

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

# GEOMETRY

Thursday, August 13, 2009—8:30 to 11:30 a.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.

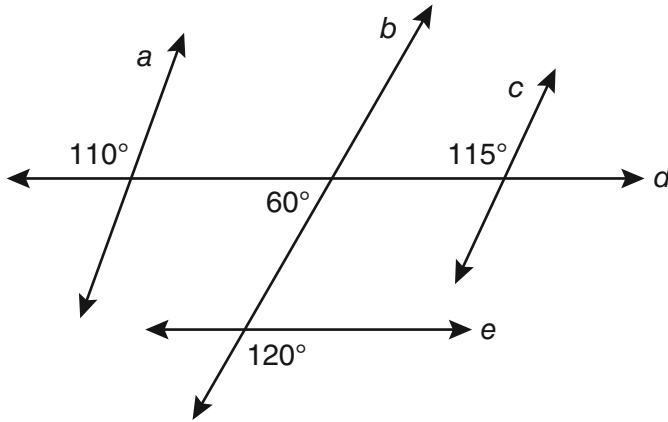
**DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.**

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]

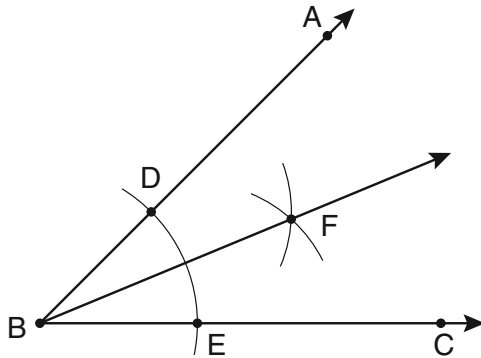
Use this space for computations.

1 Based on the diagram below, which statement is true?



- (1)  $a \parallel b$
- (2)  $a \parallel c$
- (3)  $b \parallel c$
- (4)  $d \parallel e$

2 The diagram below shows the construction of the bisector of  $\angle ABC$ .

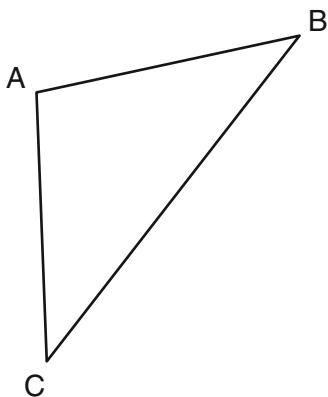


Which statement is *not* true?

- (1)  $m\angle EBF = \frac{1}{2} m\angle ABC$
- (2)  $m\angle DBF = \frac{1}{2} m\angle ABC$
- (3)  $m\angle EBF = m\angle ABC$
- (4)  $m\angle DBF = m\angle EBF$

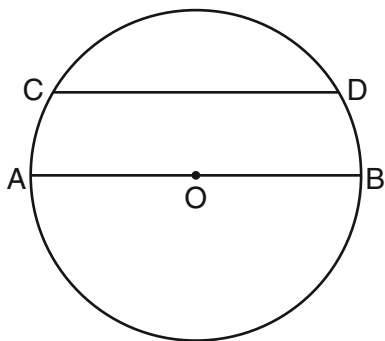
Use this space for  
computations.

- 3 In the diagram of  $\triangle ABC$  below,  $\overline{AB} \cong \overline{AC}$ . The measure of  $\angle B$  is  $40^\circ$ .



What is the measure of  $\angle A$ ?

- (1)  $40^\circ$  (3)  $70^\circ$   
(2)  $50^\circ$  (4)  $100^\circ$
- 4 In the diagram of circle  $O$  below, chord  $\overline{CD}$  is parallel to diameter  $\overline{AOB}$  and  $m\widehat{AC} = 30$ .

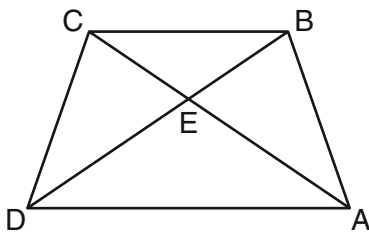


What is  $m\widehat{CD}$ ?

- (1) 150 (3) 100  
(2) 120 (4) 60

Use this space for computations.

- 5 In the diagram of trapezoid  $ABCD$  below, diagonals  $\overline{AC}$  and  $\overline{BD}$  intersect at  $E$  and  $\triangle ABC \cong \triangle DCB$ .

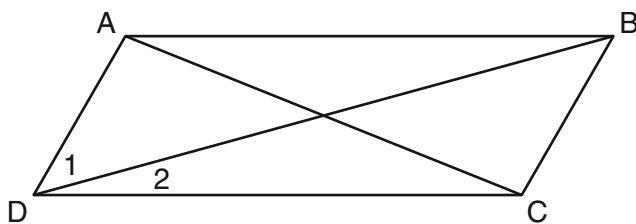


Which statement is true based on the given information?

- (1)  $\overline{AC} \cong \overline{BC}$                       (3)  $\angle CDE \cong \angle BAD$   
(2)  $\overline{CD} \cong \overline{AD}$                       (4)  $\angle CDB \cong \angle BAC$
- 6 Which transformation produces a figure similar but *not* congruent to the original figure?

- (1)  $T_{1,3}$                                       (3)  $R_{90^\circ}$   
(2)  $D_{\frac{1}{2}}$                                       (4)  $r_{y=x}$

- 7 In the diagram below of parallelogram  $ABCD$  with diagonals  $\overline{AC}$  and  $\overline{BD}$ ,  $m\angle 1 = 45$  and  $m\angle DCB = 120$ .

