10** If  $\log a = x$  and  $\log b = y$ , what is  $\log a\sqrt{b}$ ?

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

**11** Which relation is a function?

- (1)  $xy = 7$                                       (3)  $x^2 - y^2 = 7$   
(2)  $x = 7$                                         (4)  $x^2 + y^2 = 7$

**12** Which equation, when graphed on a Cartesian coordinate plane, would best represent an elliptical racetrack?

- (1)  $3x^2 + 10y^2 = 288,000$                       (3)  $3x + 10y = 288,000$   
(2)  $3x^2 - 10y^2 = 288,000$                       (4)  $30xy = 288,000$

Use this space for  
computations.

13 The expression  $\frac{2+i}{3+i}$  is equivalent to

(1)  $\frac{6+5i}{8}$

(3)  $\frac{7-5i}{10}$

(2)  $\frac{6+i}{8}$

(4)  $\frac{7+i}{10}$

14 For which quadratic equation is the axis of symmetry  $x = 3$ ?

(1)  $y = -x^2 + 3x + 5$

(3)  $y = x^2 + 6x + 3$

(2)  $y = -x^2 + 6x + 2$

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

15 A crate weighing  $w$  pounds sits on a ramp positioned at an angle of  $\theta$  with the horizontal. The forces acting on this crate are modeled by the equation  $Mw \cos \theta = w \sin \theta$ , where  $M$  is the coefficient of friction. What is an expression for  $M$  in terms of  $\theta$ ?

(1)  $M = \tan \theta$

(3)  $M = \sec \theta$

(2)  $M = \cot \theta$

(4)  $M = \csc \theta$

16 If  $(a^x)^{\frac{2}{3}} = \frac{1}{a^2}$ , what is the value of  $x$ ?

(1) 1

(3) -3

(2) 2

(4) -1

17 What is the third term in the expansion of  $(\cos x + 3)^5$ ?

(1)  $90 \cos^2 x$

(3)  $60 \cos^3 x$

(2)  $270 \cos^2 x$

(4)  $90 \cos^3 x$

18 Which equation has imaginary roots?

- (1)  $x(5 + x) = 8$   
(2)  $x(5 - x) = -3$

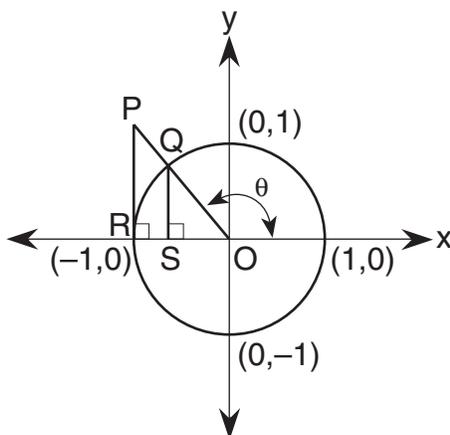
- (3)  $x(x + 6) = -10$   
(4)  $(2x + 1)(x - 3) = 7$

Use this space for  
computations.

19 The graphs of the equations  $y = 2^x$  and  $y = -2x + a$  intersect in Quadrant I for which values of  $a$ ?

- (1)  $0 < a < 1$   
(2)  $a < 1$
- (3)  $a \geq 1$   
(4)  $a > 1$

20 In the accompanying diagram,  $\overline{PR}$  is tangent to circle  $O$  at  $R$ ,  $\overline{QS} \perp \overline{OR}$ , and  $\overline{PR} \perp \overline{OR}$ .



