

# FOR TEACHERS ONLY

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

## MATHEMATICS B

Wednesday, August 13, 2003 — 8:30 to 11:30 a.m., only

### SCORING KEY

#### Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Mathematics B examination. More detailed information about scoring is provided in the publication *Information Booklet for 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 printed at the end of this key. 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) 4	(11) 2	(16) 2
(2) 2	(7) 4	(12) 4	(17) 3
(3) 1	(8) 3	(13) 2	(18) 1
(4) 1	(9) 2	(14) 4	(19) 1
(5) 3	(10) 3	(15) 1	(20) 4

**Part II**

For each question, use the specific criteria to award a maximum of two credits.

- (21) [2] 20.1, 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] The time when the ball reaches its maximum height is found correctly, but no further correct work is shown.
- or*
- [1] 20.1, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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- (22) [2]  $1\frac{1}{4}$  or an equivalent answer, 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]  $1\frac{1}{4}$  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*

(23) [2]  $\frac{x + 4}{4}$ , 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]  $\frac{x + 4}{4}$ , 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.

(24) [2] 56, and appropriate work is shown, such as  $\frac{1}{2} \cdot 14 \cdot 16 \cdot \sin 30$ .

[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] 56, 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] 16.6, 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] A correct substitution of 4.75 for  $t$  is made, but no further correct work is shown.

**or**

[1] 16.6, 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*

(26) [2] No, and a correct justification is given.

[1] No, but an incomplete or partially incorrect explanation is given.

[0] No, but no explanation is given.

***or***

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

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**Part III**

For each question, use the specific criteria to award a maximum of four credits.

(27) [4]  $\overline{AB}$  and  $\overline{A''B''}$  are graphed and labeled correctly,  $A''(0,-5)$  and  $B''(-2,0)$ , and a correct transformation is identified, such as  $R_{180^\circ}$ ,  $R_{-180^\circ}$ , or  $r_{(0,0)}$ .

[3] One error is made in graphing  $\overline{AB}$ , but  $\overline{A''B''}$  is graphed and labeled appropriately, and an appropriate transformation is identified.

[2]  $\overline{AB}$  is graphed and labeled correctly but one mistake is made in finding  $\overline{A''B''}$ , but an appropriate transformation is identified.

**or**

[2] Both  $\overline{AB}$  and  $\overline{A''B''}$  are graphed and labeled correctly, but the transformation is missing or is incorrect.

[1]  $\overline{AB}$  is graphed and labeled correctly, but one mistake is made in finding  $\overline{A''B''}$ , and the transformation is missing or is incorrect.

**or**

[1] One error is made in graphing  $\overline{AB}$ , but  $\overline{A''B''}$  is graphed and labeled appropriately, but the transformation is missing or is incorrect.

**or**

[1]  $R_{180^\circ}$ ,  $R_{-180^\circ}$ , or  $r_{(0,0)}$ , 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.

MATHEMATICS B – *continued*

- (28) [4]  $2 \pm i$ , and appropriate work is shown.
- [3] Appropriate work is shown, but one computational error is made, but the result is expressed as a complex number in simplest  $a + bi$  form.
- or**
- [3] Appropriate work is shown, but the roots are not expressed in simplest  $a + bi$  form.
- or**
- [3] Appropriate work is shown, but only one complex root, in simplest  $a + bi$  form, is found.
- [2] Appropriate work is shown, but one computational error is made, resulting in a solution that is not a complex number.
- or**
- [2] Appropriate work is shown, but two or more computational errors are made, but the result is expressed as a complex number in simplest  $a + bi$  form.
- or**
- [2] Appropriate work is shown, but one conceptual error is made.
- or**
- [2] An incorrect quadratic formula is used, but the result is expressed as a complex number in simplest  $a + bi$  form.
- [1] Incorrect substitution is made into the quadratic formula, such as  $a = 1$ ,  $b = 5$ , and  $c = -4$ , but the resulting equation is solved appropriately.
- or**
- [1]  $2 \pm i$ , 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] 174, and appropriate work is shown, such as the use of the Law of Cosines.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- [2] Appropriate work is shown, but two or more computational or rounding errors are made.
- or**
- [2] One conceptual error is made when applying the Law of Cosines, but an appropriate answer is found.
- [1] Correct substitution is made into the Law of Cosines, but no further correct work is shown.
- or**
- [1] 174, 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.
- (30) [4]  $y = 2 \sin \frac{1}{2}x + 3$  or  $y = -2 \sin \frac{1}{2}x + 3$ , and appropriate work is shown.
- [3] The fact that  $c$  is equal to 3 is not recognized, resulting in an answer of  $y = 2 \sin \frac{1}{2}x$  or  $y = -2 \sin \frac{1}{2}x$ .
- or**
- [3] The values of  $a$ ,  $b$ , and  $c$  are determined correctly, and appropriate work is shown, but the equation is not written.
- or**
- [3] The value of  $a$  or  $c$  is determined incorrectly, but the value of  $b$  is determined correctly, and appropriate work is shown, and an appropriate equation is written.
- [2] Only the value of  $b$  is determined correctly, but appropriate work is shown, and an appropriate equation is written.
- or**
- [2] Only the values of  $a$  and  $c$  are determined correctly, but appropriate work is shown, and an appropriate equation is written.
- [1] The value of  $a$  or  $c$  is determined incorrectly, and the value of  $b$  is not determined or is determined incorrectly, but appropriate work is shown, and an appropriate equation is written.
- or**
- [1]  $y = 2 \sin \frac{1}{2}x + 3$  or  $y = -2 \sin \frac{1}{2}x + 3$ , 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.