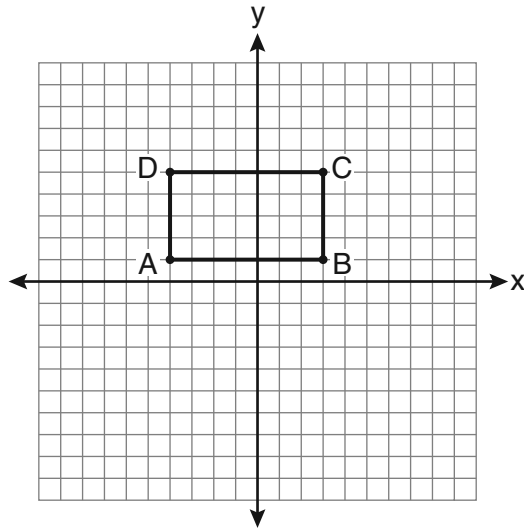


What is the measure of  $\angle 2$ ?

- (1)  $15^\circ$                                       (3)  $45^\circ$   
(2)  $30^\circ$                                       (4)  $60^\circ$

Use this space for  
computations.

- 8 On the set of axes below, Geoff drew rectangle  $ABCD$ . He will transform the rectangle by using the translation  $(x,y) \rightarrow (x + 2, y + 1)$  and then will reflect the translated rectangle over the  $x$ -axis.



What will be the area of the rectangle after these transformations?

- (1) exactly 28 square units
  - (2) less than 28 square units
  - (3) greater than 28 square units
  - (4) It cannot be determined from the information given.
- 9 What is the equation of a line that is parallel to the line whose equation is  $y = x + 2$ ?
- (1)  $x + y = 5$
  - (2)  $2x + y = -2$
  - (3)  $y - x = -1$
  - (4)  $y - 2x = 3$
- 10 The endpoints of  $\overline{CD}$  are  $C(-2, -4)$  and  $D(6, 2)$ . What are the coordinates of the midpoint of  $\overline{CD}$ ?
- (1)  $(2, 3)$
  - (2)  $(2, -1)$
  - (3)  $(4, -2)$
  - (4)  $(4, 3)$

**Use this space for  
computations.**

**11** What are the center and the radius of the circle whose equation is  $(x - 3)^2 + (y + 3)^2 = 36$ ?

- (1) center =  $(3, -3)$ ; radius = 6
- (2) center =  $(-3, 3)$ ; radius = 6
- (3) center =  $(3, -3)$ ; radius = 36
- (4) center =  $(-3, 3)$ ; radius = 36

**12** Given the equations:

$$y = x^2 - 6x + 10$$

$$y + x = 4$$

What is the solution to the given system of equations?

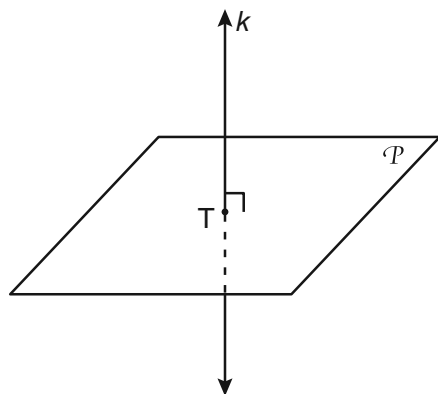
- (1)  $(2, 3)$
- (2)  $(3, 2)$
- (3)  $(2, 2)$  and  $(1, 3)$
- (4)  $(2, 2)$  and  $(3, 1)$

**13** The diagonal  $\overline{AC}$  is drawn in parallelogram  $ABCD$ . Which method can *not* be used to prove that  $\triangle ABC \cong \triangle CDA$ ?

- (1) SSS
- (2) SAS
- (3) SSA
- (4) ASA

Use this space for  
computations.

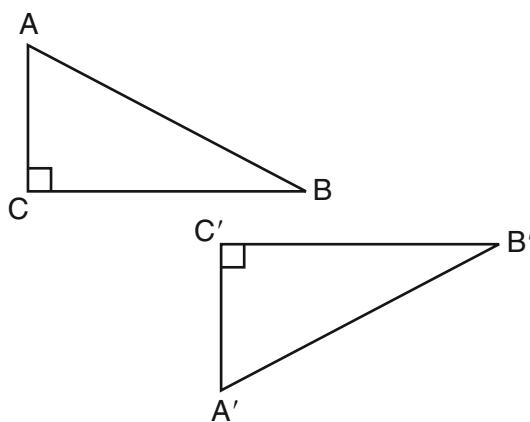
14 In the diagram below, line  $k$  is perpendicular to plane  $\mathcal{P}$  at point  $T$ .



Which statement is true?

- (1) Any point in plane  $\mathcal{P}$  also will be on line  $k$ .
- (2) Only one line in plane  $\mathcal{P}$  will intersect line  $k$ .
- (3) All planes that intersect plane  $\mathcal{P}$  will pass through  $T$ .
- (4) Any plane containing line  $k$  is perpendicular to plane  $\mathcal{P}$ .