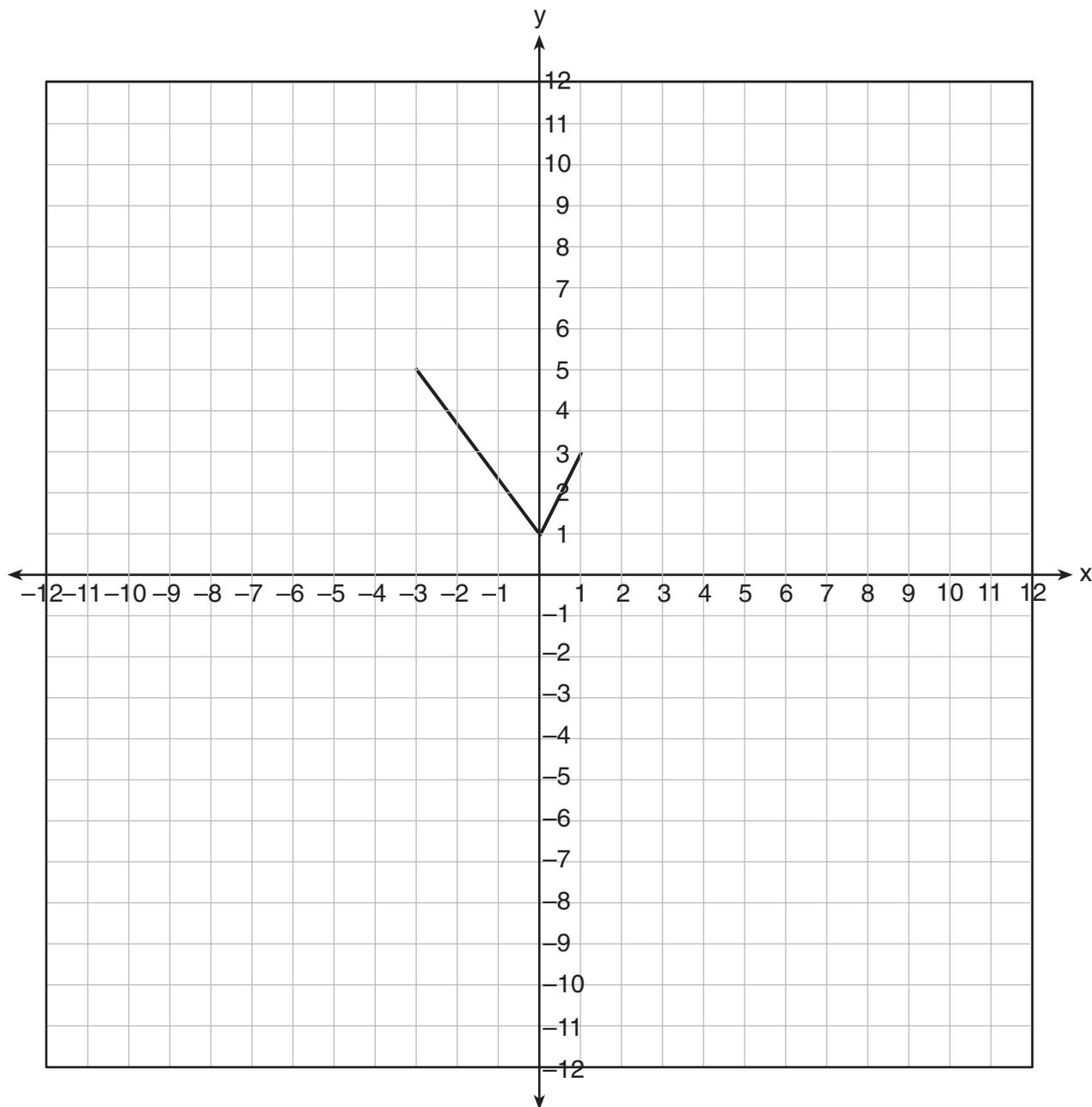
Which measure represents  $\sin \theta$ ?

- (1)  $SO$   
(2)  $RO$
- (3)  $PR$   
(4)  $QS$
-

## 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 graph of the function  $g(x)$  is shown on the accompanying set of axes. On the same set of axes, sketch the image of  $g(x)$  under the transformation  $D_2$ .



**22** Solve for  $m$ :  $3^{m+1} - 5 = 22$

**23** Evaluate:  $\sum_{k=0}^3 (3 \cos k\pi + 1)$

24 Express in simplest form:  $\frac{1}{x} + \frac{1}{x + 3}$

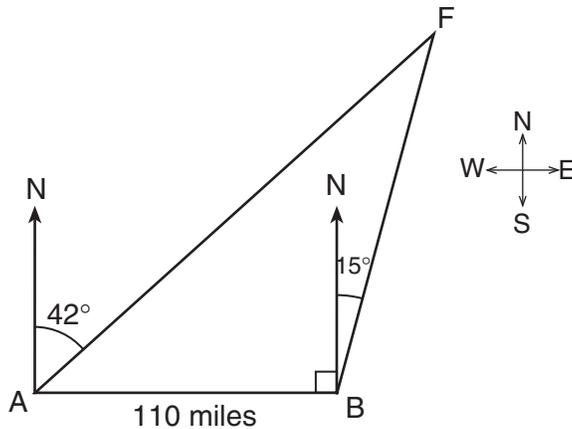
25 A landscape architect is designing a triangular garden to fit in the corner of a lot. The corner of the lot forms an angle of  $70^\circ$ , and the sides of the garden including this angle are to be 11 feet and 13 feet, respectively. Find, to the *nearest integer*, the number of square feet in the area of the garden.

