**The University of the State of New York**

**REGENTS HIGH SCHOOL EXAMINATION**

# GEOMETRY

**Thursday,** January 28, 2010—9:15 a.m. to 12:15 p.m., only

**Student Name:** _____

**School Name:** _____

**Print your name and the name of your school on the lines above. Then turn to the last page of this booklet, which is the answer sheet for Part I. Fold the last page along the perforations and, slowly and carefully, tear off the answer sheet. Then fill in the heading of your answer sheet.**

**This examination has four parts, with a total of 38 questions. You must answer all questions in this examination. Write your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in Parts II, III, and IV directly in this booklet. All work should be written in pen, except graphs and drawings, which should be done in pencil. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc.**

**The formulas that you may need to answer some questions in this examination are found at the end of the examination. This sheet is perforated so you may remove it from this booklet.**

**Scrap paper is not permitted for any part of this examination, but you may use the blank spaces in this booklet as scrap paper. A perforated sheet of scrap graph paper is provided at the end of this booklet for any question for which graphing may be helpful but is not required. You may remove this sheet from this booklet. Any work done on this sheet of scrap graph paper will *not* be scored.**

**When you have completed the examination, you must sign the statement printed at the end of the answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet cannot be accepted if you fail to sign this declaration.**

**Notice…**

**A graphing calculator, a straightedge (ruler), and a compass must be available for you to use while taking this examination.**

**The use of any communications device is strictly prohibited when taking this examination. If you use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.**

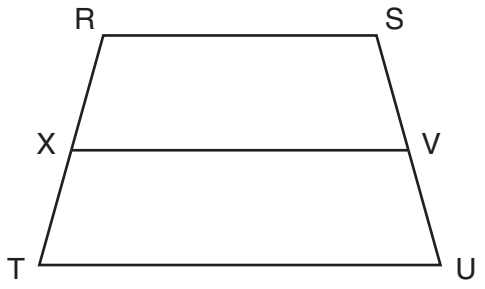
**DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.**

## Part I

**Answer all 28 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question.** [56]

**Use this space for computations.**

**1** In the diagram below of trapezoid $RSUT$, $\overline{RS} \parallel \overline{TU}$, $X$ is the midpoint of $\overline{RT}$, and $V$ is the midpoint of $\overline{SU}$.




If $RS = 30$ and $XV = 44$, what is the length of $\overline{TU}$?

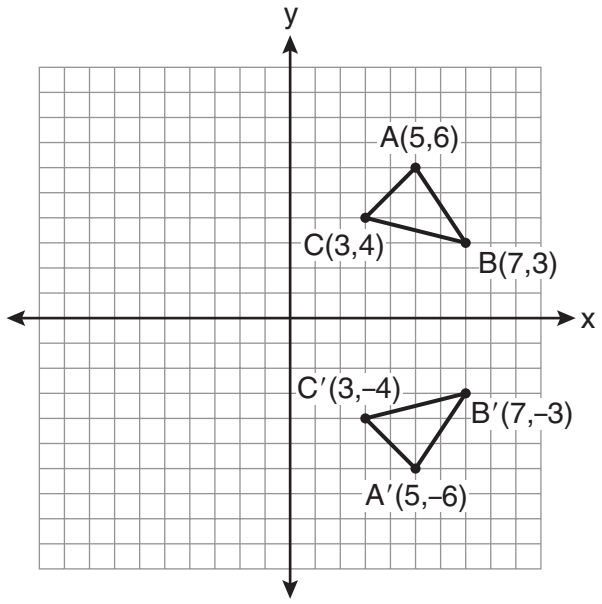
(1) 37
(2) 58
(3) 74
(4) 118

**2** In $\triangle ABC$, $m\angle A = x$, $m\angle B = 2x + 2$, and $m\angle C = 3x + 4$. What is the value of $x$?

(1) 29
(2) 31
(3) 59
(4) 61

**Use this space for computations.**

**3** Which expression best describes the transformation shown in the diagram below?



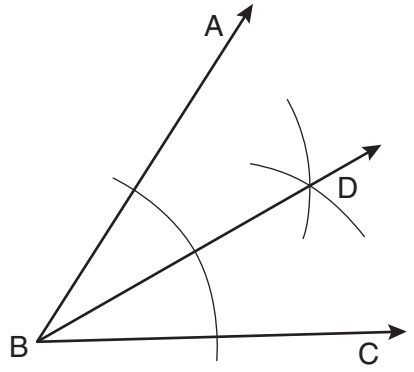

(1) same orientation; reflection

(2) opposite orientation; reflection

(3) same orientation; translation

(4) opposite orientation; translation

**4** Based on the construction below, which statement must be true?




(1) $m\angle ABD = \frac{1}{2}m\angle CBD$

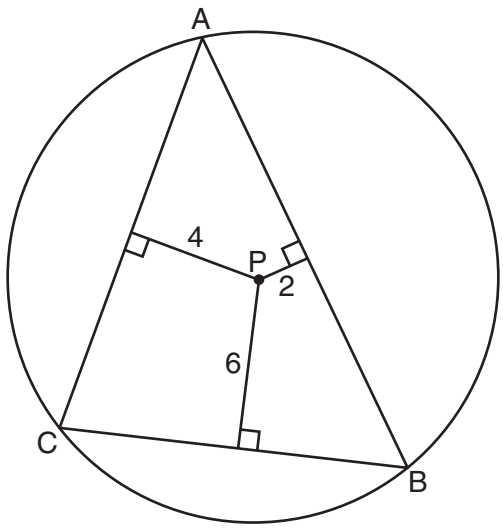
(2) $m\angle ABD = m\angle CBD$

(3) $m\angle ABD = m\angle ABC$

(4) $m\angle CBD = \frac{1}{2}m\angle ABD$

**Use this space for computations.**

**5** In the diagram below, $\triangle ABC$ is inscribed in circle $P$. The distances from the center of circle $P$ to each side of the triangle are shown.




Which statement about the sides of the triangle is true?

(1) $AB > AC > BC$

(2) $AB < AC$ and $AC > BC$

(3) $AC > AB > BC$

(4) $AC = AB$ and $AB > BC$

**6** Which transformation is *not* always an isometry?

(1) rotation

(2) dilation

(3) reflection

(4) translation

**7** In $\triangle ABC$, $\overline{AB} \cong \overline{BC}$. An altitude is drawn from $B$ to $\overline{AC}$ and intersects $\overline{AC}$ at $D$. Which statement is *not* always true?