15 In the diagram below, which transformation was used to map  $\triangle ABC$  to  $\triangle A'B'C'$ ?



- (1) dilation
- (2) rotation
- (3) reflection
- (4) glide reflection

**Use this space for  
computations.**

**16** Which set of numbers represents the lengths of the sides of a triangle?

- (1) {5, 18, 13}                      (3) {16, 24, 7}  
(2) {6, 17, 22}                      (4) {26, 8, 15}

**17** What is the slope of a line perpendicular to the line whose equation is  $y = -\frac{2}{3}x - 5$ ?

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

**18** A quadrilateral whose diagonals bisect each other and are perpendicular is a

- (1) rhombus                              (3) trapezoid  
(2) rectangle                            (4) parallelogram

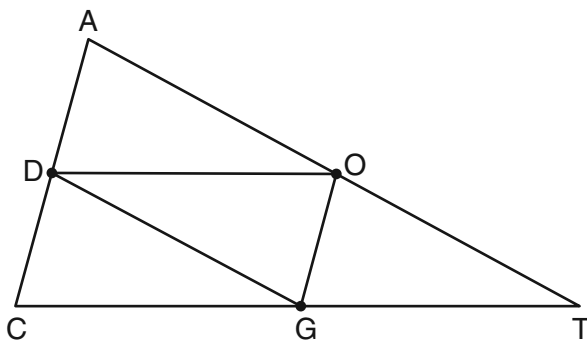
**19** If the endpoints of  $\overline{AB}$  are  $A(-4,5)$  and  $B(2,-5)$ , what is the length of  $\overline{AB}$ ?

- (1)  $2\sqrt{34}$                               (3)  $\sqrt{61}$   
(2) 2                                        (4) 8



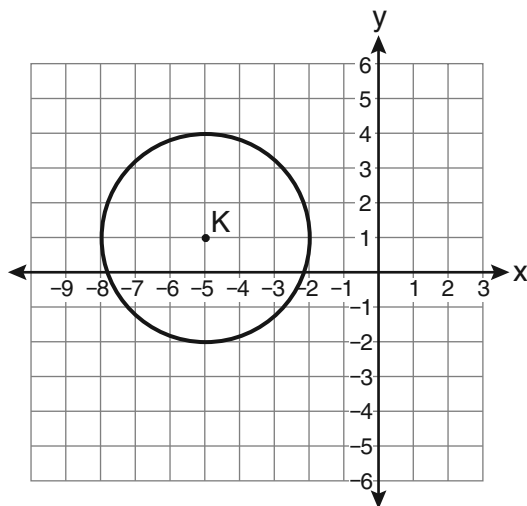
Use this space for  
computations.

- 20 In the diagram below of  $\triangle ACT$ ,  $D$  is the midpoint of  $\overline{AC}$ ,  $O$  is the midpoint of  $\overline{AT}$ , and  $G$  is the midpoint of  $\overline{CT}$ .



If  $AC = 10$ ,  $AT = 18$ , and  $CT = 22$ , what is the perimeter of parallelogram  $CDOG$ ?

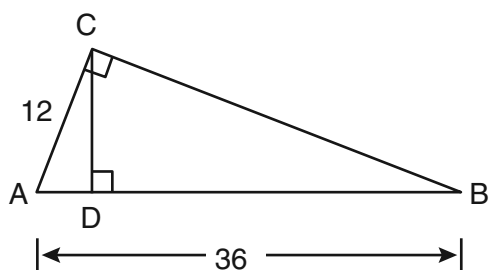
- (1) 21  
(2) 25  
(3) 32  
(4) 40
- 21 Which equation represents circle  $K$  shown in the graph below?



- (1)  $(x + 5)^2 + (y - 1)^2 = 3$     (3)  $(x - 5)^2 + (y + 1)^2 = 3$   
(2)  $(x + 5)^2 + (y - 1)^2 = 9$     (4)  $(x - 5)^2 + (y + 1)^2 = 9$

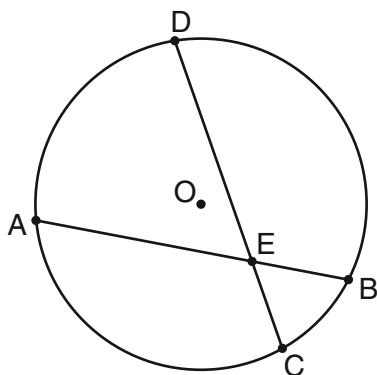
Use this space for computations.

- 22 In the diagram below of right triangle  $ACB$ , altitude  $\overline{CD}$  is drawn to hypotenuse  $\overline{AB}$ .



If  $AB = 36$  and  $AC = 12$ , what is the length of  $\overline{AD}$ ?

- (1) 32  
(2) 6  
(3) 3  
(4) 4
- 23 In the diagram of circle  $O$  below, chord  $\overline{AB}$  intersects chord  $\overline{CD}$  at  $E$ ,  $DE = 2x + 8$ ,  $EC = 3$ ,  $AE = 4x - 3$ , and  $EB = 4$ .

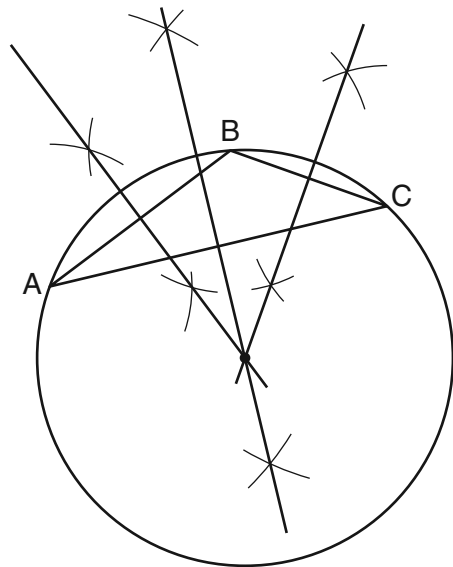


What is the value of  $x$ ?

- (1) 1  
(2) 3.6  
(3) 5  
(4) 10.25
- 24 What is the negation of the statement “Squares are parallelograms”?
- (1) Parallelograms are squares.  
(2) Parallelograms are not squares.  
(3) It is not the case that squares are parallelograms.  
(4) It is not the case that parallelograms are squares.

Use this space for  
computations.

- 25 The diagram below shows the construction of the center of the circle circumscribed about  $\triangle ABC$ .