MATHEMATICS B – *continued*

- (31) [4]  $\bar{x} = 80$ ,  $\bar{y} = 20.8$ , and  $y = 0.25x + 0.8$ , and appropriate work is shown to prove that  $(\bar{x}, \bar{y})$  is a point on the line of regression.

[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.

[1]  $\bar{x} = 80$ ,  $\bar{y} = 20.8$ , and  $y = 0.25x + 0.8$ , 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.

- (32) [4] 29 hammers to make a profit and 45 hammers to make a profit of \$100, 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] Either the number of hammers to make a profit or the number of hammers to make a profit of \$100 is determined correctly, and appropriate work is shown.

[1] One conceptual and one computational error are made.

**or**

[1] The correct equation and inequality or the correct equations are written, but no further correct work is shown.

**or**

[1] 29 hammers to make a profit and 45 hammers to make a profit of \$100, but no work is shown.

[0] 29 and 45, 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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**Part IV**

For each question, use the specific criteria to award a maximum of six credits.

- (33) [6]  $\frac{2}{1}$  or 2:1 or an equivalent ratio, and appropriate work is shown.
- [5] Appropriate work is shown, but one computational error is made, but an appropriate ratio is found.
- or*
- [5] Appropriate work is shown, but the answer is not written as a ratio.
- or*
- [5] Appropriate work is shown, but the ratio is reversed or is simplified incorrectly.
- [4] Appropriate work is shown, but two or more computational errors are made, but an appropriate ratio is found.
- or*
- [4] Correct measures are found for all the arcs and the angles, and appropriate work is shown, but no ratio is found.
- or*
- [4] Correct measures are found for all the arcs, but the measure of one angle is found incorrectly, but an appropriate ratio is found.
- [3] One conceptual error is made, but appropriate work is shown, and an appropriate ratio is found.
- or*
- [3] Correct measures are found for all the arcs, but the measures of both angles are found incorrectly, but an appropriate ratio is found.
- [2] Correct measures are found for all the arcs, but no further correct work is shown.
- [1] Only the value of  $x$  is found correctly, and appropriate work is shown.
- or*
- [1]  $\frac{2}{1}$  or 2:1 or an equivalent ratio, 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 – *concluded*

- (34) [6] 19, and appropriate work is shown, such as  
 $P(\text{at least three}) = {}_4C_3(0.6)^3(0.4) + {}_4C_4(0.6)^4$  and  $P(0) = (0.4)^4$ .
- [5] Appropriate work is shown, but one computational error is made.
- or***
- [5] Correct probabilities are computed, but no answer or an incorrect answer is found.
- [4] Appropriate work is shown, but two or more computational errors are made.
- or***
- [4] Only the probability for at least three strikes is found correctly, but an appropriate ratio is determined.
- [3] The probability for at least three strikes is found correctly, and no further correct work is shown.
- or***
- [3] Only the probability for zero strikes is found correctly, but an appropriate ratio is determined.
- [2] Only the probability for zero strikes is found correctly, and no further correct work is shown.
- or***
- [2] Only the equation for the probability for at least three strikes is written, and it is not solved.
- [1] Conceptual errors are made in finding the probabilities, but an appropriate ratio is determined, based on the incorrect probabilities.
- or***
- [1] 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.
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MATHEMATICS B

**Map to Learning Standards**

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

## Regents Examination in Mathematics B

August 2003

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

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. The school principal is responsible for assuring that the student's final examination score is based on a fair, accurate, and reliable scoring of the student's answer paper.

Because scaled scores corresponding to raw scores in the conversion chart may change from one examination to another, it is crucial that for each administration, the conversion chart provided in the scoring key 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.