(1) $\angle ABD \cong \angle CBD$

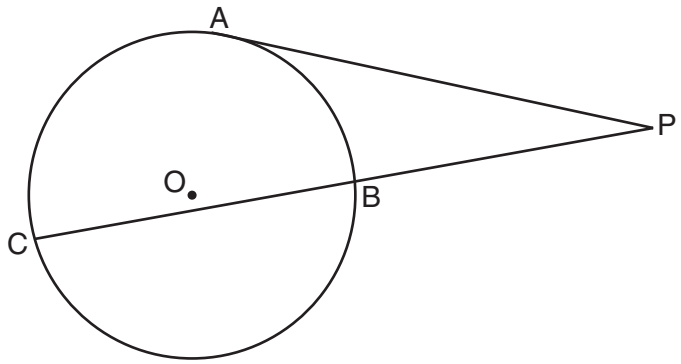
(2) $\angle BDA \cong \angle BDC$

(3) $\overline{AD} \cong \overline{BD}$

(4) $\overline{AD} \cong \overline{DC}$

**Use this space for computations.**

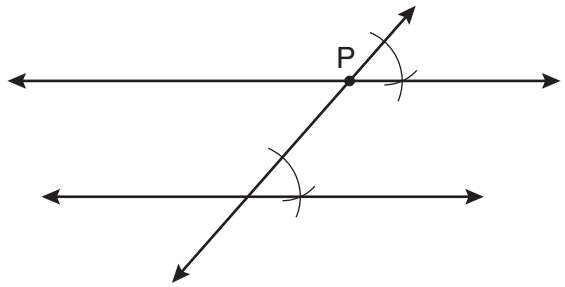
**8** In the diagram below, tangent $\overline{PA}$ and secant $\overline{PBC}$ are drawn to circle $O$ from external point $P$.




If $PB = 4$ and $BC = 5$, what is the length of $\overline{PA}$?

(1) 20
(2) 9
(3) 8
(4) 6

**9** Which geometric principle is used to justify the construction below?




(1) A line perpendicular to one of two parallel lines is perpendicular to the other.
(2) Two lines are perpendicular if they intersect to form congruent adjacent angles.
(3) When two lines are intersected by a transversal and alternate interior angles are congruent, the lines are parallel.
(4) When two lines are intersected by a transversal and the corresponding angles are congruent, the lines are parallel.

**Use this space for computations.**

**10** Which equation represents the circle whose center is $(-2,3)$ and whose radius is 5?

(1) $(x-2)^2+(y+3)^2=5$ (3) $(x+2)^2+(y-3)^2=25$

(2) $(x+2)^2+(y-3)^2=5$ (4) $(x-2)^2+(y+3)^2=25$

**11** Towns $A$ and $B$ are 16 miles apart. How many points are 10 miles from town $A$ and 12 miles from town $B$?

(1) 1 (3) 3

(2) 2 (4) 0

**12** Lines $j$ and $k$ intersect at point $P$. Line $m$ is drawn so that it is perpendicular to lines $j$ and $k$ at point $P$. Which statement is correct?

(1) Lines $j$ and $k$ are in perpendicular planes.

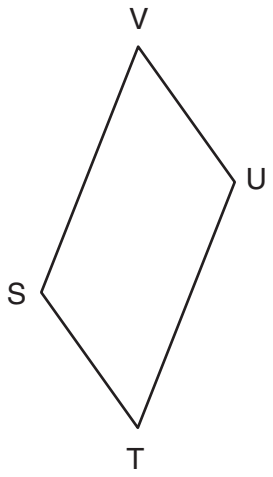
(2) Line $m$ is in the same plane as lines $j$ and $k$.

(3) Line $m$ is parallel to the plane containing lines $j$ and $k$.

(4) Line $m$ is perpendicular to the plane containing lines $j$ and $k$.

**Use this space for computations.**

**13** In the diagram below of parallelogram $STUV$, $SV = x + 3$, $VU = 2x - 1$, and $TU = 4x - 3$.




What is the length of $\overline{SV}$?

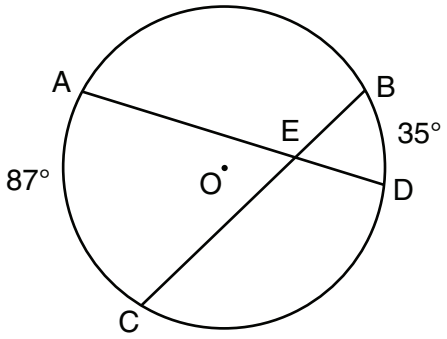
(1) 5
(2) 2
(3) 7
(4) 4

**14** Which equation represents a line parallel to the line whose equation is $2y - 5x = 10$?

(1) $5y - 2x = 25$
(2) $5y + 2x = 10$
(3) $4y - 10x = 12$
(4) $2y + 10x = 8$

**Use this space for computations.**

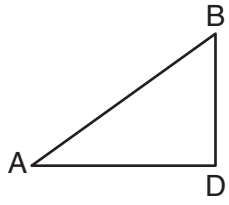
**15** In the diagram below of circle $O$, chords $\overline{AD}$ and $\overline{BC}$ intersect at $E$, $m\overset{\frown}{AC} = 87$, and $m\overset{\frown}{BD} = 35$.




What is the degree measure of $\angle CEA$?

(1) 87
(2) 61
(3) 43.5
(4) 26

**16** In the diagram below of $\triangle ADB$, $m\angle BDA = 90$, $AD = 5\sqrt{2}$, and $AB = 2\sqrt{15}$.




What is the length of $\overline{BD}$?

(1) $\sqrt{10}$
(2) $\sqrt{20}$
(3) $\sqrt{50}$
(4) $\sqrt{110}$

**Use this space for computations.**

**17** What is the distance between the points $(-3,2)$ and $(1,0)$?

(1) $2\sqrt{2}$

(2) $2\sqrt{3}$

(3) $5\sqrt{2}$

(4) $2\sqrt{5}$

**18** What is an equation of the line that contains the point $(3,-1)$ and is perpendicular to the line whose equation is $y = -3x + 2$?

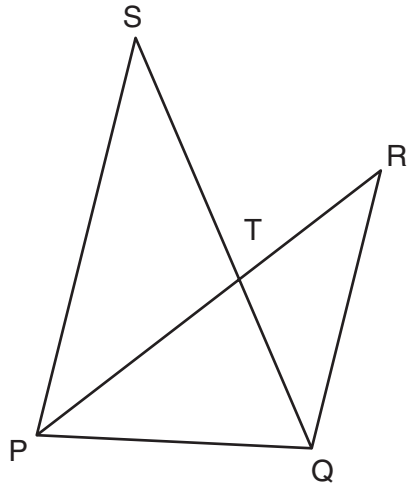
(1) $y = -3x + 8$

(2) $y = -3x$

(3) $y = \frac{1}{3}x$

(4) $y = \frac{1}{3}x - 2$

**19** In the diagram below, $\overline{SQ}$ and $\overline{PR}$ intersect at $T$, $\overline{PQ}$ is drawn, and $\overline{PS} \parallel \overline{QR}$.




Which technique can be used to prove $\triangle PST \sim \triangle RQT$?