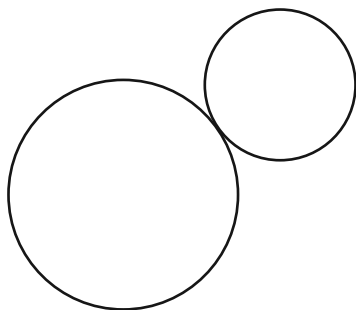


This construction represents how to find the intersection of

- (1) the angle bisectors of  $\triangle ABC$
  - (2) the medians to the sides of  $\triangle ABC$
  - (3) the altitudes to the sides of  $\triangle ABC$
  - (4) the perpendicular bisectors of the sides of  $\triangle ABC$
- 26 A right circular cylinder has a volume of 1,000 cubic inches and a height of 8 inches. What is the radius of the cylinder to the *nearest tenth of an inch*?
- |          |          |
|----------|----------|
| (1) 6.3  | (3) 19.8 |
| (2) 11.2 | (4) 39.8 |
- 27 If two different lines are perpendicular to the same plane, they are
- |               |                 |
|---------------|-----------------|
| (1) collinear | (3) congruent   |
| (2) coplanar  | (4) consecutive |

**Use this space for  
computations.**

**28** How many common tangent lines can be drawn to the two externally tangent circles shown below?



(1) 1

(3) 3

(2) 2

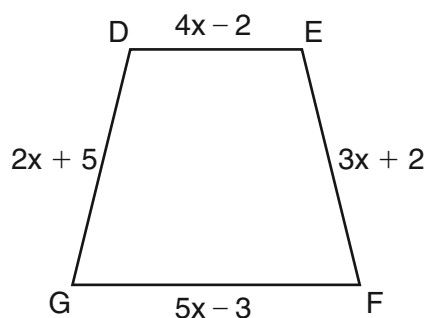
(4) 4



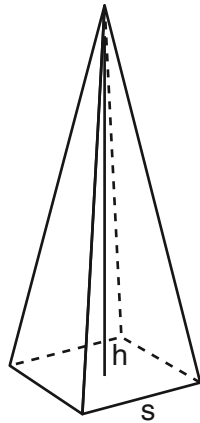
## Part II

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 the diagram below of isosceles trapezoid  $DEFG$ ,  $\overline{DE} \parallel \overline{GF}$ ,  $DE = 4x - 2$ ,  $EF = 3x + 2$ ,  $FG = 5x - 3$ , and  $GD = 2x + 5$ . Find the value of  $x$ .



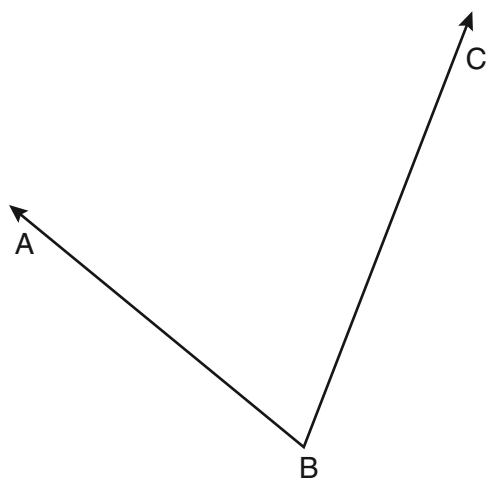
**30** A regular pyramid with a square base is shown in the diagram below.



A side,  $s$ , of the base of the pyramid is 12 meters, and the height,  $h$ , is 42 meters. What is the volume of the pyramid in cubic meters?

**31** Write an equation of the line that passes through the point  $(6, -5)$  and is parallel to the line whose equation is  $2x - 3y = 11$ .

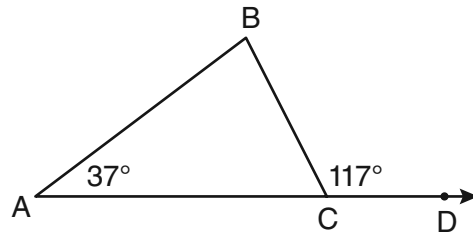
**32** Using a compass and straightedge, construct the angle bisector of  $\angle ABC$  shown below. [Leave all construction marks.]





**33** The degree measures of the angles of  $\triangle ABC$  are represented by  $x$ ,  $3x$ , and  $5x - 54$ .  
Find the value of  $x$ .

- 34 In the diagram below of  $\triangle ABC$  with side  $\overline{AC}$  extended through  $D$ ,  $m\angle A = 37$  and  $m\angle BCD = 117$ . Which side of  $\triangle ABC$  is the longest side? Justify your answer.

