

# FOR TEACHERS ONLY

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

## MATHEMATICS A

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 A 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) 4	(6) 2	(11) 2	(16) 4
(2) 1	(7) 2	(12) 4	(17) 3
(3) 4	(8) 3	(13) 1	(18) 1
(4) 2	(9) 4	(14) 2	(19) 4
(5) 1	(10) 1	(15) 3	(20) 3

**Part II**

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

- (21) [2] 30, and appropriate work is shown or an appropriate explanation is given.
- [1] Angles of the equilateral triangle are shown to be  $60^\circ$ , but  $x$  is not determined or is determined incorrectly.
- or***
- [1] 30, but no work is shown or no explanation 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.
- (22) [2] 1, and an appropriate explanation is given, such as when 1 is added to 3, the result is the identity element, 4; therefore 1 is the inverse of 3.
- [1]  $1 + 3 = 4$ , but the identity element is not identified.
- or***
- [1] 4 is identified as the inverse because the identity element and inverse element are confused.
- or***
- [1] 1, but no explanation or an incorrect explanation 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.
- (23) [2] 319, and appropriate work is shown.
- [1] A correct proportion is shown, but no solution or an incorrect solution is found.
- or***
- [1] An incorrect proportion of equal difficulty is solved appropriately.
- or***
- [1] Appropriate work is shown, but one computational error is made.
- or***
- [1] 319, 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 A – *continued*

(24) [2] 6, and appropriate work is shown, such as  $0.70x + 0.30 \leq 5.00$  or trial and error with three trials and appropriate checks.

[1] The inequality is solved correctly, but the number of doughnuts is not found.

*or*

[1] The trial-and-error method is used to find a correct solution, but fewer than three trials are shown.

*or*

[1] 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.

(25) [2] 44, and appropriate work is shown, such as  $0.8(200 - 145)$ .

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

*or*

[1] 44, 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 three credits.

- (26) [3] 33, and appropriate work is shown, such as a Venn diagram.
- [2] Appropriate work is shown, but the number of households that purchased only Brand A and only Brand B is found,  $22 + 35 = 57$ .
- or**
- [2] Appropriate work is shown, but one computational error is made.
- [1] A conceptual error is made, such as subtracting 87 from 100.
- or**
- [1] 33, 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.
- (27) [3] 63, and appropriate work is shown, such as  $400 - (81 + 88 + 88)$  and determining the highest and lowest possible scores remaining that total 143.
- [2] Appropriate work is shown, but one computational error is made.
- [1] A total of 400 is shown, but one conceptual error is made, such as 257 is subtracted, and then 143 is split into 72 and 71, resulting in an answer of 71.
- or**
- [1] Appropriate work is shown, but more than one computational error is made.
- or**
- [1] No answer or an incorrect answer is found, but a list such as \_\_\_\_, \_\_\_\_, 81, 88, 88 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 A – *continued*

- (28) [3] 7, and appropriate work is shown or an appropriate explanation is given.
- [2] Appropriate work is shown, but one computational error is made.
- or**
- [2] No answer or an incorrect answer is found, but  $\frac{1}{4}$  of 28 and  $\frac{1}{3}$  of 21 are calculated correctly to arrive at 14.
- [1] Appropriate work is shown, but more than one computational error is made.
- or**
- [1] No answer or an incorrect answer is found, but  $\frac{1}{4}$  of 28 is calculated correctly to arrive at 21.
- or**
- [1] 7, 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) [3] 150, and appropriate work is shown, such as  ${}_5C_2 \cdot {}_6C_2$ .
- [2] Appropriate work is shown, but one computational error is made.
- or**
- [2] All the possible combinations of two mystery books and all the possible combinations of two biographies are calculated, but the answers are not multiplied.
- [1] Appropriate work is shown, but more than one computational error is made.
- or**
- [1] Appropriate work is shown, but one conceptual error is made, such as the computation  ${}_{11}C_4 = 330$ .
- or**
- [1] 150, 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 A – *continued*

(30) [3] The circle is graphed correctly, and appropriate work shows that  $(5,-2)$  does not lie on the circle.

[2] The circle is graphed correctly, but the work fails to show that  $(5,-2)$  does not lie on the circle.

[1] The circle is graphed incorrectly, but the location of  $(5,-2)$  is determined appropriately, based on the incorrect graph.

[0] Yes or no, 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.