(1) SAS

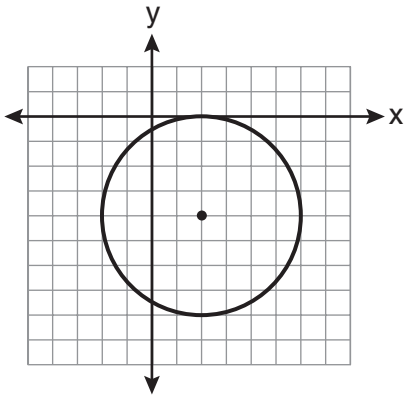
(2) SSS

(3) ASA

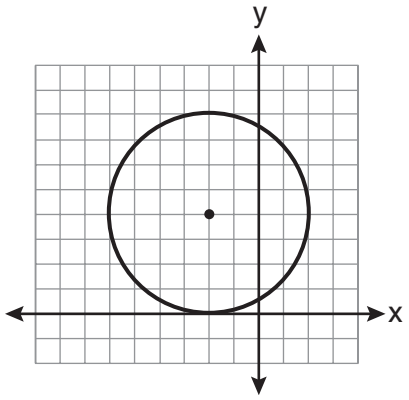
(4) AA

**Use this space for computations.**

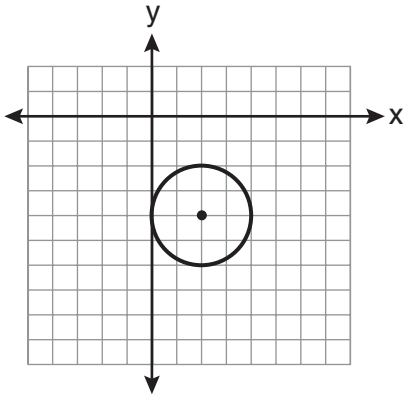
**20** The equation of a circle is $(x - 2)^2 + (y + 4)^2 = 4$. Which diagram is the graph of the circle?



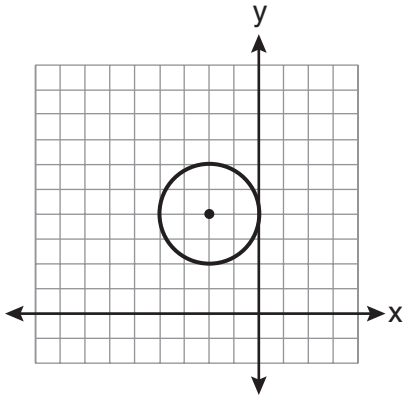

(1)




(3)



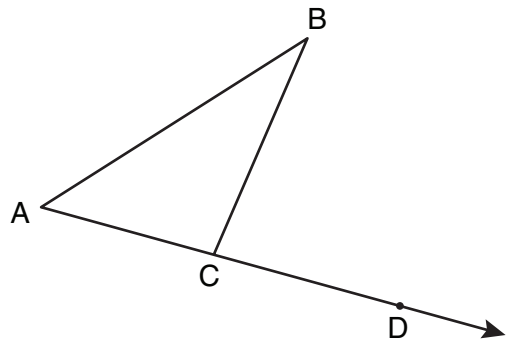

(2)




(4)

**Use this space for computations.**

**21** In the diagram below, $\triangle ABC$ is shown with $\overline{AC}$ extended through point $D$.




If $m\angle BCD = 6x + 2$, $m\angle BAC = 3x + 15$, and $m\angle ABC = 2x - 1$, what is the value of $x$?

(1) 12

(2) $14\frac{10}{11}$

(3) 16

(4) $18\frac{1}{9}$

**22** Given $\triangle ABC \sim \triangle DEF$ such that $\frac{AB}{DE} = \frac{3}{2}$. Which statement is *not* true?

(1) $\frac{BC}{EF} = \frac{3}{2}$

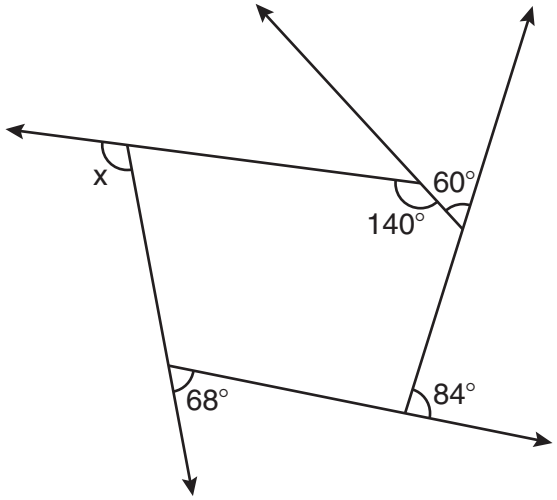
(2) $\frac{m\angle A}{m\angle D} = \frac{3}{2}$

(3) $\frac{\text{area of } \triangle ABC}{\text{area of } \triangle DEF} = \frac{9}{4}$

(4) $\frac{\text{perimeter of } \triangle ABC}{\text{perimeter of } \triangle DEF} = \frac{3}{2}$

**Use this space for computations.**

**23** The pentagon in the diagram below is formed by five rays.




What is the degree measure of angle $x$?

(1) 72
(2) 96
(3) 108
(4) 112

**24** Through a given point, $P$, on a plane, how many lines can be drawn that are perpendicular to that plane?

(1) 1
(2) 2
(3) more than 2
(4) none

**25** What is the slope of a line that is perpendicular to the line whose equation is $3x + 4y = 12$?

(1) $\frac{3}{4}$
(2) $-\frac{3}{4}$
(3) $\frac{4}{3}$
(4) $-\frac{4}{3}$

**Use this space for computations.**

**26** What is the image of point $A(4,2)$ after the composition of transformations defined by $R_{90^\circ} \circ r_{y=x}$?

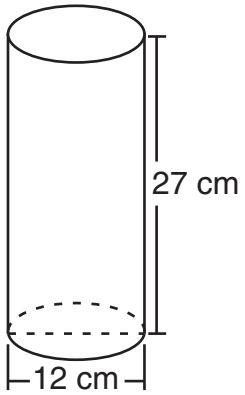
(1) $(-4,2)$

(2) $(4,-2)$

(3) $(-4,-2)$

(4) $(2,-4)$

**27** Which expression represents the volume, in cubic centimeters, of the cylinder represented in the diagram below?




(1) $162\pi$

(2) $324\pi$

(3) $972\pi$

(4) $3{,}888\pi$

**28** What is the inverse of the statement "If two triangles are not similar, their corresponding angles are not congruent"?

(1) If two triangles are similar, their corresponding angles are not congruent.

(2) If corresponding angles of two triangles are not congruent, the triangles are not similar.

(3) If two triangles are similar, their corresponding angles are congruent.

(4) If corresponding angles of two triangles are congruent, the triangles are similar.