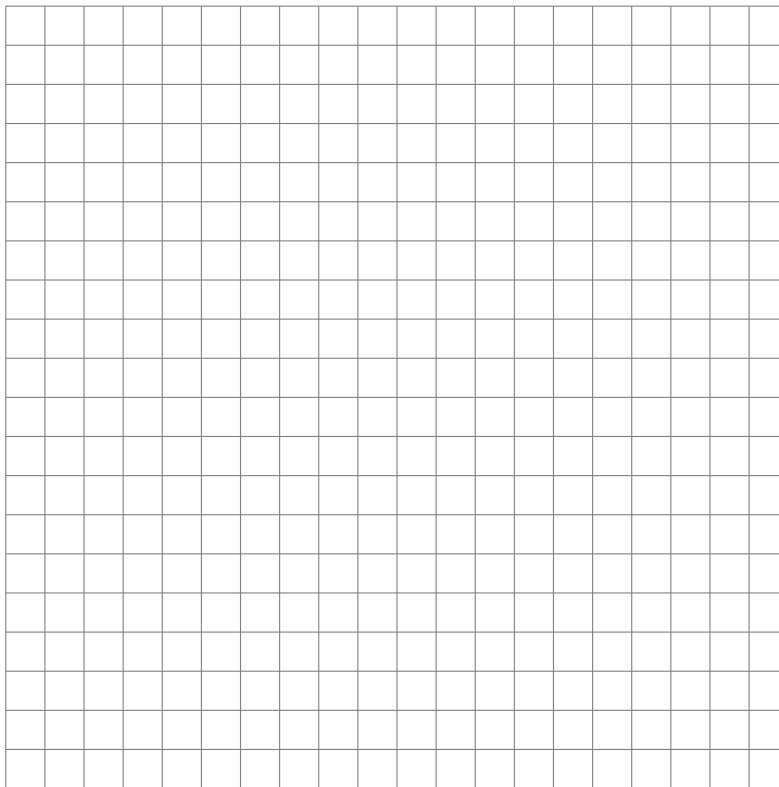


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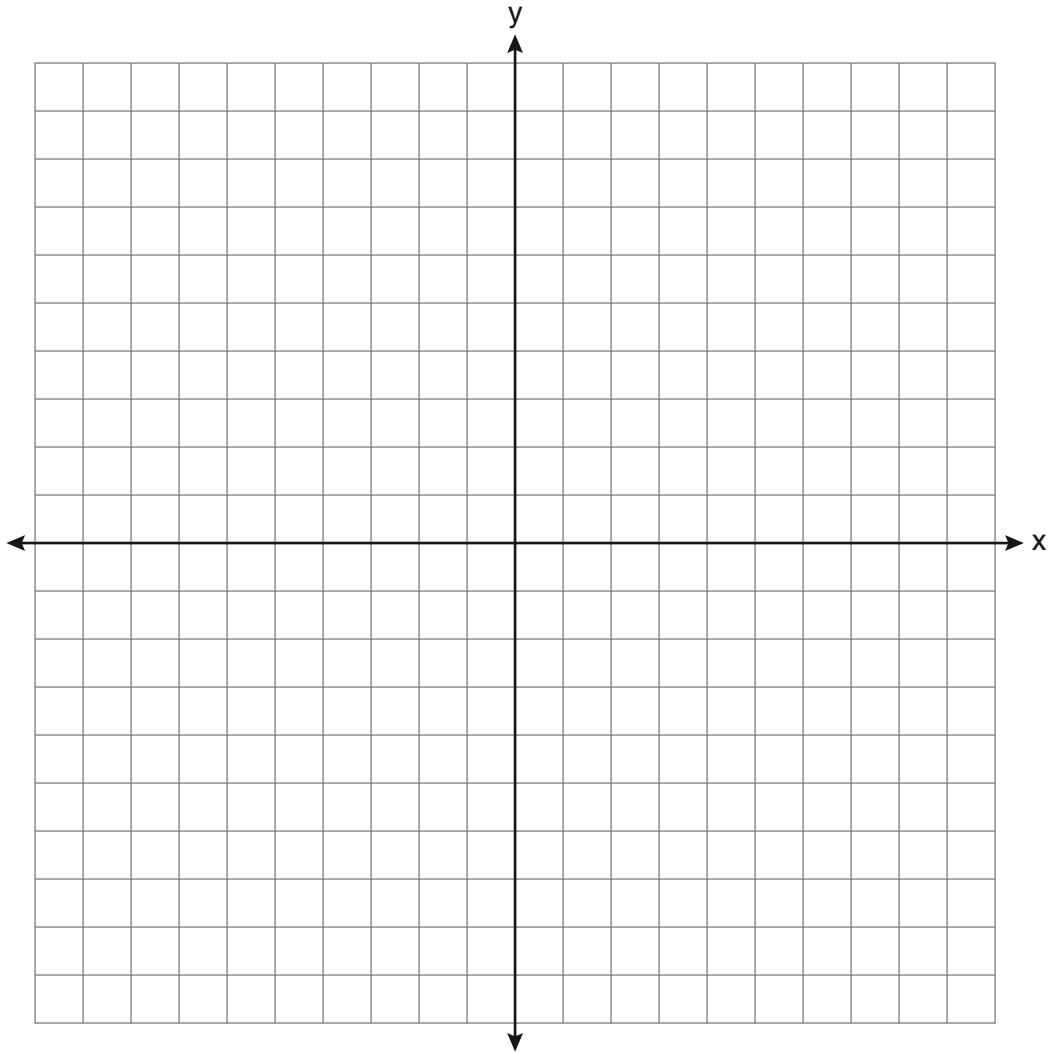
### Part III

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]