**26** A certain drug raises a patient's heart rate,  $h(x)$ , in beats per minute, according to the function  $h(x) = 70 + 0.2x$ , where  $x$  is the bloodstream drug level, in milligrams. The level of the drug in the patient's bloodstream is a function of time,  $t$ , in hours, according to the formula  $g(t) = 300(0.8)^t$ . Find the value of  $h(g(4))$ , the patient's heart rate in beats per minute, to the *nearest whole number*.

### 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 As shown in the accompanying diagram, two tracking stations,  $A$  and  $B$ , are on an east-west line 110 miles apart. A forest fire is located at  $F$ , on a bearing  $42^\circ$  northeast of station  $A$  and  $15^\circ$  northeast of station  $B$ . How far, to the nearest mile, is the fire from station  $A$ ?

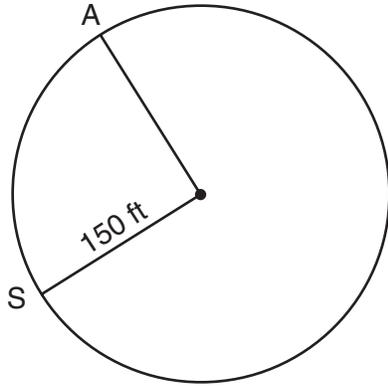


**28** Solve for all values of  $q$  that satisfy the equation  $\sqrt{3q + 7} = q + 3$ .

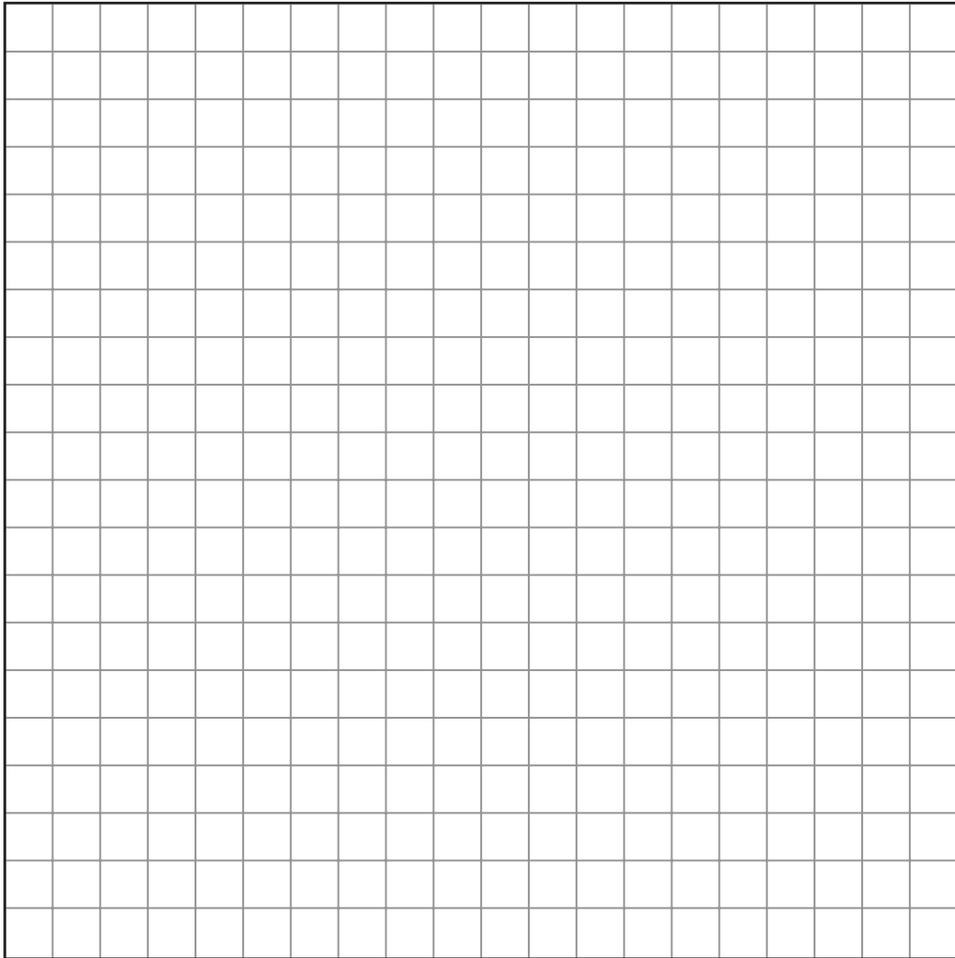
**29** The probability that a planted watermelon seed will sprout is  $\frac{3}{4}$ . If Peyton plants seven seeds from a slice of watermelon, find, to the *nearest ten thousandth*, the probability that *at least* five will sprout.