## Part II

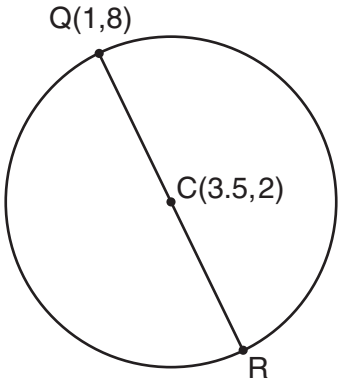
**Answer all 6 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil.** [12]

**29** In $\triangle RST$, $m\angle RST = 46$ and $\overline{RS} \cong \overline{ST}$. Find $m\angle STR$.

**30** Tim has a rectangular prism with a length of 10 centimeters, a width of 2 centimeters, and an unknown height. He needs to build another rectangular prism with a length of 5 centimeters and the same height as the original prism. The volume of the two prisms will be the same. Find the width, in centimeters, of the new prism.

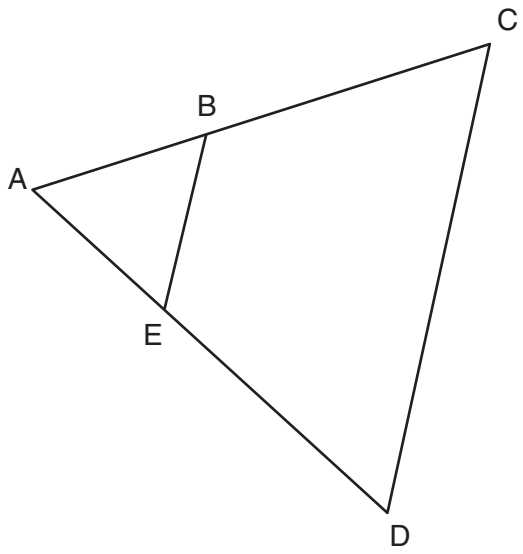
**31** In the diagram below of circle $C$, $\overline{QR}$ is a diameter, and $Q(1,8)$ and $C(3.5, 2)$ are points on a coordinate plane.

Find and state the coordinates of point $R$.

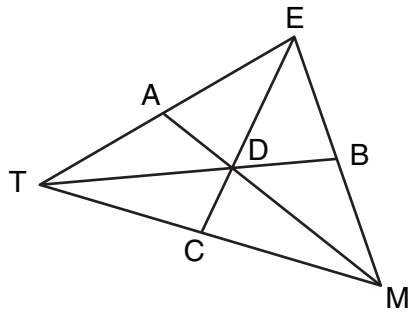


**32** Using a compass and straightedge, and $\overline{AB}$ below, construct an equilateral triangle with all sides congruent to $\overline{AB}$. [Leave all construction marks.]

**33** In the diagram below of $\triangle ACD$, $E$ is a point on $\overline{AD}$ and $B$ is a point on $\overline{AC}$, such that $\overline{EB} \parallel \overline{DC}$. If $AE = 3$, $ED = 6$, and $DC = 15$, find the length of $\overline{EB}$.



**34** In the diagram below of $\triangle TEM$, medians $\overline{TB}$, $\overline{EC}$, and $\overline{MA}$ intersect at $D$, and $TB = 9$. Find the length of $\overline{TD}$.



## Part III

**Answer all 3 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil.** [12]

**35** In $\triangle KLM$, $m\angle K = 36$ and $KM = 5$. The transformation $D_2$ is performed on $\triangle KLM$ to form $\triangle K'L'M'$.

Find $m\angle K'$. Justify your answer.

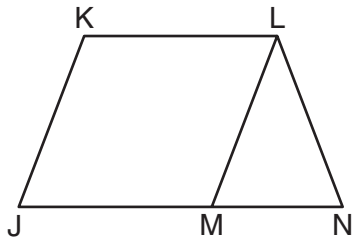
Find the length of $\overline{K'M'}$. Justify your answer.

**36** Given: $JKLM$ is a parallelogram.

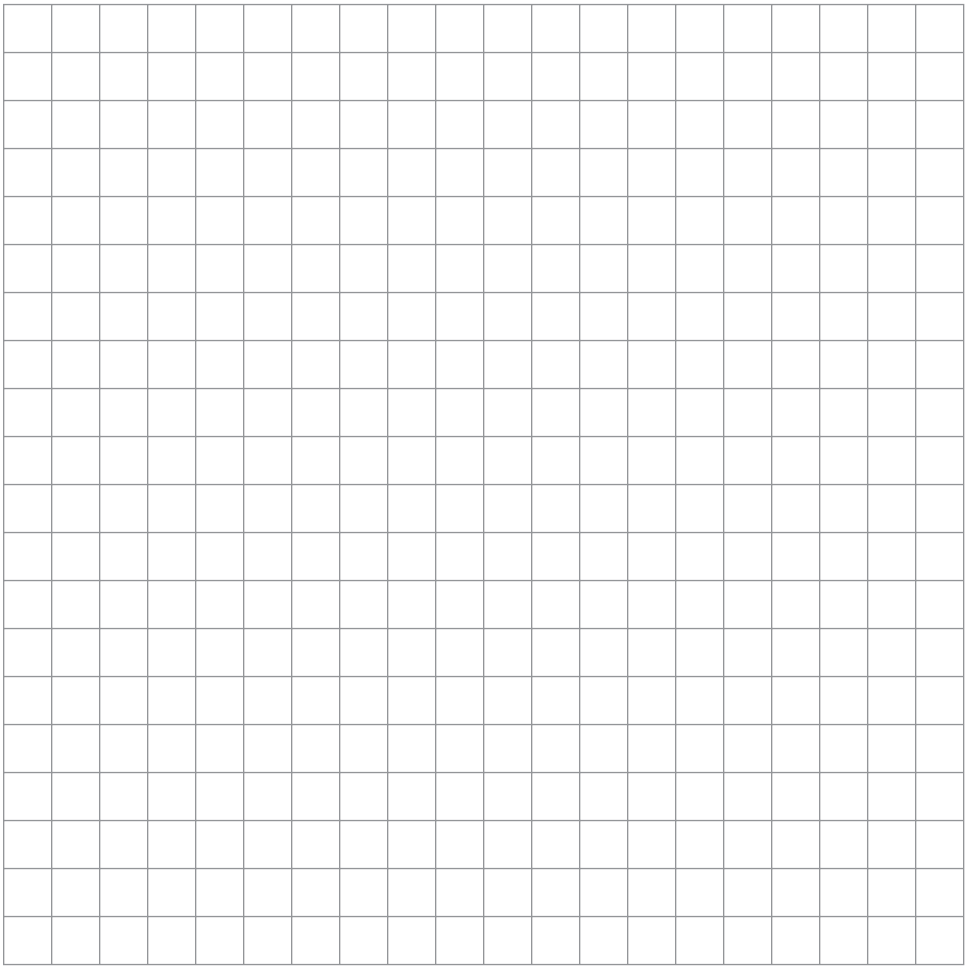
$\overline{JM} \cong \overline{LN}$

$\angle LMN \cong \angle LNM$

Prove: $JKLM$ is a rhombus.