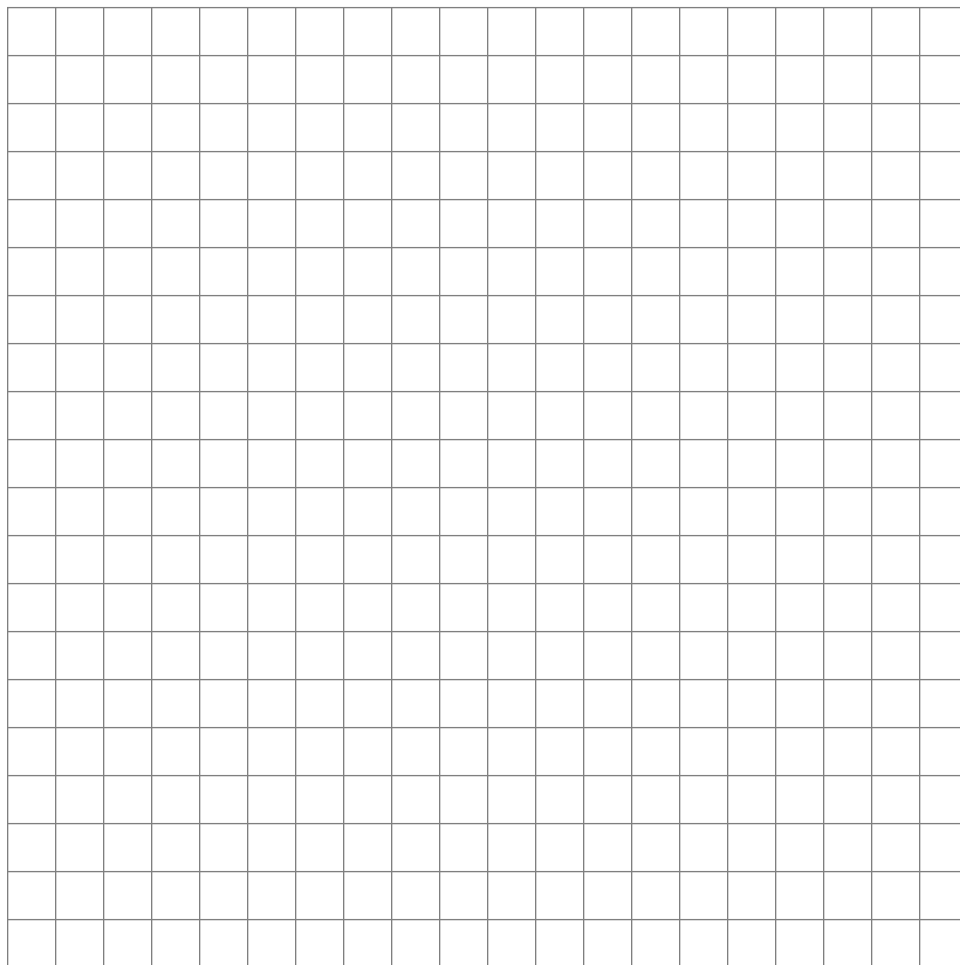
- 35 Write an equation of the perpendicular bisector of the line segment whose endpoints are  $(-1,1)$  and  $(7,-5)$ . [The use of the grid below is optional.]



**36** On the set of axes below, sketch the points that are 5 units from the origin and sketch the points that are 2 units from the line  $y = 3$ . Label with an **X** all points that satisfy *both* conditions.



- 37** Triangle  $DEG$  has the coordinates  $D(1,1)$ ,  $E(5,1)$ , and  $G(5,4)$ . Triangle  $DEG$  is rotated  $90^\circ$  about the origin to form  $\triangle D'E'G'$ . On the grid below, graph and label  $\triangle DEG$  and  $\triangle D'E'G'$ . State the coordinates of the vertices  $D'$ ,  $E'$ , and  $G'$ . Justify that this transformation preserves distance.

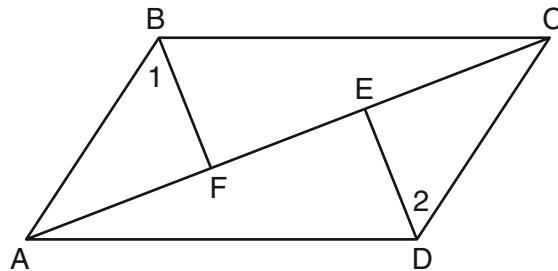


### Part IV

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 Given: Quadrilateral  $ABCD$ , diagonal  $\overline{AFEC}$ ,  $\overline{AE} \cong \overline{FC}$ ,  $\overline{BF} \perp \overline{AC}$ ,  $\overline{DE} \perp \overline{AC}$ ,  $\angle 1 \cong \angle 2$

Prove:  $ABCD$  is a parallelogram.



## Reference Sheet

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Volume	Cylinder	$V = Bh$ where $B$ is the area of the base
	Pyramid	$V = \frac{1}{3}Bh$ where $B$ is the area of the base
	Right Circular Cone	$V = \frac{1}{3}Bh$ 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	$L = \pi rl$ where $l$ is the slant height

