The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

GEOMETRY

Thursday, January 26, 2012 — 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 for 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.

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 Line n intersects lines l and m, forming the angles shown in the diagram below.
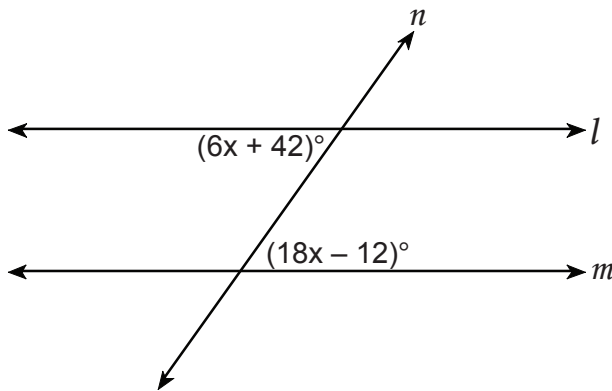
Which value of x would prove $l \parallel m$?

(1) 2.5 (3) 6.25

(2) 4.5 (4) 8.75

2 In a given triangle, the point of intersection of the three medians is the same as the point of intersection of the three altitudes. Which classification of the triangle is correct?

(1) scalene triangle (3) equilateral triangle

(2) isosceles triangle (4) right isosceles triangle

3 A circle has the equation $(x - 2)^2 + (y + 3)^2 = 36$. What are the coordinates of its center and the length of its radius?

(1) $(-2,3)$ and 6 (3) $(-2,3)$ and 36

(2) $(2,-3)$ and 6 (4) $(2,-3)$ and 36

4 In the diagram below, *MATH* is a rhombus with diagonals $\overline{AH}$ and $\overline{MT}$.

If m∠*HAM* = 12, what is m∠*AMT*?

(1) 12   (3) 84

(2) 78   (4) 156

5 A line segment has endpoints (4,7) and (1,11). What is the length of the segment?

(1) 5   (3) 16

(2) 7   (4) 25

6 In △*FGH*, m∠*F* = 42 and an exterior angle at vertex *H* has a measure of 104. What is m∠*G*?

(1) 34   (3) 76

(2) 62   (4) 146

7 Which diagram represents a correct construction of equilateral △ABC, given side $\overline{AB}$?

(1)

(3)

(2)

(4)

8 In the diagram below, △ABC is circumscribed about circle O and the sides of △ABC are tangent to the circle at points D, E, and F.

If AB = 20, AE = 12, and CF = 15, what is the length of $\overline{AC}$?

(1) 8　　　　　　　　　　　　(3) 23

(2) 15　　　　　　　　　　　(4) 27

9 In $\triangle ABC$ and $\triangle DEF$, $\dfrac{AC}{DF} = \dfrac{CB}{FE}$. Which additional information would prove $\triangle ABC \sim \triangle DEF$?

(1) $AC = DF$ (3) $\angle ACB \cong \angle DFE$

(2) $CB = FE$ (4) $\angle BAC \cong \angle EDF$

10 The angles of triangle ABC are in the ratio of 8:3:4. What is the measure of the *smallest* angle?

(1) $12°$ (3) $36°$

(2) $24°$ (4) $72°$

11 When a quadrilateral is reflected over the line $y = x$, which geometric relationship is *not* preserved?

(1) congruence   (3) parallelism

(2) orientation   (4) perpendicularity

12 Which equation represents circle O with center $(2, -8)$ and radius 9?

(1) $(x + 2)^2 + (y - 8)^2 = 9$

(2) $(x - 2)^2 + (y + 8)^2 = 9$

(3) $(x + 2)^2 + (y - 8)^2 = 81$

(4) $(x - 2)^2 + (y + 8)^2 = 81$

13 Which statement is the negation of "Two is a prime number" and what is the truth value of the negation?

(1) Two is not a prime number; false

(2) Two is not a prime number; true

(3) A prime number is two; false

(4) A prime number is two; true

14 In the diagram below of circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E.
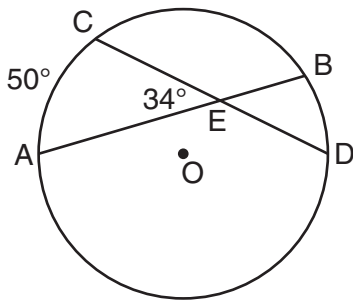
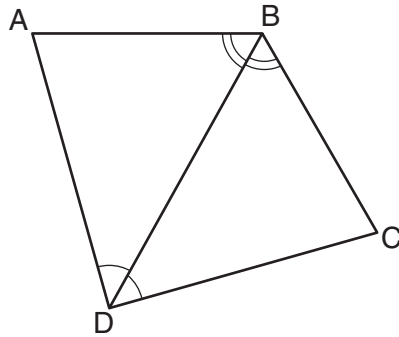If m∠AEC = 34 and m$\widehat{AC}$ = 50, what is m$\widehat{DB}$?