**37** On the grid below, graph the points that are equidistant from both the $x$ and $y$ axes and the points that are 5 units from the origin. Label with an **X** all points that satisfy both conditions.



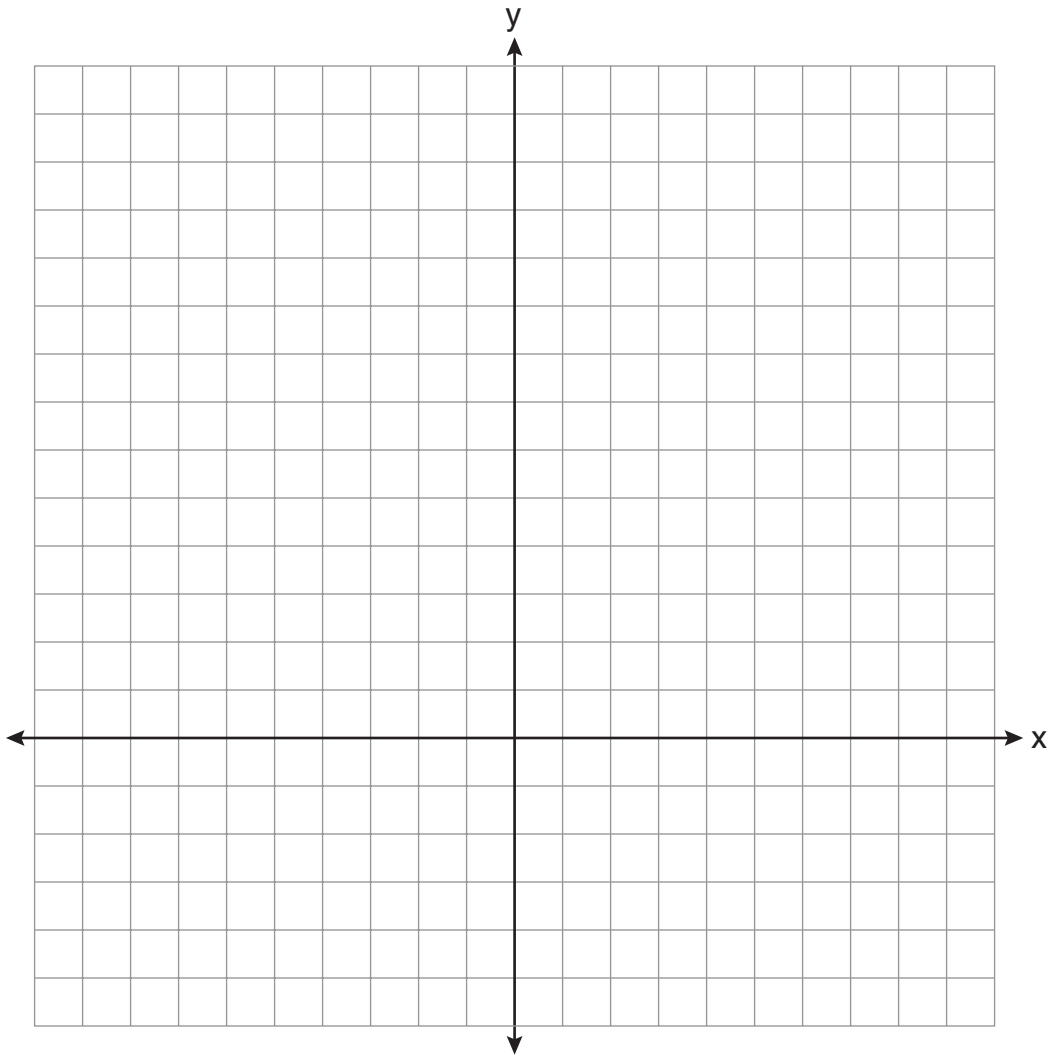
## Part IV

**Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. A correct numerical answer with no work shown will receive only 1 credit. The answer should be written in pen.** [6]

**38** On the set of axes below, solve the following system of equations graphically for all values of $x$ and $y$.

$$y = (x - 2)^2 + 4$$

$$4x + 2y = 14$$



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# Reference Sheet

| | | |
|---|---|---|
| Volume | Cylinder | $V = Bh$<br>where $B$ is the area of the base |
| | Pyramid | $V = \frac{1}{3}Bh$<br>where $B$ is the area of the base |
| | Right Circular Cone | $V = \frac{1}{3}Bh$<br>where $B$ is the area of the base |
| | Sphere | $V = \frac{4}{3}\pi r^3$ |

| | | |
|---|---|---|
| Lateral Area ($L$) | Right Circular Cylinder | $L = 2\pi rh$ |
| | Right Circular Cone | $L = \pi rl$<br>where $l$ is the slant height |