**30** Find, to the *nearest degree*, all values of  $\theta$  in the interval  $0^\circ \leq \theta < 360^\circ$  that satisfy the equation  $3 \cos 2\theta + \sin \theta - 1 = 0$ .

31 Kathy and Tami are at point  $A$  on a circular track that has a radius of 150 feet, as shown in the accompanying diagram. They run counter-clockwise along the track from  $A$  to  $S$ , a distance of 247 feet. Find, to the *nearest degree*, the measure of minor arc  $AS$ .



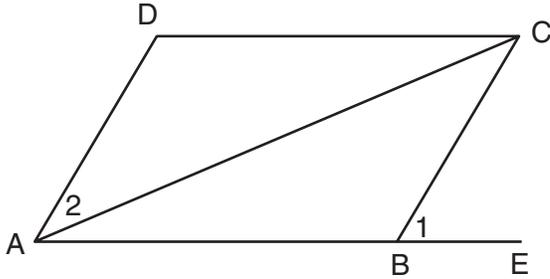
**32** The height of a projectile is modeled by the equation  $y = -2x^2 + 38x + 10$ , where  $x$  is time, in seconds, and  $y$  is height, in feet. During what interval of time, to the *nearest tenth of a second*, is the projectile *at least* 125 feet above ground? [The use of the accompanying grid 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 Given: parallelogram  $ABCD$ , diagonal  $\overline{AC}$ , and  $\overline{ABE}$

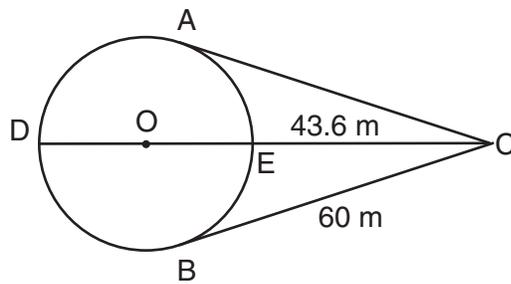


Prove:  $m\angle 1 > m\angle 2$

34 An architect is designing a park with an entrance represented by point  $C$  and a circular garden with center  $O$ , as shown in the accompanying diagram. The architect plans to connect three points on the circumference of the garden,  $A$ ,  $B$ , and  $D$ , to the park entrance,  $C$ , with walkways so that walkways  $\overline{CA}$  and  $\overline{CB}$  are tangent to the garden, walkway  $\overline{DOEC}$  is a path through the center of the garden,  $m\widehat{ADB}:m\widehat{AEB} = 3:2$ ,  $BC = 60$  meters, and  $EC = 43.6$  meters.

Find the measure of the angle between walkways  $\overline{CA}$  and  $\overline{CB}$ .

Find the diameter of the circular garden, to the *nearest meter*.