Surface Area	Sphere	$SA = 4\pi r^2$
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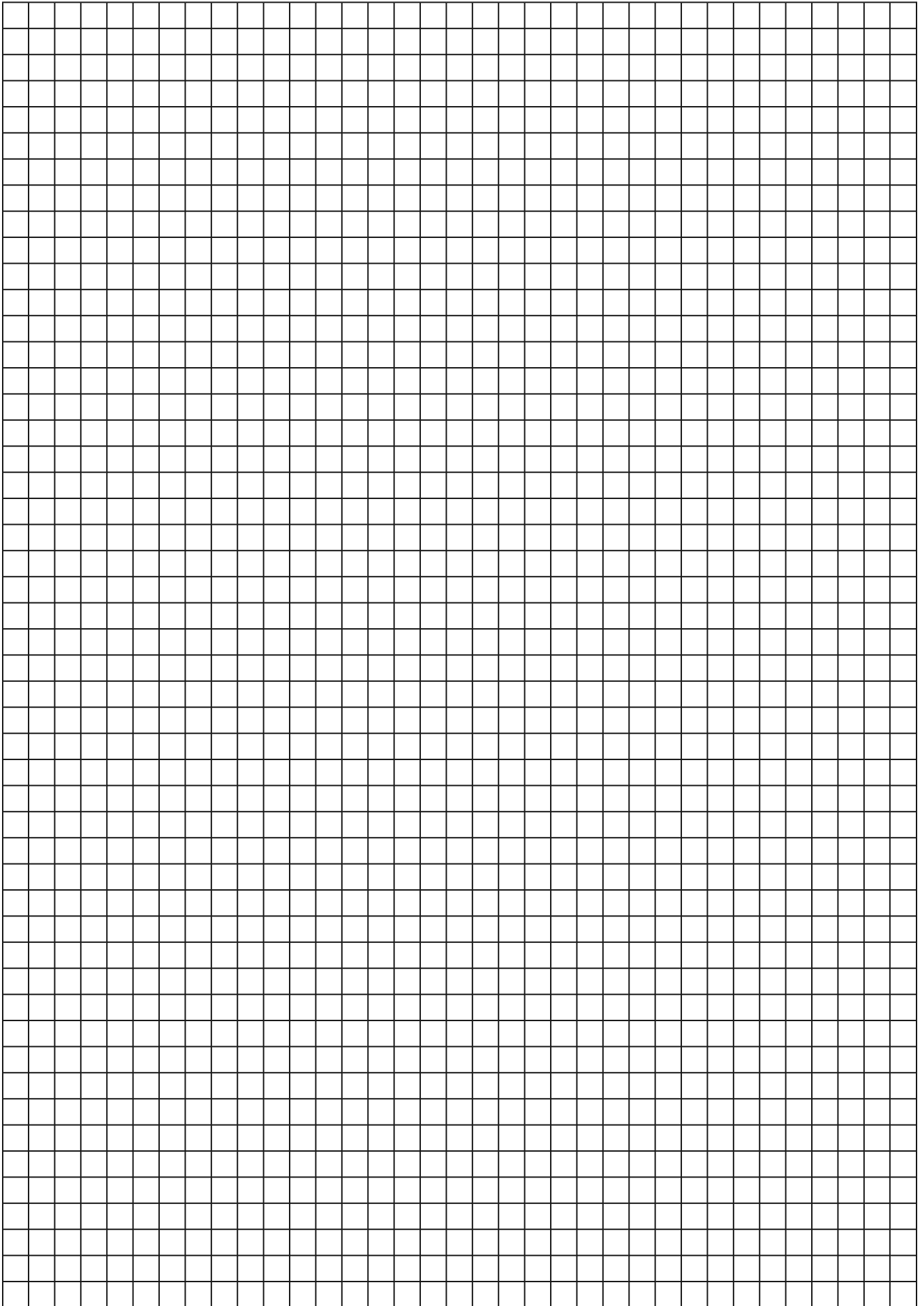
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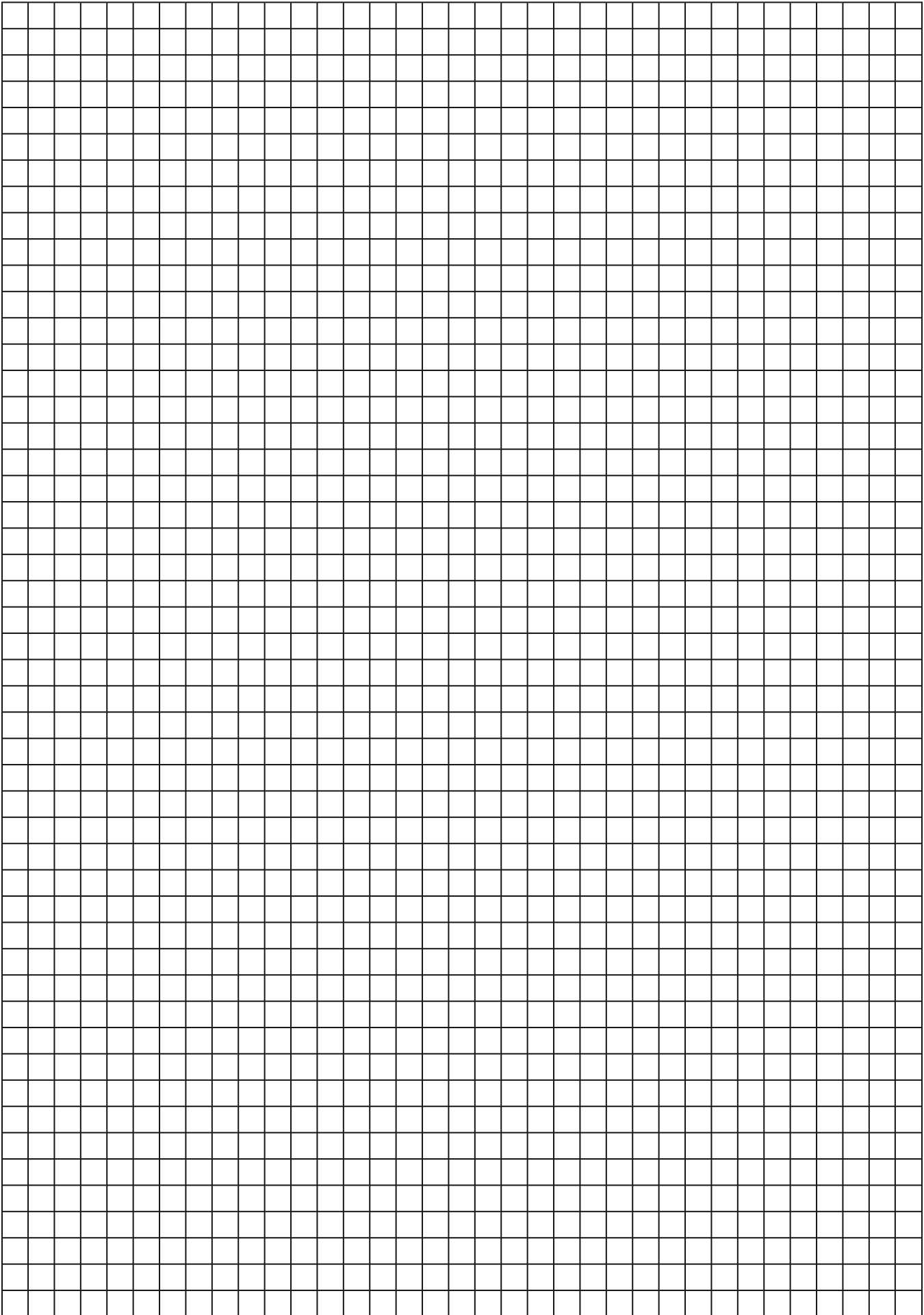
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The University of the State of New York  
REGENTS HIGH SCHOOL EXAMINATION

**GEOMETRY**

Thursday, August 13, 2009—8:30 to 11:30 a.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 should 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.

