

FOR TEACHERS ONLY

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

MATHEMATICS B

Thursday, August 16, 2001 — 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 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) 4	(6) 3	(11) 1	(16) 1
(2) 1	(7) 1	(12) 3	(17) 4
(3) 2	(8) 1	(13) 4	(18) 3
(4) 3	(9) 3	(14) 1	(19) 2
(5) 4	(10) 2	(15) 2	(20) 3

Part II

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

- (21) [2] $-\frac{4}{5}$ or -0.8 , and appropriate work is shown.
- [1] $\frac{4}{5}$ or 0.8 , and appropriate work is shown, but the quadrant was not taken into consideration.
- or**
- [1] $-\frac{4}{5}$ or -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.
- (22) [2] Appropriate work is shown, such as $(a + bi)(a - bi) = a^2 + b^2$.
- [1] The conjugate is incorrect, but multiplication and substitution for i^2 are appropriate.
- or**
- [1] The conjugate is correct, but one or more errors in multiplication and/or substitution for i^2 are made.
- [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] 8, and appropriate work is shown, such as $5(70) = 43.75x$.
- [1] 4, and \$87.50 is used instead of \$43.75 per person.
- or**
- [1] Appropriate work is shown, but one computational error is made.
- or**
- [1] 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.

- (24) [2] $\sqrt{171}$ or 13 or 13.1 or 13.08 or an equivalent answer, and appropriate work is shown, such as the use of the equation of a circle ($x^2 + y^2 = r^2$) or the Pythagorean theorem.

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

or

[1] Incorrect analysis is shown, such as $x = 5$ and $y = 14$, but the work is concluded appropriately.

or

[1] A correct answer is found, 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] 8 or an equivalent answer, and appropriate work is shown.

[1] The denominators are cleared correctly, such as $6(t + 16) + 6t = t(t + 16)$, but the factoring is incorrect, or one error is made using the quadratic formula.

or

[1] The denominators are not cleared correctly, but an equation of equal difficulty is solved.

or

[1] 8 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.

(26) [2] $-\frac{3}{5}$, and appropriate work is shown, such as

$$\cos(x + 180) = \cos x \cos 180^\circ - \sin x \sin 180^\circ = \frac{3}{5}(-1) - \frac{4}{5}(0).$$

or

[2] $-\frac{3}{5}$, and appropriate work is shown, such as $\cos(x + 180) = -\cos x$.

or

[2] $-\frac{3}{5}$, and angle x is found, and correct substitution leads to $\cos(x + 180)$.

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

or

[1] $\cos x = \frac{4}{5}$ is found, but substitution errors are made.

or

[1] $-\frac{3}{5}$, 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.

Part III

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

- (27) [4] $A = 1.5$, $B = 0.5$, and $D = 6.5$ or an equivalent answer, and appropriate work is shown or an appropriate explanation is given for each number found.
- [3] Correct answers are found, but appropriate work is shown or an appropriate explanation is given for only two of the numbers found.
- [2] Only two correct answers are found, but appropriate work is shown or an appropriate explanation is given for the two answers.
- [1] Only one correct answer is found, but appropriate work is shown or an appropriate explanation is given for that answer.

or

- [1] $A = 1.5$, $B = 0.5$, and $D = 6.5$ 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.
- (28) [4] $\frac{41}{59,049}$, and appropriate work is shown, such as ${}_5C_5(\frac{1}{9})^5 + {}_5C_4(\frac{1}{9})^4(\frac{8}{9})^1$.

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

or

- [3] The combination includes an incorrect setup for determining the probability of hitting the bull's-eye five times but a correct setup for determining the probability of hitting the bull's-eye four times, but an appropriate probability is found.
- [2] The probability of “exactly 4” is found.

or

- [2] The probability of “at most 3” is found.
- [1] A probability of $\frac{1}{9}$ is found, based on the area of the two circles.

or

- [1] $\frac{41}{59,049}$, 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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- (29) [4] 8.7 standard deviation, 70% within one standard deviation, and “Yes,” and appropriate work is shown, and an appropriate justification is given.

or

- [4] 8.7 standard deviation, 70% within one standard deviation, and “No,” and appropriate work is shown, and an appropriate justification is given.

- [3] One error is made in determining the standard deviation or the percent, but all the other work is appropriate.

- [2] 8.7 and 70%, and appropriate work is shown, but no justification is given.

or

- [2] The standard deviation is determined correctly, but more than one error is made when calculating the percent, but the justification is appropriate.

- [1] The standard deviation is determined correctly, but no further work is shown.

or

- [1] The standard deviation is determined incorrectly, but the percent is appropriate, based on the incorrect standard deviation.

- [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] $c(x) = 0.06x^2$ or an equivalent equation; width = $\sqrt{11.5}$ inches or an equivalent, length = $3\sqrt{11.5}$ inches or an equivalent, and height = $\frac{3}{2}\sqrt{11.5}$ inches or an equivalent, and appropriate work is shown.