# Formulas

## Area of Triangle

$$K = \frac{1}{2} ab \sin C$$

## Law of Cosines

$$a^2 = b^2 + c^2 - 2bc \cos A$$

## Functions of the Sum of Two Angles

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$

## Functions of the Double Angle

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

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

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

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

## Functions of the Difference of Two Angles

$$\sin(A - B) = \sin A \cos B - \cos A \sin B$$

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$

## Functions of the Half Angle

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

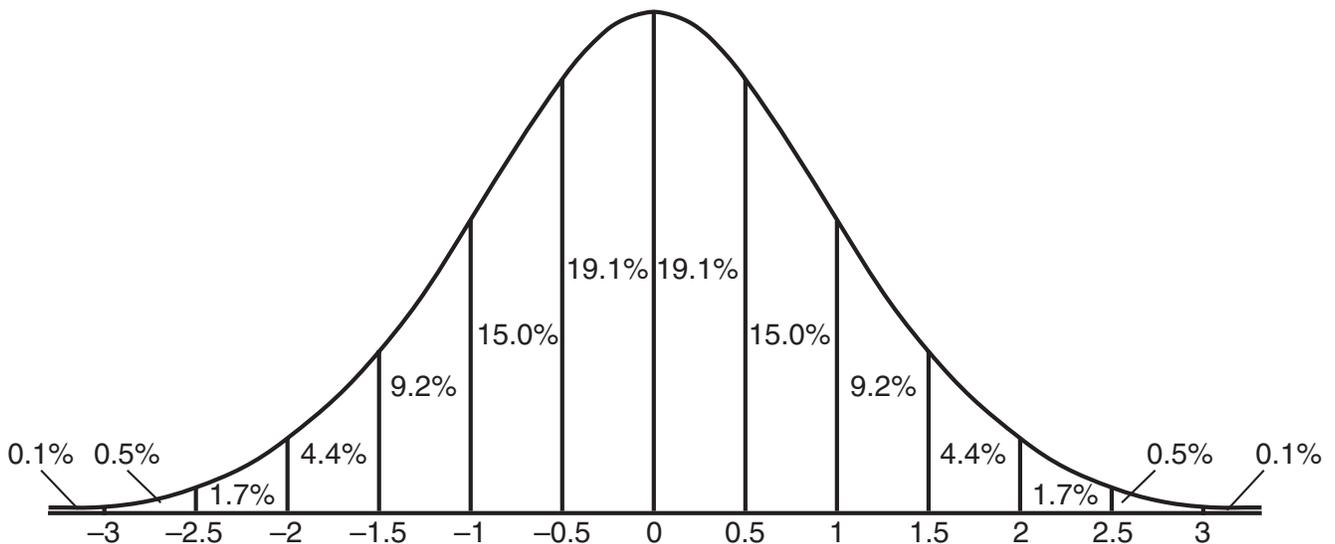
$$\cos \frac{1}{2} A = \pm \sqrt{\frac{1 + \cos A}{2}}$$