| | | |
|---|---|---|
| Surface Area | Sphere | $SA = 4\pi r^2$ |

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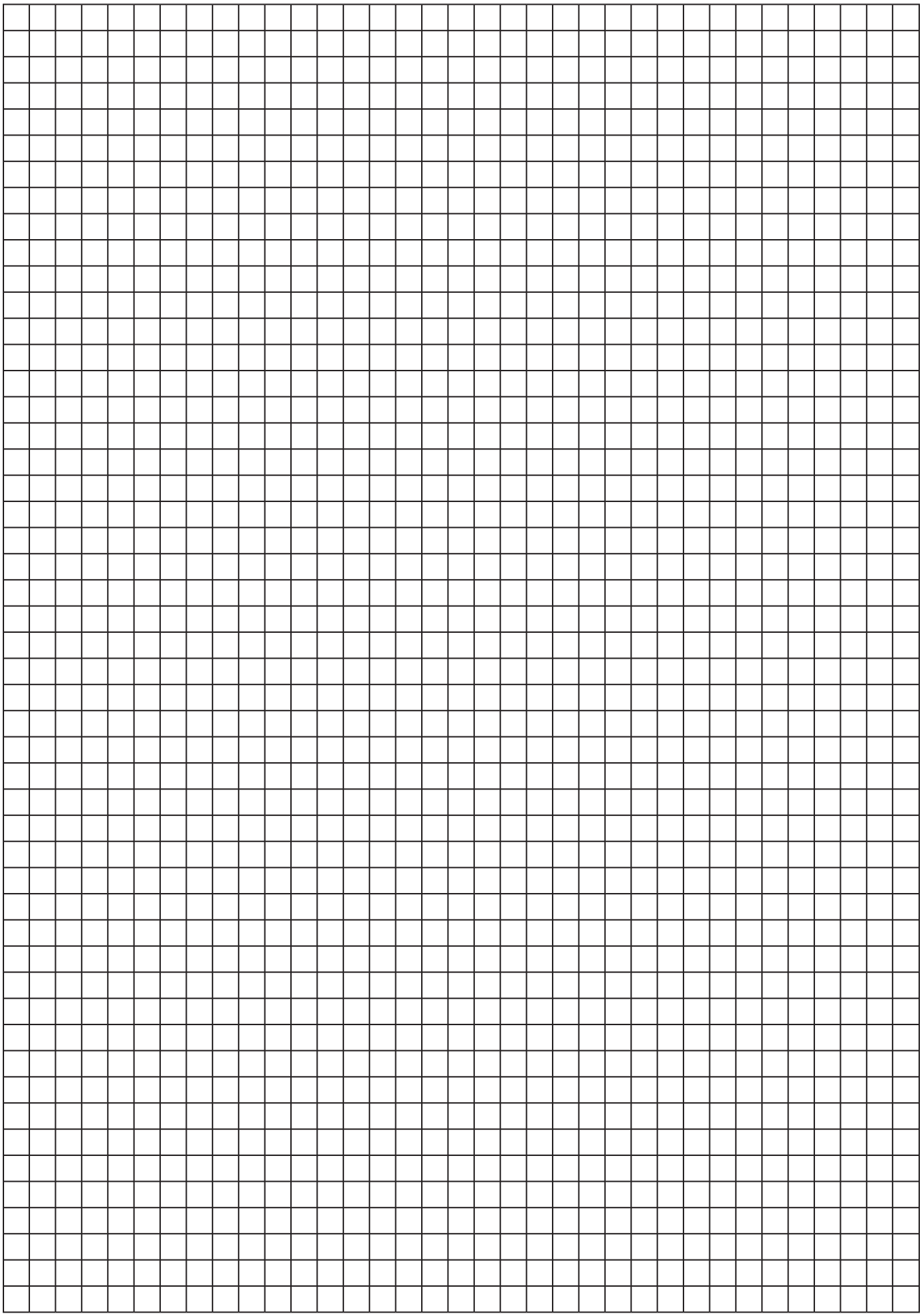
**Scrap Graph Paper — This sheet will *not* be scored.**



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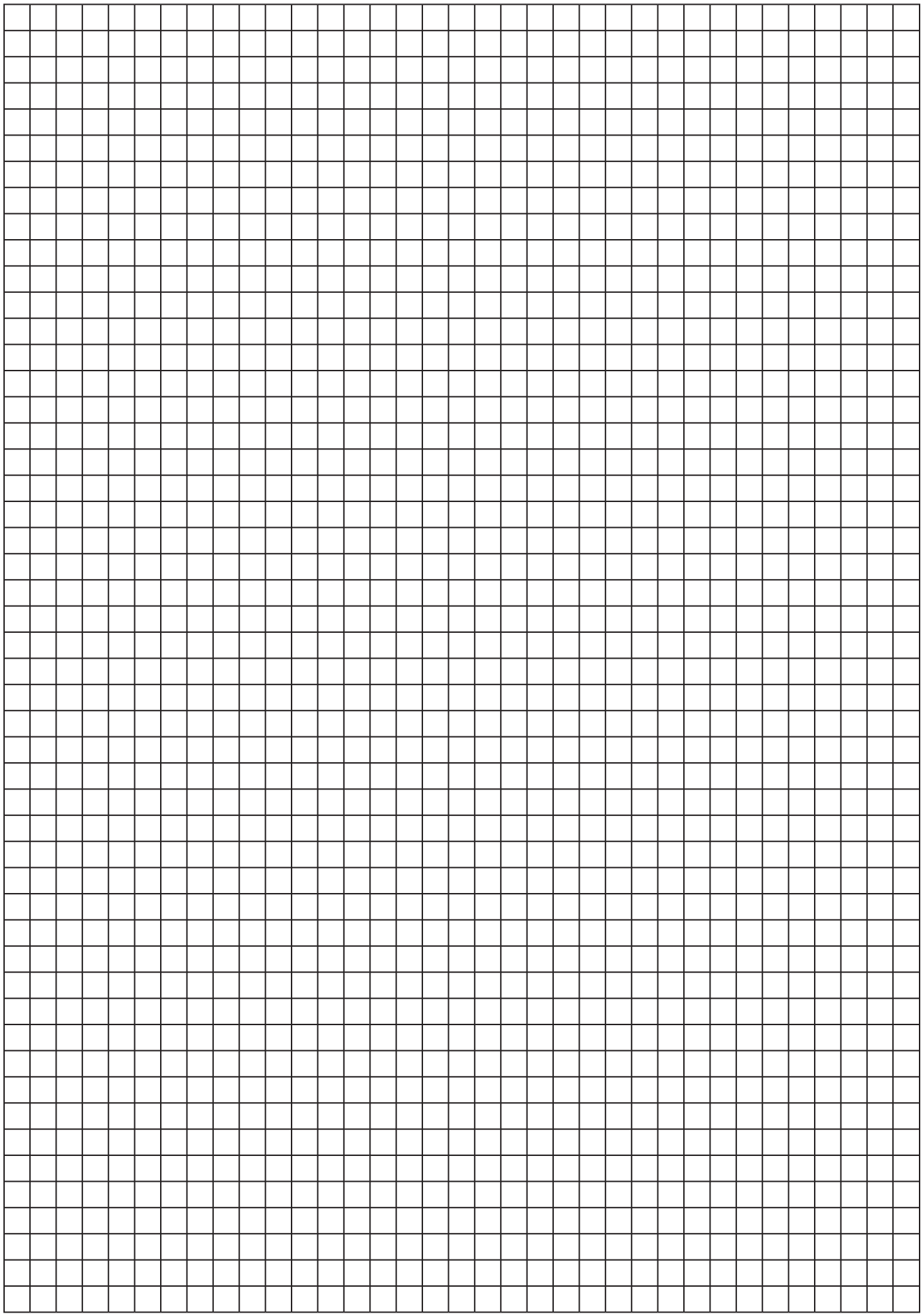

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**The University of the State of New York**

**REGENTS HIGH SCHOOL EXAMINATION**

# GEOMETRY

**Thursday,** January 28, 2010—9:15 a.m. to 12:15 p.m., only

## ANSWER SHEET

**Student** . . . . . **Sex:** ❑ **Male** ❑ **Female** **Grade** . . . . . .

**Teacher** . . . . . **School** . . . . . .

**Your answers to Part I should be recorded on this answer sheet.**

**Part I**

**Answer all 28 questions in this part.**

| | | | |
|---|---|---|---|
| 1 . . . . . | 8 . . . . . | 15 . . . . . | 22 . . . . . |
| 2 . . . . . | 9 . . . . . | 16 . . . . . | 23 . . . . . |
| 3 . . . . . | 10 . . . . . | 17 . . . . . | 24 . . . . . |
| 4 . . . . . | 11 . . . . . | 18 . . . . . | 25 . . . . . |
| 5 . . . . . | 12 . . . . . | 19 . . . . . | 26 . . . . . |
| 6 . . . . . | 13 . . . . . | 20 . . . . . | 27 . . . . . |
| 7 . . . . . | 14 . . . . . | 21 . . . . . | 28 . . . . . |

