FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS B

Wednesday, June 20, 2001 — 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 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) 2	(11) 4	(16) 3
(2) 4	(7) 3	(12) 2	(17) 2
(3) 3	(8) 4	(13) 4	(18) 4
(4) 1	(9) 1	(14) 3	(19) 3
(5) 2	(10) 2	(15) 1	(20) 4

Part II

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

(21) **[2]** 49.8, 65.1, and 65.1, and the appropriate use of the area formula is shown.

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

or

[1] Only one or two angles are found correctly.

or

[1] Cosine is used instead of sine, but appropriate work is shown.

or

[1] The setup is appropriate, but incorrect work is shown, such as the sine of the angle but not the angle is found.

or

[1] 49.8, 65.1, and 65.1, 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.

(22) **[2]** 0.3 or an equivalent answer, 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 no answer is found.

or

[1] 0.3 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.

(23) **[2]** $6.85, and appropriate work is shown.

[1] The correct rate for the first 5 minutes and the correct rate for each additional minute is shown, but the cost of a 30-minute call is not found.

or

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

or

[1] $6.85, but no work is shown.

[0] The student calculates *either* the rate for the first 5 minutes *or* the rate for each additional minute, but no further 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.

(24) **[2]** $4(x - 2)$ or $4x - 8$, and appropriate work is shown.

[1] The problem is factored correctly but not reduced to simplest form.

or

[1] Only two of the expressions are factored correctly, but an appropriate answer is found.

or

[1] $4(x - 2)$ or $4x - 8$, but no work is shown.

[0] Only the formula for volume 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]** 13.3, and appropriate work is shown.

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

or

[1] The correct value is substituted for n, and the equation is converted to exponential form, but it is not solved.

or

[1] 13.3, 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.

(26) **[2]** 25, and appropriate work is shown.

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

or

[1] The solution is incomplete, such as only the correct percent is shown.

or

[1] 25, 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]** 11.8, and an appropriate application of the Law of Cosines is shown.

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

or

[3] The Law of Cosines is correctly applied, but the square root is not found.

[2] The Law of Cosines is applied correctly, and correct substitutions are shown, but no further work is shown.

or

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

[1] The diagram is set up with the correct sides and angles, and the Law of Cosines is written, but substitution is not made.

or

[1] The diagram is set up with the correct sides and angles, but no further work is shown.

or

[1] 11.8, 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.

(28) **[4]** 12.6, 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 quadratic formula is incorrect.

[2] An appropriate equation is shown and put in standard form, but the quadratic formula is not used correctly.

or

[2] An appropriate equation is shown and put in standard form, but no further work is shown.

or

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

[1] An appropriate equation is shown, but all other work is missing or is incorrect.

or

[1] 12.6, 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.

(29) **[4]** Both parabolas are graphed correctly with the line of symmetry $x = 3.5$ drawn and labeled as $x = 3.5$.

[3] $y = -x^2 + 9$ is graphed incorrectly, but an appropriate translation is drawn, and an appropriate line of symmetry is drawn and labeled correctly.

or

[3] $y = -x^2 + 9$ and its translation are graphed correctly, but no line of symmetry or an incorrect line of symmetry is drawn for the translation or no equation or an incorrect equation is shown for the line of symmetry.

[2] $y = -x^2 + 9$ is graphed correctly, but its translation is graphed incorrectly, but an appropriate line of symmetry is drawn and labeled correctly.

or

[2] $y = -x^2 + 9$ is graphed incorrectly, but an appropriate translation is graphed, but an incorrect line of symmetry is drawn.

[1] $y = -x^2 + 9$ and its translation are graphed incorrectly, but an appropriate line of symmetry is drawn and labeled correctly.

or

[1] $y = -x^2 + 9$ is graphed correctly, but an incorrect translation and line of symmetry are drawn.

[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]** (0,0) and $\left(\frac{1}{2},\frac{1}{2}\right)$, and both graphs are drawn correctly.

[3] Both graphs are drawn correctly, but one or both points of intersection are stated incorrectly.

or

[3] The graph of $y = 2x^2$ is incorrect, but the inverse is appropriate or correct, and the appropriate points of intersection are stated correctly.

[2] Both points of intersection are found correctly, using an algebraic solution.

or

[2] The graph of $y = 2x^2$ is incorrect, but the inverse is appropriate or correct, but no further work is shown.

or

[2] The graph of $y = 2x^2$ is correct, but the inverse is incorrect, but the appropriate points of intersection are stated.

or

[2] The graph of $y = 2x^2$ is incorrect, but the inverse is correct, but the points of intersection are not stated or are incorrect.