## Law of Sines

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

## Normal Curve

### Standard Deviation

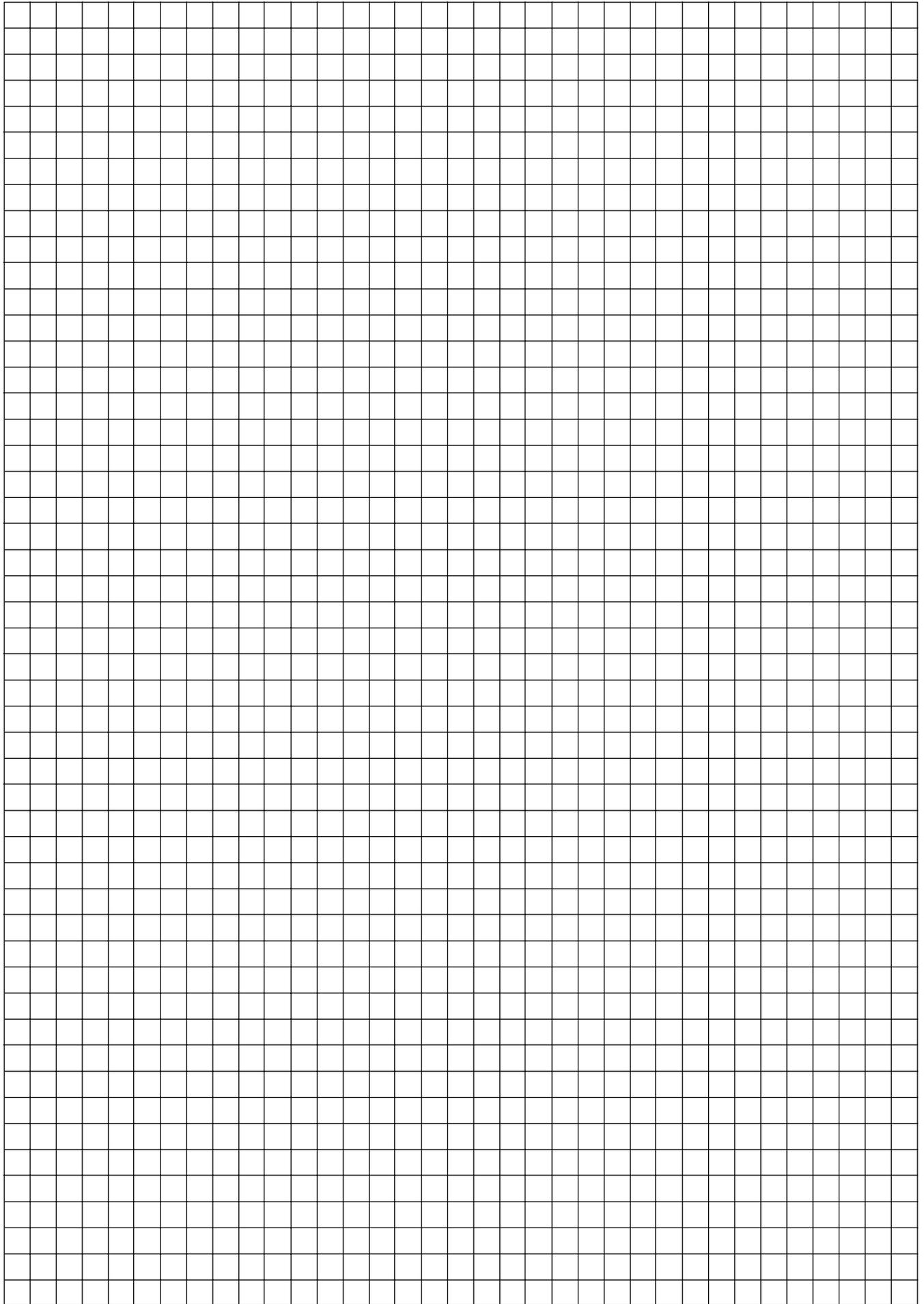




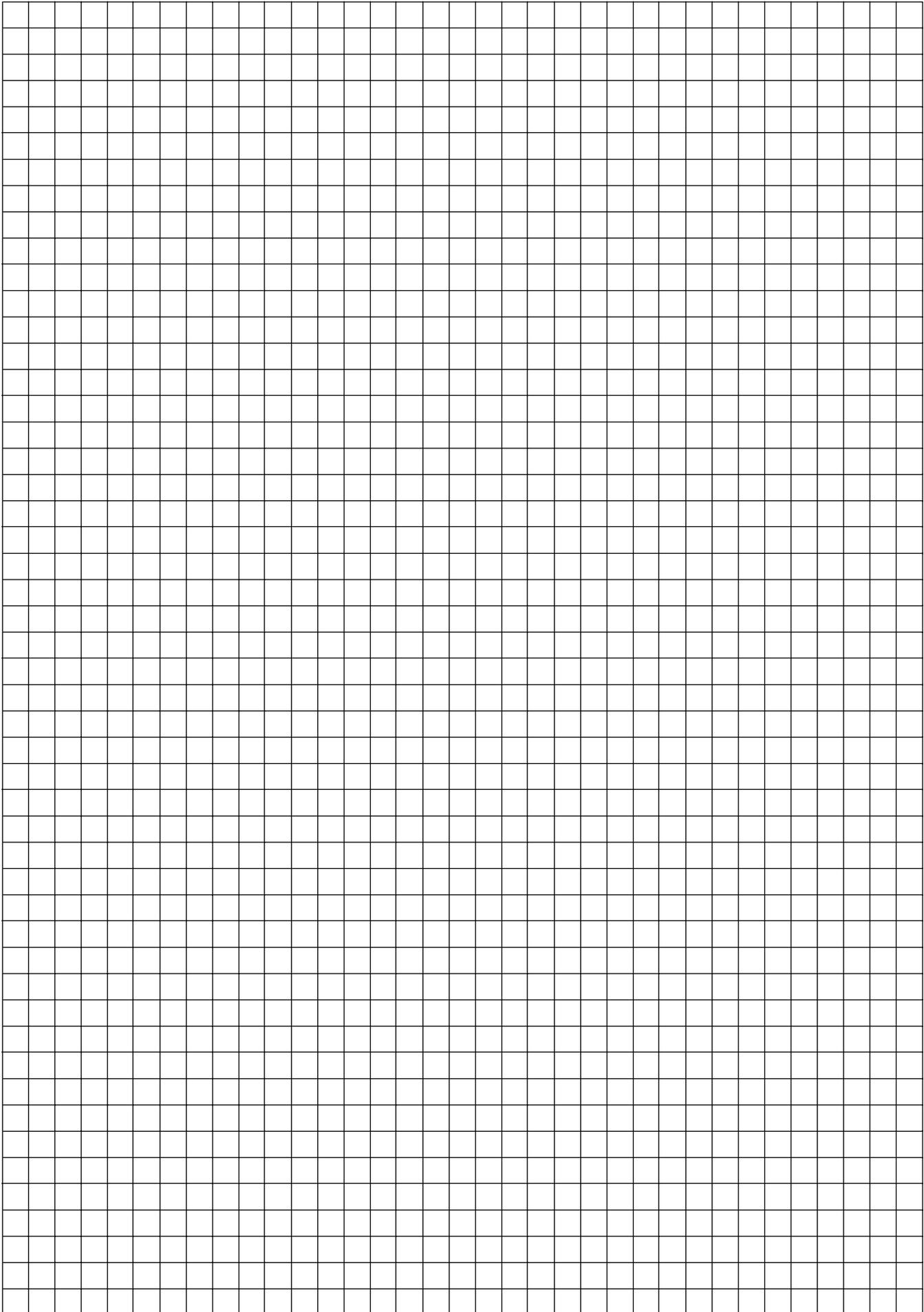
Scrap Graph Paper — This sheet will *not* be scored.