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

or

[3] One or more dimensions are represented incorrectly, but all further work is appropriate.

or

[3] The correct function is found and solved for x , but no further work is shown.

[2] The dimensions are represented correctly, but the equation is incorrect, but all further work is appropriate.

or

[2] The dimensions are represented correctly, and the correct function is written, but further work is incomplete or is incorrect.

[1] The dimensions are represented correctly, but the function is written and solved incorrectly.

or

[1] $\sqrt{11.5}$, $3\sqrt{11.5}$, and $\frac{3}{2}\sqrt{11.5}$, 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.

(31) [4] $BC = 6.75$ and the area of $\triangle ABC = 16.7055$ or 16.71 or an equivalent answer, and appropriate work is shown, such as using the Law of Sines and the formula for the area of a triangle.

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

[2] Only the correct length of \overline{BC} is found, and appropriate work is shown.

or

[2] The length of \overline{BC} is found incorrectly, but an appropriate area of the triangle is found, based on the incorrect value of \overline{BC} .

[1] The Law of Sines is used, and appropriate substitution is made, but no further work is shown.

or

[1] $BC = 6.75$ and the area of $\triangle ABC = 16.7055$ or 16.71 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.

(32) [4] 3.1 , and appropriate work is shown, such as $5 = 10(0.8)^t$.

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

or

[3] An incorrect value for A is used, but the equation is solved appropriately.

[2] An incorrect value for A is used, but the equation is solved appropriately, but one computational or rounding error is made.

[1] 3.1 , 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.

Part IV

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

- (33) [6] $y = -6.2x + 12,451.2$; 20.2 thousand; and 2008; and appropriate work is shown.
- [5] The correct equation is shown, but only the number of gallons or the year is correct.
- [4] The slope and y -intercept are incorrect, but the slope is negative and the number of gallons and the year are appropriate, based on the incorrect equation.
- [3] The slope and y -intercept are incorrect, but the slope is negative, but only the number of gallons or the year is appropriate, based on the incorrect equation.
- [2] The correct equation is shown, but the number of gallons and the year are not determined or are determined incorrectly.
- or**
- [2] The incorrect equation $y = 6.2x + 12,451.2$ is shown, but appropriate work is shown for the number of gallons and the year.
- [1] An incorrect equation is shown with a negative slope, and the number of gallons and the year are not determined.
- or**
- [1] 20.2 thousand and 2008, 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) [6] The correct slopes of $\overline{AB} = \frac{1}{2}$ and $\overline{CD} = \frac{1}{2}$ are found, $\overline{AB} \parallel \overline{CD}$ is stated, and an explanation of why they are parallel is given. The correct slopes of $\overline{AD} = -\frac{5}{2}$ and $\overline{BC} = -\frac{1}{2}$ are found, \overline{AD} is not parallel to \overline{BC} is stated, and an explanation of why they are not parallel is given. An explanation that $ABCD$ is a trapezoid is given.

[5] The correct slopes of \overline{AB} , \overline{CD} , \overline{AD} , and \overline{BC} are found, and $\overline{AB} \parallel \overline{CD}$ and $\overline{AD} \not\parallel \overline{BC}$ are stated, but an explanation that $ABCD$ is a trapezoid is not given.

or

[5] One computational error is made in finding the slopes, but all further work is appropriate, based on the calculated slopes.

[4] The correct slope of \overline{AB} and \overline{CD} are found, and $\overline{AB} \parallel \overline{CD}$ is stated, but incorrect slopes of \overline{AD} and \overline{BC} are found, but an explanation of why they are not parallel is given, but an explanation that $ABCD$ is a trapezoid is not given.

or

[4] More than one computational error is made in finding the slopes, but \overline{AB} and \overline{CD} are found to have equal slopes and \overline{AD} and \overline{BC} to have different slopes, but an explanation that $ABCD$ is a trapezoid is given.

[3] Incorrect slopes of \overline{AB} , \overline{CD} , \overline{AD} , and \overline{BC} are found, such as by using an incorrect formula, \overline{AB} and \overline{CD} are found to have equal slopes and \overline{AD} and \overline{BC} to have different slopes, but an explanation that $ABCD$ is a trapezoid is given.

[2] Only the correct slopes of \overline{AB} , \overline{CD} , \overline{AD} , and \overline{BC} are found, and appropriate work is shown.

[1] Only two correct slopes are found, and appropriate work is shown.

or

[1] $AB = \frac{1}{2}$, $CD = \frac{1}{2}$, $AD = -\frac{5}{2}$, and $BC = -\frac{1}{2}$, 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.

Map to Learning Standards

Key Ideas	Item Numbers
Mathematical Reasoning	12, 29
Number and Numeration	7, 22
Operations	2, 3, 5, 8, 9, 10, 11, 20
Modeling/Multiple Representation	1, 16, 19, 24, 27, 28
Measurement	15, 17, 18, 21, 23, 25, 32, 35
Uncertainty	6, 14, 26
Patterns/Functions	4, 13, 30, 31, 33, 34

Regents Examination in Mathematics B

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