FOR TEACHERS ONLY

MATHEMATICS B

Friday, June 20, 2003 — 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 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) 3	(16) 2
(2) 2	(7) 2	(12) 1	(17) 2
(3) 4	(8) 3	(13) 2	(18) 3
(4) 1	(9) 2	(14) 4	(19) 4
(5) 3	(10) 3	(15) 4	(20) 1

Part II

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

(21)   **[2]** 1.4, and appropriate work is shown, such as finding the axis of symmetry.

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

or

   [1] 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.

(22)   **[2]** 255, and appropriate work is shown, such as $g(3) = 3^2 - 1$ and $f(8) = 2^8 - 1 = 255$.

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

or

   [1] One conceptual error is made, such as evaluating $(g \circ f)(3)$.

or

   [1] 255, 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]** 30, and appropriate work is shown.

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

or

   [1] 30, but no work is shown.

   [0] Direct variation is used to find a solution.

or

   [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]** Mean = 31 and standard deviation = 3.2, and appropriate work is shown.

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

or

[1] Either the mean or the standard deviation is determined correctly, and appropriate work is shown.

or

[1] Mean = 31 and standard deviation = 3.2, but no work is shown.

[0] Mean = 31 *or* standard deviation = 3.2, 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.

(25)   **[2]** $\dfrac{-x-3}{10x+2}$ or an equivalent answer in simplest form, and appropriate work is shown.

[1] Either the numerator or the denominator is factored completely.

or

[1] Appropriate work is shown, but $\dfrac{3-x}{x-3}$ = −1 is not recognized.

or

[1] $\dfrac{-x-3}{10x+2}$ or an equivalent answer in simplest form, 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]** 50, and appropriate work is shown, such as 2(1 + 3 + 5 + 7 + 9).

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

or

[1] Appropriate work is shown, but (1 + 3 + 5 + 7 + 9) is not multiplied by 2, resulting in an answer of 25.

or

[1] 50, 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.

(27)   **[4]** Appropriate work is shown, and an appropriate concluding statement is made to prove quadrilateral *ABCD* is a rhombus.

[3] The proof is completed appropriately, but one computational error is made, but an appropriate concluding statement is made.

or

[3] Appropriate work is shown to prove quadrilateral *ABCD* is a rhombus, but the concluding statement is missing, incomplete, or incorrect.

[2] The proof is completed appropriately, but more than one computational error is made, but an appropriate concluding statement is made.

or

[2] Appropriate work is shown, but one of the formulas used is incorrect.

or

[2] Appropriate work is shown to prove quadrilateral *ABCD* is a parallelogram, and an appropriate concluding statement is made, but the sides are not proved to be equal.

or

[2] Quadrilateral *ABCD* is proved to be a rhombus by assuming quadrilateral *ABCD* is a parallelogram.

[1] Appropriate work is shown to prove quadrilateral *ABCD* is a parallelogram, and the concluding statement is missing, incomplete, or incorrect.

or

[1] The definition of a rhombus is stated, but no proof 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.

(28) **[4]** 9 and 26, and appropriate work is shown, such as graphing and labeling the equations and identifying the points of intersection.

[3] Both functions are graphed correctly, and the points of intersection are indicated, but the prices are not stated.

or

[3] The parabola is graphed correctly, but the line is graphed incorrectly, but appropriate prices are stated.

[2] The line and the parabola are graphed and labeled, but a conceptual error is made, such as only one price is found because the graph of the parabola is incomplete.

or

[2] The line is graphed correctly, but the parabola is graphed incorrectly, but appropriate prices are stated.

or

[2] 9 and 26, but only an algebraic solution is shown.

[1] Both the line and the parabola are graphed incorrectly, but appropriate prices are stated.

or

[1] 9 and 26, but no work is shown.

[0] 9 *or* 26, 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.

[OVER]

(29)   **[4]** Two, and the paths are sketched and labeled correctly, and appropriate work is shown.

[3] Appropriate work is shown, but one computational or graphing error is made, but the appropriate number of points of intersection is stated.

or

[3] Only one path is sketched correctly, but the correct interval is used, and an appropriate number of points of intersection is stated.

or

[3] The paths are sketched correctly, but an incorrect interval is used, but the appropriate number of points of intersection is stated.

or

[3] The paths are sketched correctly in the correct interval, but the number of points of intersection is not stated or is stated incorrectly.