**Your answers for Parts II, III, and IV should be written in the test booklet.**

**The declaration below must be signed when you have completed the examination.**

**I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination and that I have neither given nor received assistance in answering any of the questions during the examination.**

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**Signature**

| GEOMETRY | | | |
|---|---|---|---|
| **Question** | **Maximum Credit** | **Credits Earned** | **Rater's/Scorer's Initials** |
| **Part I 1–28** | **56** | | |
| **Part II 29** | **2** | | |
| **30** | **2** | | |
| **31** | **2** | | |
| **32** | **2** | | |
| **33** | **2** | | |
| **34** | **2** | | |
| **Part III 35** | **4** | | |
| **36** | **4** | | |
| **37** | **4** | | |
| **Part IV 38** | **6** | | |
| **Maximum Total** | **86** | | |

| **Rater's/Scorer's Name** (minimum of three) |
|---|
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**Total Raw Score** | **Checked by** | **Scaled Score** (from conversion chart)

Tear Here

Tear Here

# FOR TEACHERS ONLY

**The University of the State of New York**

**REGENTS HIGH SCHOOL EXAMINATION**

# GEOMETRY

**Thursday,** January 28, 2010 — 9:15 a.m. to 12:15 p.m., only

# SCORING KEY AND RATING GUIDE

### Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Regents Examination in Geometry. More detailed information about scoring is provided in the publication *Information Booklet for Scoring the Regents Examinations in Integrated Algebra and Geometry*.

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 check marks 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 that will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Thursday, January 28, 2010. 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 56 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) 2 | (8) 4 | (15) 2 | (22) 2 |
| (2) 1 | (9) 4 | (16) 1 | (23) 3 |
| (3) 2 | (10) 3 | (17) 4 | (24) 1 |
| (4) 2 | (11) 2 | (18) 4 | (25) 3 |
| (5) 1 | (12) 4 | (19) 4 | (26) 1 |
| (6) 2 | (13) 1 | (20) 2 | (27) 3 |
| (7) 3 | (14) 3 | (21) 1 | (28) 3 |

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site http://www.emsc.nysed.gov/osa/ and select the link "Examination Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents examination period.

**General Rules for Applying Mathematics Rubrics**

**I. General Principles for Rating**

The rubrics for the constructed-response questions on the Regents Examinations in Geometry are designed to provide a systematic, consistent method for awarding credit. The rubrics are not to be considered all-inclusive; it is impossible to anticipate all the different methods that students might use to solve a given problem. Each response must be rated carefully using the teacher's professional judgment and knowledge of mathematics; all calculations must be checked. The specific rubrics for each question must be applied consistently to all responses. In cases that are not specifically addressed in the rubrics, raters must follow the general rating guidelines in the publication *Information Booklet for Scoring the Regents Examinations in Integrated Algebra and Geometry*, use their own professional judgment, confer with other mathematics teachers, and/or contact the State Education Department for guidance. During each Regents examination administration period, rating questions may be referred directly to the Education Department. The contact numbers are sent to all schools before each administration period.

**II. Full-Credit Responses**

A full-credit response provides a complete and correct answer to all parts of the question. Sufficient work is shown to enable the rater to determine how the student arrived at the correct answer.

When the rubric for the full-credit response includes one or more examples of an acceptable method for solving the question (usually introduced by the phrase "such as"), it does not mean that there are no additional acceptable methods of arriving at the correct answer. Unless otherwise specified, mathematically correct alternative solutions should be awarded credit. The only exceptions are those questions that specify the type of solution that must be used; e.g., an algebraic solution or a graphic solution. A correct solution using a method other than the one specified is awarded half the credit of a correct solution using the specified method.

**III. Appropriate Work**

*Full-Credit Responses:* The directions in the examination booklet for all the constructed-response questions state: "Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc." The student has the responsibility of providing the correct answer ***and*** showing how that answer was obtained. The student must "construct" the response; the teacher should not have to search through a group of seemingly random calculations scribbled on the student paper to ascertain what method the student may have used.

*Responses With Errors:* Rubrics that state "Appropriate work is shown, but …" are intended to be used with solutions that show an essentially complete response to the question but contain certain types of errors, whether computational, rounding, graphing, or conceptual. If the response is incomplete; i.e., an equation is written but not solved or an equation is solved but not all of the parts of the question are answered, appropriate work has ***not*** been shown. Other rubrics address incomplete responses.

**IV. Multiple Errors**

*Computational Errors, Graphing Errors, and Rounding Errors:* Each of these types of errors results in a 1-credit deduction. Any combination of two of these types of errors results in a 2-credit deduction. No more than 2 credits should be deducted for such mechanical errors in any response. The teacher must carefully review the student's work to determine what errors were made and what type of errors they were.

*Conceptual Errors:* A conceptual error involves a more serious lack of knowledge or procedure. Examples of conceptual errors include using the incorrect formula for the area of a figure, choosing the incorrect trigonometric function, or multiplying the exponents instead of adding them when multiplying terms with exponents. A response with one conceptual error can receive no more than half credit.

If a response shows repeated occurrences of the same conceptual error, the student should not be penalized twice. If the same conceptual error is repeated in responses to other questions, credit should be deducted in each response.

If a response shows two (or more) different major conceptual errors, it should be considered completely incorrect and receive no credit.

If a response shows one conceptual error and one computational, graphing, or rounding error, the teacher must award credit that takes into account both errors; i.e., awarding half credit for the conceptual error and deducting 1 credit for each mechanical error (maximum of two deductions for mechanical errors).

## Part II

For each question, use the specific criteria to award a maximum of two credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(29) **[2]** 67, and appropriate work is shown.

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

***or***

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

***or***

**[1]** 67, 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) **[2]** 4, and appropriate work is shown.

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

***or***

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

***or***

**[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.

(31) **[2]** (6,– 4), and appropriate work is shown.

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

***or***

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

***or***

**[1]** Appropriate work is shown, but the answer is expressed as $x = 6$ and $y = -4$.

***or***

**[1]** (6,– 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.

(32) **[2]** A correct construction is drawn showing all appropriate arcs, and the congruent line segments are drawn.

**[1]** All construction arcs are drawn, but the congruent line segments are not drawn.

**[0]** A drawing that is not an appropriate construction 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.

(33) **[2]** 5, and appropriate work is shown.