[1] Both graphs are incorrect, but the points of intersection are appropriate, based on the incorrect graphs.

or

[1] The graph of $y = 2x^2$ is correct, but the inverse is incorrect, and the points of intersection are labeled or stated incorrectly.

or

[1] (0,0) and $\left(\frac{1}{2},\frac{1}{2}\right)$, but no work is shown.

[0] Straight lines are used as graphs of the functions.

or

[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]** 210° and 330°, and appropriate work is shown.

[3] Correct substitution and factoring are shown, with at least the reference angle of 30° found.

or

[3] Correct substitution is shown, and the equation is put in standard form and factored correctly, but an incorrect reference angle is used to find appropriate answers.

or

[3] An incorrect quadratic equation is solved correctly, and appropriate angles are determined.

[2] Correct substitution is shown, and the equation is put in standard form and factored correctly, but no angles are found.

[1] Correct substitution is shown, but the equation is not factored or is factored incorrectly.

or

[1] 210° and 330°, but no work is shown.

[0] 210° or 330° or 30°, 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]** 60°, and an appropriate sketch is drawn, and appropriate work is shown.

[3] A correct sketch is shown, and m$\overset{\frown}{AB}$ is correct.

or

[3] A correct sketch is shown, but one computational error is made, leading to an incorrect m$\overset{\frown}{AB}$, but m$\overset{\frown}{CB}$ is appropriate, based on the incorrect m$\overset{\frown}{AB}$.

[2] A correct sketch is shown, but an incorrect procedure is used to find either the correct or incorrect m$\overset{\frown}{AB}$, but m$\overset{\frown}{CB}$ is appropriate, based on the incorrect m$\overset{\frown}{AB}$.

or

[2] An incorrect sketch is shown, but an appropriate m$\overset{\frown}{CB}$ is found, based on the incorrect sketch.

[1] Only a correct sketch is shown.

or

[1] 60°, 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]** A complete and correct proof is shown, such as the example below:

Statements	Reasons
1 Chords $\overline{AB}$ and $\overline{CD}$ of circle O intersect at E, and chords $\overline{AB}$ and $\overline{CD}$ are drawn.	1 Given
2 $\angle A \cong \angle C$	2 Inscribed angles of a circle that intercept the same arc are congruent.
3 $\angle AED \cong \angle CEB$	3 Vertical angles are congruent.
4 $\triangle AED \sim \triangle CEB$	4 AA $\cong$ AA
5 $\frac{AE}{CE} = \frac{ED}{EB}$	5 Corresponding sides of similar triangles are in proportion.
6 $(AE)(EB) = (CE)(ED)$	6 In a proportion, the product of the means equals the product of the extremes.

[5] $\triangle AED$ and $\triangle CEB$ are correctly proved to be similar, and the appropriate proportion is written with justification.

or

[5] A correct proof is shown, but one of the justifications is missing or is incorrect.

[4] $\triangle AED$ and $\triangle CEB$ are correctly proved to be similar, but no further work is shown.

[3] A correct proof is shown, but more than one justification is missing or is incorrect.

[2] The triangles are said to be similar, and the conclusion is written.

[1] Only one correct statement and justification are given.

[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]** $\overline{W}$ = 44.6 and $\overline{L}$ = 43.2, the line of best-fit equation ($y = -1.007559x + 88.137149$) is shown, and an appropriate justification of point $(\overline{W}, \overline{L})$ fitting or not fitting, depending on the rounding of the equation, is given.

[5] $\overline{W}$ or $\overline{L}$ is incorrect, but the rest of the work is appropriate.

or

[5] All conditions of the problem are met, except it is not stated whether $(\overline{W}, \overline{L})$ lies or does not lie on the line of best fit.

or

[5] $\overline{W}$ and $\overline{L}$ and the equation of the line of best fit are correct, but one error results in an incorrect conclusion, such as the calculation or interchanging of $\overline{W}$ and $\overline{L}$.

[4] Both $\overline{W}$ and $\overline{L}$ are incorrect, but the rest of the work is appropriate.

or

[4] $\overline{W}$ and $\overline{L}$ are correct, but the equation of the line of best fit is incorrect, but the justification is appropriate, based on the incorrect equation.

or

[4] $\overline{W}$ and $\overline{L}$ are correct, a correct scatter plot is drawn, a correct line of best fit is drawn, $(\overline{W}, \overline{L})$ is plotted correctly, and a statement indicating that the point does or does not fit the line is given, with an appropriate explanation, but no equation is used.

or

[4] All conditions of the problem are met, except for the justification of whether $(\overline{W}, \overline{L})$ lies on the line.

[3] $\overline{W}$ and $\overline{L}$ are correct, but the equation of the line of best fit is stated incorrectly, and no further work is shown.

[2] Only $\overline{W}$ and $\overline{L}$ are found correctly.

[1] Only one mean is found correctly.

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

Regents Examination in Mathematics B

June 2001

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

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.