[2] Appropriate work is shown, but more than one computational or graphing error is made, but the appropriate number of points of intersection is stated.

or

[2] Only one path is sketched correctly in the correct interval, and the number of points of intersection is not stated or is stated incorrectly.

or

[2] Only one path is sketched appropriately in an incorrect interval, but an appropriate number of points of intersection is stated.

[1] A basic sine and cosine curve are sketched, but they do not have the correct traits of the equation, but an appropriate number of points of intersection is stated.

or

[1] One path is sketched correctly in the correct interval, but the second graph is not sketched.

[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]** 11,052 and 14, and appropriate work is shown.

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

or

[3] 14, and appropriate work is shown, but the amount of money he will have after 2 years is not found.

[2] Appropriate work is shown, but more than one computational or rounding error is made.

or

[2] 11,052, and appropriate work is shown, and a correct log equation, such as $\log 2 = .05x \log 2.718$ is written, but it is not solved.

[1] 11,052, and appropriate work is shown, but the number of years to double his investment is not found or is found incorrectly.

or

[1] Appropriate substitutions are made for both equations, but neither equation is solved.

or

[1] 11,052 and 14, but no work is shown.

[0] 11,052 *or* 14, 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.

[OVER]

(31) **[4]** $\frac{1,472}{78,125}$, and appropriate work is shown, such as $_7C_6 \left(\frac{2}{5}\right)^6 \left(\frac{3}{5}\right)^1 + {}_7C_7 \left(\frac{2}{5}\right)^7 \left(\frac{3}{5}\right)^0$.

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

or

[3] The probabilities for exactly six times and exactly seven times are calculated correctly, but they are not added.

or

[3] The probability for at most six times is calculated correctly.

[2] Appropriate work is shown, but more than one computational error is made.

or

[2] Appropriate work is shown, but one conceptual error is made, such as multiplying the probabilities.

[1] A correct expression is written for finding the probability, but no further correct work is shown.

or

[1] The probability for exactly six times is calculated correctly.

or

[1] $\frac{1,472}{78,125}$, 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]** 91.5, and appropriate work is shown, such as using the Law of Sines to find either side of the obtuse triangle and then using the sine function to find the height of the lighthouse.

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

or

[3] The angles in the obtuse triangle are found incorrectly, but appropriate work is shown, and an appropriate height of the lighthouse is found.

[2] Appropriate work is shown, but more than one computational or rounding error is made.

or

[2] A correct length of a side of the obtuse triangle is found, but no further correct work is shown.

[1] An appropriate equation is set up for one triangle, but it is not solved.

or

[1] 91.5, 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.

Part IV

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

(33)   **[6]** 2,700, and appropriate work is shown, such as using the Law of Cosines and finding the area of the triangle.

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

[4] Appropriate work is shown, but more than one computational or rounding error is made.

or

[4] Appropriate work is shown, and the area of the triangle is determined correctly, but the dollar amount is not determined or is determined incorrectly.

or

[4] The Law of Cosines is used correctly to determine an angle, but an incorrect procedure is used to find the area, but an appropriate dollar amount is found.

or

[4] The Law of Cosines is used incorrectly to determine an angle, but a correct procedure is used to find the area, and an appropriate dollar amount is found.

[3] The Law of Cosines is used correctly to determine an angle, but an incorrect procedure is used to find the area, and the dollar amount is not determined or is determined incorrectly.

[2] The Law of Cosines is used correctly to determine an angle, but no further correct work is shown.

[1] A correct equation using the Law of Cosines is written, but no further correct work is shown.

or

[1] 2,700, 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) *a* **[2]** Both circles are drawn and labeled correctly.

[1] Both circles are drawn, but one conceptual error is made.

or

[1] Only one circle is drawn and labeled correctly.

b **[4]** 0.7722345326 or an equivalent decimal answer, and appropriate work is shown, such as $\frac{400 - 29\pi}{400}$.

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

or

[3] The probability that point (x,y) lies inside the circles is found, and appropriate work is shown.

[2] Appropriate work is shown, but more than one computational or rounding error is made.

or

[2] Only the correct areas of the square and the circles are found.

[1] Only the correct area of the square or the circles is found.

or

[1] 0.7722345326 or an equivalent answer, but no work is shown.

a and *b*

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

Map to Learning Standards

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

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

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.