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

***or***

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

***or***

**[1]** A correct proportion is written, but no further correct work is shown.

***or***

**[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.

(34) **[2]** 6, and appropriate work is shown.

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

***or***

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

***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.

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## Part III

For each question, use the specific criteria to award a maximum of four credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(35) **[4]** 36 and 10, and appropriate justifications are written.

**[3]** 36 and 10, but only one appropriate justification is written.

**[2]** 36 and 10, but both justifications are incorrect.

***or***

**[2]** 36 or 10, and an appropriate justification is written.

**[1]** 36 and 10, but no justifications are written.

**[0]** 36 or 10, but no justification is written.

***or***

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

(36) **[4]** A complete and correct proof that includes a concluding statement is written.

**[3]** A proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one statement or reason is missing or is incorrect or no concluding statement is written.

***or***

**[3]** $\overline{JM} \cong \overline{LM}$ is proven, but no conclusion is written.

**[2]** A proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but two statements or reasons are missing or are incorrect.

***or***

**[2]** A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

**[1]** Some correct relevant statements about the proof are made, but three or more of the statements or reasons are missing or are incorrect.

**[0]** The "given" and/or the "prove" statements are rewritten in the style of a formal proof, but no further correct relevant statements are written.

***or***

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

(37) **[4]** Both loci are graphed correctly, and the four points of intersection are labeled with an **X**.

**[3]** Both loci are graphed correctly, but only two or three points of intersection are labeled.

***or***

**[3]** Both loci are graphed, but one graphing error is made, but appropriate points of intersection are labeled.

**[2]** Both loci are graphed correctly, but the points of intersection are not labeled or are labeled incorrectly.

***or***

**[2]** Both loci are graphed, but two or more graphing errors are made, but appropriate points of intersection are labeled.

***or***

**[2]** Both loci are graphed, but one conceptual error is made, but appropriate points of intersection are labeled.

**[1]** One locus is graphed correctly, but no further correct 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 IV

For this question, use the specific criteria to award a maximum of six credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(38) **[6]** Both equations are graphed correctly, and (1,5) is stated.

**[5]** Appropriate work is shown, but one computational or graphing error is made, but an appropriate solution is stated.

**[4]** Appropriate work is shown, but two or more computational or graphing errors are made, but an appropriate solution is stated.

***or***

**[4]** Both equations are graphed correctly, but the solution is not stated or is stated incorrectly.

**[3]** Appropriate work is shown, but one conceptual error is made, but an appropriate solution is stated.

***or***

**[3]** (1,5) is stated, but a method other than graphing is used.

**[2]** Appropriate work is shown, but one conceptual error and one computational or graphing error are made, but an appropriate solution is stated.

***or***

**[2]** Only the parabola is graphed correctly.

**[1]** Appropriate work is shown, but one conceptual error and two or more computational or graphing errors are made, but an appropriate solution is stated.

***or***

**[1]** Only the line is graphed correctly.

***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.

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## Map to Core Curriculum

| Content Band | Item Numbers |
|---|---|
| Geometric Relationships | 12, 24, 27, 30 |
| Constructions | 4, 9, 32 |
| Locus | 11, 37 |
| Informal and Formal Proofs | 1, 2, 5, 7, 8, 13, 15, 16, 19, 21, 22, 23, 28, 29, 33, 34, 36 |
| Transformational Geometry | 3, 6, 26, 35 |
| Coordinate Geometry | 10, 14, 17, 18, 20, 25, 31, 38 |

## Regents Examination in Geometry

## January 2010

## Chart for Converting Total Test Raw Scores to Final Examination Scores (Scaled Scores)

**The *Chart for Determining the Final Examination Score for the January 2010 Regents Examination in Geometry* will be posted on the Department's web site http://www.emsc.nysed.gov/osa/ on Thursday, January 28, 2010. Conversion charts provided for previous administrations of the Geometry examination must NOT be used to determine students' final scores for this administration.**

## Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to www.emsc.nysed.gov/osa/exameval.
2. Select the test title.
3. Complete the required demographic fields.
4. Complete each evaluation question and provide comments in the space provided.
5. Click the SUBMIT button at the bottom of the page to submit the completed form.

University of the State of New York
State Education Department

# Regents Examination in Geometry
## January 2010

### Chart for Converting Total Test Raw Scores to Final Examination Scores (Scale Scores)

| Raw Score | Scale Score | Raw Score | Scale Score | Raw Score | Scale Score | Raw Score | Scale Score |
|---|---|---|---|---|---|---|---|
| 86 | 100 | 64 | 81 | 42 | 67 | 20 | 42 |
| 85 | 99 | 63 | 80 | 41 | 66 | 19 | 41 |
| 84 | 98 | 62 | 80 | 40 | 65 | 18 | 39 |
| 83 | 96 | 61 | 79 | 39 | 64 | 17 | 37 |
| 82 | 95 | 60 | 79 | 38 | 63 | 16 | 35 |
| 81 | 94 | 59 | 78 | 37 | 62 | 15 | 34 |
| 80 | 93 | 58 | 77 | 36 | 62 | 14 | 32 |
| 79 | 92 | 57 | 77 | 35 | 61 | 13 | 30 |
| 78 | 91 | 56 | 76 | 34 | 60 | 12 | 28 |
| 77 | 90 | 55 | 75 | 33 | 59 | 11 | 25 |
| 76 | 89 | 54 | 75 | 32 | 58 | 10 | 23 |
| 75 | 88 | 53 | 74 | 31 | 57 | 9 | 21 |
| 74 | 88 | 52 | 73 | 30 | 55 | 8 | 19 |
| 73 | 87 | 51 | 73 | 29 | 54 | 7 | 17 |
| 72 | 86 | 50 | 72 | 28 | 53 | 6 | 14 |
| 71 | 86 | 49 | 72 | 27 | 52 | 5 | 12 |
| 70 | 85 | 48 | 71 | 26 | 51 | 4 | 10 |
| 69 | 84 | 47 | 70 | 25 | 49 | 3 | 7 |
| 68 | 84 | 46 | 69 | 24 | 48 | 2 | 5 |
| 67 | 83 | 45 | 69 | 23 | 47 | 1 | 2 |
| 66 | 82 | 44 | 68 | 22 | 45 | 0 | 0 |
| 65 | 82 | 43 | 67 | 21 | 44 | | |

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 scale score that corresponds to that raw score. The scale score is the student's final examination score. Enter this score in the space labeled "Scale Score" on the student's answer sheet.

All student answer papers that receive a scale score of 60 through 64 **must** be scored a second time to ensure the accuracy of the score. 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.

Because scale scores corresponding to raw scores in the conversion chart change from one examination to another, it is crucial that for each administration, the conversion chart provided for that administration be used to determine the student's final score. The chart above is usable only for this administration of the Regents Examination in Geometry.