Tear Here

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Thursday, June 23, 2005 — 9:15 a.m. to 12:15 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 23, 2005 — 9:15 a.m. to 12:15 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 Administering and Scoring the Regents Examinations in Mathematics A and Mathematics B*.

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

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

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

Raters should record the student's scores for all questions and the total raw score on the student's detachable answer sheet. Then the student's total raw score should be converted to a scaled score by using the conversion chart that will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Thursday, June 23, 2005. The student's scaled score should be entered in the box provided on the student's detachable answer sheet. The scaled score is the student's final examination score.

#### Part I

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

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

Updated information regarding the rating of this examination may be posted on the New York State Education Department’s web site during the rating period. Visit the site <http://www.emsc.nysed.gov/osa/> and select the link “Latest Information” for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and at least one more time before the final scores for the examination are recorded.

### General Rules for Applying Mathematics Rubrics

#### I. General Principles for Rating

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

#### II. Full-Credit Responses

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

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

#### III. Appropriate Work

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

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

#### IV. Multiple Errors

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

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

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

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

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

**Part II**

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

(21) [2] A graph is sketched that maps  $(-3,5)$  to  $(-6,10)$ ,  $(0,1)$  to  $(0,2)$ , and  $(1,3)$  to  $(2,6)$ .

[1] One graphing or computational error is made, but an appropriate graph is sketched.

[0] A graph is sketched that represents a dilation of only  $x$  or  $y$ .

*or*

[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] 2, 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] 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.

(23) [2] 4, 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] 4, 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*

(24) [2]  $\frac{2x+3}{x(x+3)}$  or  $\frac{2x+3}{x^2+3x}$ , and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made or the answer is not simplified completely.

**or**

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

**or**

[1]  $\frac{2x+3}{x(x+3)}$  or  $\frac{2x+3}{x^2+3x}$ , 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] 67, and appropriate work is shown, such as  $A = \frac{1}{2}(11)(13) \sin 70^\circ$ .

[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] 67, 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] 95, 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, such as calculating  $g(h(4))$ .

**or**

[1] 95, but no work is shown.

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

**Part III**

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

- (27) [4] 234, and appropriate work is shown, such as using the Law of Sines.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or***
- [3] Appropriate work is shown, but one substitution error is made, such as using 42 as  $m\angle FAB$ .
- or***
- [3] Appropriate work is shown, but the correct distance to station  $B$  (180 miles) is 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] Correct substitution is made into the Law of Sines, but no further correct work is shown.
- [1] Appropriate work is shown, but one conceptual error and one computational error are made.
- or***
- [1] 234, 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]  $-2$  and  $-1$ , and appropriate work is shown.

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

***or***

[3] Appropriate work is shown, but only one value of  $q$  is found.

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

***or***

[2] Appropriate work is shown, but one conceptual error is made, such as squaring only the left side of the equation.

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

***or***

[1]  $-2$  and  $-1$ , but no work is shown.