\_\_\_\_\_  
Signature



# FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

## GEOMETRY

Thursday, August 13, 2009 — 8:30 to 11:30 a.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 Examination in 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, August 13, 2009. 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.

GEOMETRY – *continued*

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

Updated information regarding the rating of this examination may be posted on the New York State Education Department’s website 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 Examination in Geometry*, use their own professional judgment, confer with other mathematics teachers, and/or contact the consultants at 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).

GEOMETRY – *continued*

**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] 3, 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] 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.

(30) [2] 2016, 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] 2016, 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.



GEOMETRY – *continued*

(31) [2]  $y + 5 = \frac{2}{3}(x - 6)$  or an equivalent linear equation, 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]  $y + 5 = \frac{2}{3}(x - 6)$  or an equivalent linear equation, 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) [2] A correct construction is drawn showing all appropriate arcs, and the angle bisector is drawn.

[1] All construction arcs are drawn, but the angle bisector line is not drawn.

*or*

[1] Appropriate work is shown, but one construction error is made, such as not extending the sides of the original angle to show points of intersection of the arc.

[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.

GEOMETRY – *continued*

- (33) [2] 26, 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]  $x + 3x + 5x - 54 = 180$  or an equivalent equation, but no further correct work is shown.
- or*
- [1] 26, 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]  $\overline{AC}$ , and an appropriate justification is given, and appropriate work is shown, such as a correctly labeled diagram.
- [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] All angle measures are identified correctly, but no further correct work is shown.
- or*
- [1]  $\overline{AC}$ , but no work is shown, and no justification 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.
-

GEOMETRY – *continued*

**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]  $y + 2 = \frac{4}{3}(x - 3)$  or an equivalent linear equation, and appropriate work is shown.

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

*or*

[3] The correct slope and midpoint of the segment and the slope of the perpendicular bisector are found, but no equation or an incorrect equation is written.

[2] Appropriate work is shown, but two or more computational or graphing errors are made.

*or*

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

*or*

[2] Appropriate work is shown to find the correct slope and midpoint of the segment, but no further correct work is shown.

*or*

[2] Appropriate work is shown to find the slope of the original segment and the slope of the perpendicular bisector, but no further correct work is shown.

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

*or*

[1] Appropriate work is shown to find the correct slope or midpoint of the segment, but no further correct work is shown.

*or*

[1]  $y + 2 = \frac{4}{3}(x - 3)$  or an equivalent linear equation, 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.

GEOMETRY – *continued*

(36) [4] Both loci are drawn correctly, and the three points of intersection are labeled with an X.

[3] Both loci are drawn correctly, but only two points of intersection are labeled.

*or*

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

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

*or*

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

*or*

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

[1] One locus is drawn correctly, but no further correct work is shown.

*or*

[1] Xs are placed appropriately, but no loci 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.

GEOMETRY – *continued*

- (37) [4]  $D'(-1,1)$ ,  $E'(-1,5)$ ,  $G'(-4,5)$ ,  $\triangle DEG$  and  $\triangle D'E'G'$  are graphed and labeled correctly, and an appropriate justification is given, such as showing congruent segments or stating that all rotations preserve distance.
- [3] Appropriate work is shown, but one computational, graphing, or labeling error is made.
- or***
- [3] Appropriate work is shown, but no justification is given.
- or***
- [3] Appropriate work is shown, but the coordinates are not stated or are stated incorrectly.
- [2] Appropriate work is shown, but one computational, graphing, or labeling error is made, and no justification is given.
- or***
- [2] Appropriate work is shown, but two or more computational, graphing, or labeling errors are made.
- or***
- [2] Appropriate work is shown, but one conceptual error is made.
- or***
- [2] Both triangles are graphed and labeled correctly, but no further correct work is shown.
- [1] Appropriate work is shown, but one conceptual error and one computational, graphing, or labeling error are made.
- or***
- [1] Both triangles are graphed correctly, but no further correct work is shown.
- or***
- [1]  $D'(-1,1)$ ,  $E'(-1,5)$ ,  $G'(-4,5)$ , 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.
-

GEOMETRY – *continued*

**Part IV**

For each 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] A complete and correct proof that includes a concluding statement is written.

[5] 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.

[4] 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.

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

*or*

[3]  $\triangle AFB \cong \triangle CED$  is proven, but no further correct work is shown.

[2] A proof is written that demonstrates a method of proof, but one conceptual error is made, and one statement or reason is missing or is incorrect.

*or*

[2] Some correct relevant statements about the proof are made, but three or four statements or reasons are missing or are incorrect.

[1] Only one correct relevant statement and reason are written.

[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.

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**Map to Core Curriculum**

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

**Regents Examination in Geometry  
August 2009**

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

**The *Chart for Determining the Final Examination Score for the August 2009 Regents Examination in Geometry* will be posted on the Department’s web site <http://www.emsc.nysed.gov/osa/> on Thursday, August 13, 2009. 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](http://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.







## Regents Examination in Geometry August 2009

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

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.