

# FOR TEACHERS ONLY

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

## MATHEMATICS B

Tuesday, August 13, 2002 — 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) 1	(11) 3	(16) 1
(2) 3	(7) 4	(12) 1	(17) 4
(3) 1	(8) 4	(13) 2	(18) 3
(4) 2	(9) 2	(14) 2	(19) 3
(5) 4	(10) 1	(15) 4	(20) 2

**Part II**

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

- (21) [2] 7,800, and appropriate work is shown.
- [1] Appropriate work is shown, but one computational or rounding error is made.
- or*
- [1] 7,800, 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] 0.341 or 34.1% or an equivalent answer, and appropriate work is shown.
- [1] 0.682 or 0.841 or some other probability related to one standard deviation from the mean is shown.
- or*
- [1] 0.341 or 34.1% 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.
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- (23) [2]  $\frac{\pi}{3}$ , and appropriate work or an appropriate diagram is shown.
- [1] Appropriate work is shown, but the answer is not expressed in simplest form.
- or*
- [1] A correct diagram is drawn, but no answer or an incorrect answer is found.
- or*
- [1]  $60^\circ$ , and appropriate work or an appropriate diagram is shown.
- or*
- [1]  $\frac{\pi}{3}$ , 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*

(24) [2] 5,279.61, and appropriate work is shown, such as  $3,500\left(1 + \frac{0.0825}{12}\right)^{(12 \times 5)}$ .

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

*or*

[1] 5,279.61, 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] 1.5 and a correct diagram is drawn, and appropriate work is shown.

[1] Appropriate work is shown and a correct answer is found, but an incorrect diagram is drawn.

*or*

[1] A correct diagram is drawn, but no further correct work is shown.

*or*

[1] An incorrect diagram is drawn, but an appropriate answer is found.

*or*

[1] 1.5, but no work is shown.

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

MATHEMATICS B – *continued*

(26) [2] 142.5, and appropriate work is shown, such as  $\frac{1}{2}(16)(21)(\sin 58^\circ)$ .

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

***or***

[1] An incorrect trigonometric function is used, but an appropriate answer is found, such as  $\frac{1}{2}(16)(21)(\cos 58^\circ)$ , resulting in an answer of 89 or 89.0.

***or***

[1] 142.5, 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.

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**Part III**

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

- (27) [4] 161, and appropriate work is shown, such as  $500x > \frac{3,200,000}{x} + 60,000$ .
- [3] Appropriate work is shown, but one computational error is made or  $-40$  is not rejected.
- [2] A correct inequality is given in standard form, but it is not solved.
- [1] An incorrect quadratic inequality of equal difficulty is solved appropriately.
- or***
- [1] 161, 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] 63, 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 supplement of the angle is found, resulting in an answer of 117.
- [2] Appropriate work is shown, but more than one computational or rounding error is made.
- or***
- [2] A conceptual error is made when applying the Law of Cosines.
- [1] A correctly labeled diagram is drawn, but no further correct work is shown.
- or***
- [1] 63, 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] Time of maximum height = 2.45, maximum height = 31.39, time when it hit the ground = 4.98, and appropriate algebraic or graphic work is shown. [Answers for time, in seconds, may vary based on method of solution.]
- [3] Appropriate algebraic or graphic work is shown, but one computational or graphing error is made.
- or**
- [3] The times are found correctly, but the maximum height is incorrect.
- [2] The rock's maximum height and the time it takes to reach that height are found correctly, but the time it takes to hit the ground is incorrect.
- or**
- [2] The time it takes the rock to hit the ground is found correctly, but the maximum height and the time it takes to reach that height are incorrect.
- [1] Time of maximum height = 2.45, maximum height = 31.39, time when it hit the ground = 4.98, 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] The proof in column or paragraph form explains clearly, by using contradiction or indirect proof, that altitude  $\overline{BD}$  does not bisect side  $\overline{AC}$ .
- [3] An appropriate conclusion is shown, without specifying that congruent triangles are actually formed only if a triangle is isosceles.
- [2] An appropriate diagram is drawn and some evidence that congruence may be an issue is shown, but no further reasoning is given or no conclusion is drawn.
- [1] Circular reasoning is used or the statement is said to be true, but no proof by contradiction or indirect proof 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] Both equations are graphed correctly and the description of the transformation  $a \rightarrow b$  is correct, such as  $T_{(4,3)} \circ r_{x\text{-axis}}$  or  $r_{y=3} \circ T_{(4,3)}$  or  $T_{(4,3)} \circ R_{180^\circ}$  or an equivalent explanation, such as a shift right of 4 followed by a reflection over the  $x$ -axis followed by a shift up of 3.
- [3] Both equations are graphed correctly, but only one transformation is shown or described correctly.
- [2] Both equations are graphed correctly, but no further correct work is shown.
- [1] Only one equation is graphed correctly, and no composition formula or explanation is shown.
- or**
- [1] The correct composition formula or explanation is shown, but no graphs or incorrect graphs are drawn.
- or**
- [1] Both equations are graphed incorrectly, but an appropriate composition formula or explanation 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] The scatter plot is completed correctly, and the correct regression equation is given, such as  $y = 4.8(6.8)^x$ .
- [3] Appropriate work is shown, but one graphing or rounding error is made.
- [2] The scatter plot is completed correctly, but the coefficients of the regression equation are transposed.
- or**
- [2] The scatter plot is inaccurate, but the correct regression equation is given.
- [1] No scatter plot is drawn, but the correct regression equation is given.
- or**
- [1] The scatter plot is completed correctly, but no regression equation is given.
- [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] 6,246 and a correct diagram is drawn, and appropriate work is shown, such as the use of the Law of Sines twice or the Law of Sines followed by right-triangle trigonometry or another valid method.
- [5] Appropriate work is shown, but one computational or rounding error is made.
- [4] One of the two unknown sides of the triangle is calculated correctly and appropriate work is shown, but an incorrect method is used for calculating the altitude.
- [3] A correct diagram is drawn, and the Law of Sines is used, but one computational or rounding error is made, and the altitude is not found.
- [2] 6,246 and a correct diagram is drawn, but no further work is shown.
- or*
- [2] A correct diagram is drawn, but the assumption is made that the altitude bisects the base, and an appropriate altitude is found.
- [1] Only a correct diagram is drawn, and no further correct work is shown.
- or*
- [1] 6,246, 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] 3.5, and appropriate work is shown.
- [5] Appropriate work is shown, but one computational or rounding error is made.
- [4] A substitution error is made, resulting in an incorrect quadratic equation of equal difficulty, but the incorrect equation is solved appropriately.
- [3] A correct substitution is made, resulting in the correct quadratic equation in standard form, but the equation is not solved.
- [2] A substitution error is made, resulting in an incorrect equation of equal difficulty, and one computational or rounding error is made.
- [1] 3.5, 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.
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MATHEMATICS B

**Map to Learning Standards**

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

## Regents Examination in Mathematics B

August 2002

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

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.