[0]  $-2$  *or*  $-1$ , 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*

- (29) [4] .7564 or an equivalent answer, and appropriate work is shown, such as finding the sum of the exact probabilities that five, six, or seven seeds will sprout.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or***
- [3] The probability that *at most* five seeds will sprout is calculated correctly, and appropriate work 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] The three *exact* probabilities are found correctly, but they are not added.
- or***
- [2] The sum of only two of the three probabilities is found correctly, such as *exactly* six plus *exactly* seven, and appropriate work is shown.
- [1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
- or***
- [1] The probability that *exactly* five seeds will sprout is determined appropriately.
- or***
- [1] The substitution for the sum of the three probabilities is indicated, but no further correct work is shown.
- or***
- [1] .7564 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.

MATHEMATICS B – *continued*

- (30) [4] 42, 138, 210, and 330, and appropriate work is shown, such as substituting for  $\cos 2\theta$  and solving the resulting quadratic equation.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or***
- [3] Incorrect substitution is made for  $\cos 2\theta$ , such as  $1 - \sin^2 \theta$ , but all further work is appropriate.
- [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] Correct substitution is made, and appropriate work is shown to obtain the values of  $\sin \theta$ , but the values of  $\theta$  are not found.
- or***
- [2] A quadratic equation in terms of  $\sin \theta$  is written in standard form, but no further correct work is shown.
- [1] Appropriate work is shown, but one conceptual error and one computational error are made.
- or***
- [1] Correct substitution is made for  $\cos 2\theta$ , but no further correct work is shown.
- or***
- [1] 42, 138, 210, and 330, but no work is shown. [All four answers must be identified to receive this credit.]
- [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] 94, and appropriate work is shown.
- [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] Appropriate work is shown, and the correct radian value is found for  $\theta$ , but it is not converted to degrees.
- or***
- [2] Both formulas are set up correctly, but no further correct work is shown.
- or***
- [2] An incorrect radian value is found for  $\theta$ , but it is converted correctly to degrees.
- [1] Only one formula is set up correctly, and no further correct work is shown.
- or***
- [1] 94, 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*

(32) [4]  $3.8 \leq x \leq 15.2$ , and appropriate work is shown, such as using the quadratic formula or sketching the graph of the parabola and the line.

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

***or***

[3]  $3.8 < x < 15.2$ , and appropriate work is shown.

[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 graph of the parabola and the line are sketched correctly, 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] Correct substitution is made into the quadratic formula, but no further correct work is shown.

***or***

[1] The graph of the parabola is sketched correctly, but no further correct work is shown.

***or***

[1]  $3.8 \leq x \leq 15.2$ , but no work is shown.

[0]  $3.8 < x < 15.2$ , but no work is shown.

***or***

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

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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] A complete and correct proof is written.
- [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.

MATHEMATICS B – *continued*

(34) [6]  $m\angle ACB = 36$  and  $DOE = 39$ , and appropriate work is shown. [If trigonometry is used to find that  $m\angle ACB = 35.98138002$ , allow full credit for the full display of the calculator or any correctly rounded response.]

[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.

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

***or***

[3]  $m\angle ACB = 36$ , and appropriate work is shown, but no further correct work is shown.

***or***

[3]  $DOE = 39$ , and appropriate work is shown, 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]  $m\angle ACB = 36$  and  $DOE = 39$ , but no work is shown.

[1] The measures of the arcs are found correctly, but no further correct work is shown.

***or***

[1]  $m\angle ACB = 36$  *or*  $DOE = 39$ , but no work is shown.

[0] 36 and 39, but no work is shown and the answers are not labeled.

***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	4, 13, 18
Operations	9, 16, 21, 24
Modeling/Multiple Representation	2, 3, 6, 8, 10, 12, 14, 19, 20
Measurement	25, 27, 31, 34
Uncertainty	1, 7, 17, 23, 29
Patterns/Functions	5, 11, 15, 22, 26, 28, 30, 32

**Regents Examination in Mathematics B**

**June 2005**

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

**The *Chart for Determining the Final Examination Score for the June 2005 Regents Examination in Mathematics B*, normally located on this page, will be posted on the Department’s web site <http://www.emsc.nysed.gov/osa/> on Thursday, June 23, 2005. Conversion charts provided for previous administrations of the Mathematics B examination must NOT be used to determine students’ final scores for this administration.**