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**Part IV**

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

- (31) [4]  $x = 19.62990915$  and  $y = 9.814954576$  or equivalent answers, and appropriate work is shown, such as  $\sin 60^\circ = \frac{17}{x}$  and  $\tan 60^\circ = \frac{17}{y}$  or the Pythagorean theorem.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or**
- [3] Appropriate work is shown, and the correct answers are found, but not identified.
- [2] Appropriate work is shown, but one conceptual error is made, such as  $\sin 60^\circ = \frac{x}{17}$ .
- or**
- [2] Appropriate work is shown, but more than one computational or rounding error is made.
- [1] Appropriate work is shown, but two conceptual errors are made, such as  $\sin 60^\circ = \frac{x}{17}$  and  $\tan 60^\circ = \frac{y}{17}$ .
- or**
- [1]  $x = 19.62990915$  and  $y = 9.814954576$  or equivalent answers, 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 A – *continued*

(32) [4]  $w(w + 3) = 40$ , width = 5, and length = 8, and appropriate work is shown.

[3]  $w(w + 3) = 40$  and appropriate work is shown, but one computational error is made in finding the length and width.

*or*

[3]  $w(w + 3) = 40$  and appropriate work is shown, but only the width is found.

[2]  $w(w + 3) = 40$  and appropriate work is shown, but the length and width are not identified.

*or*

[2]  $w(w + 3) = 40$  and appropriate work is shown, but more than one computational error is made in finding the length and width.

*or*

[2] An incorrect equation of equal difficulty is solved appropriately for the length and width.

[1]  $w(w + 3) = 40$ , but no further correct work is shown.

*or*

[1] Appropriate work is shown, but one conceptual error is made, such as solving the equation  $2w + 2w + 6 = 40$ .

*or*

[1]  $w(w + 3) = 40$ , width = 5, and length = 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.

MATHEMATICS A – *continued*

- (33) [4] \$1.50 for one slice of pizza and \$0.75 for one cola, and appropriate work is shown, such as  $3x + 2y = \$6$  and  $2x + 3y = \$5.25$ .
- [3] Appropriate work is shown, but one computational error is made.
- or**
- [3] Appropriate work is shown, but only the price of one slice of pizza or the price of one cola is found correctly.
- [2] Appropriate work is shown, but more than one computational error is made.
- or**
- [2] An incorrect system of equations of equal difficulty is solved appropriately to calculate the cost of one slice of pizza and one cola.
- [1] \$1.50 for one slice of pizza and \$0.75 for one cola, 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) [4] 3, and an appropriate algebraic or graphic solution is shown.
- [3] The equation is graphed correctly, but the time to reach the ground is not identified.
- or**
- [3] Appropriate work is shown for an algebraic solution, but either no solution is found or the negative root is not rejected.
- or**
- [3] An appropriate algebraic solution is shown, but one computational error is made.
- [2] The equation is graphed incorrectly, but an appropriate time to reach the ground is identified.
- or**
- [2] The equation is factored incorrectly, but an appropriate solution is found.
- [1] 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 A – *concluded*

(35) [4] 10 and  $y - 1 = -\frac{3}{4}(x - 2)$  or an equivalent equation, and appropriate work is shown.

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

[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 in determining the distance or the equation of the line.

**or**

[2] The length, the midpoint, and the slope of  $\overline{AB}$  are found correctly, but no equation or an incorrect equation is given for the perpendicular bisector.

**or**

[2] Only a correct equation of the perpendicular bisector is found.

[1] The correct distance is found, but no attempt is made to find the equation of the perpendicular bisector.

**or**

[1] The midpoint and slope of  $\overline{AB}$  are found correctly, but no further correct work is shown.

**or**

[1] The slope of  $\overline{AB}$  and the slope of the perpendicular bisector are calculated correctly.

[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 A

**Map to Learning Standards**

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

**Regents Examination in Mathematics A**  
**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
85	100	56	68	27	39
84	99	55	67	26	37
83	97	54	66	25	36
82	96	53	65	24	35
81	95	52	64	23	34
80	94	51	63	22	33
79	93	50	62	21	31
78	91	49	61	20	30
77	90	48	60	19	29
76	89	47	60	18	28
75	88	46	59	17	26
74	87	45	58	16	25
73	86	44	57	15	24
72	85	43	56	14	22
71	83	42	55	13	21
70	82	41	54	12	19
69	81	40	53	11	18
68	80	39	52	10	16
67	79	38	51	9	15
66	78	37	50	8	13
65	77	36	48	7	12
64	76	35	47	6	10
63	75	34	46	5	9
62	74	33	45	4	7
61	73	32	44	3	5
60	72	31	43	2	4
59	71	30	42	1	2
58	70	29	41	0	0
57	69	28	40		

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 A examination.