(1) 16   (3) 68

(2) 18   (4) 118

15 The volume of a rectangular prism is 144 cubic inches. The height of the prism is 8 inches. Which measurements, in inches, could be the dimensions of the base?

(1) 3.3 by 5.5   (3) 12 by 8

(2) 2.5 by 7.2   (4) 9 by 9

16 The diagram below shows a pair of congruent triangles, with ∠*ADB* ≅ ∠*CDB* and ∠*ABD* ≅ ∠*CBD*.

Which statement must be true?

(1) ∠*ADB* ≅ ∠*CBD*   (3) $\overline{AB} \cong \overline{CD}$

(2) ∠*ABC* ≅ ∠*ADC*   (4) $\overline{AD} \cong \overline{CD}$

17 What is an equation of the line that is perpendicular to the line whose equation is $y = \frac{3}{5}x - 2$ and that passes through the point $(3,-6)$?

(1) $y = \frac{5}{3}x - 11$ (3) $y = -\frac{5}{3}x - 1$

(2) $y = -\frac{5}{3}x + 11$ (4) $y = \frac{5}{3}x + 1$

18 Point *A* lies in plane *B*. How many lines can be drawn perpendicular to plane *B* through point *A*?

(1) one   (3) zero

(2) two   (4) infinite

19 In the diagram below of isosceles trapezoid $ABCD$, $AB = CD = 25$, $AD = 26$, and $BC = 12$.

What is the length of an altitude of the trapezoid?

(1) 7   (3) 19

(2) 14   (4) 24

20 What is an equation of circle O shown in the graph below?

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

(2) $(x + 2)^2 + (y - 2)^2 = 3$

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

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

21 The diagram below represents a rectangular solid.
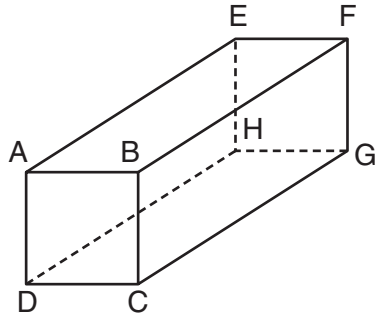
Which statement must be true?

(1) $\overline{EH}$ and $\overline{BC}$ are coplanar.

(2) $\overline{FG}$ and $\overline{AB}$ are coplanar.

(3) $\overline{EH}$ and $\overline{AD}$ are skew.

(4) $\overline{FG}$ and $\overline{CG}$ are skew.

22 In $\triangle RST$, $m\angle R = 58$ and $m\angle S = 73$. Which inequality is true?

(1) $RT < TS < RS$ (3) $RT < RS < TS$

(2) $RS < RT < TS$ (4) $RS < TS < RT$

23 The number of degrees in the sum of the interior angles of a pentagon is

(1) 72   (3) 540

(2) 360   (4) 720

24 What is the equation of a line passing through $(2, -1)$ and parallel to the line represented by the equation $y = 2x + 1$?

(1) $y = -\dfrac{1}{2}x$ (3) $y = 2x - 5$

(2) $y = -\dfrac{1}{2}x + 1$ (4) $y = 2x - 1$

25 The coordinates of the endpoints of $\overline{AB}$ are $A(0,0)$ and $B(0,6)$. The equation of the perpendicular bisector of $\overline{AB}$ is

(1) $x = 0$ (3) $y = 0$

(2) $x = 3$ (4) $y = 3$

26 In the diagram below, point P is the centroid of $\triangle ABC$.

If $PM = 2x + 5$ and $BP = 7x + 4$, what is the length of $\overline{PM}$?

(1) 9   (3) 18

(2) 2   (4) 27

27 In $\triangle PQR$, $\angle PRQ$ is a right angle and $\overline{RT}$ is drawn perpendicular to hypotenuse $\overline{PQ}$. If $PT = x$, $RT = 6$, and $TQ = 4x$, what is the length of $\overline{PQ}$?

(1) 9   (3) 3

(2) 12   (4) 15

28 In $\triangle ABC$, $AB = 5$ feet and $BC = 3$ feet. Which inequality represents all possible values for the length of $\overline{AC}$, in feet?

(1) $2 \le AC \le 8$ (3) $3 \le AC \le 7$

(2) $2 < AC < 8$ (4) $3 < AC < 7$

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, two parallel lines intersect circle O at points A, B, C, and D, with $m\widehat{AB} = x + 20$ and $m\widehat{DC} = 2x - 20$.

Find $m\widehat{AB}$.
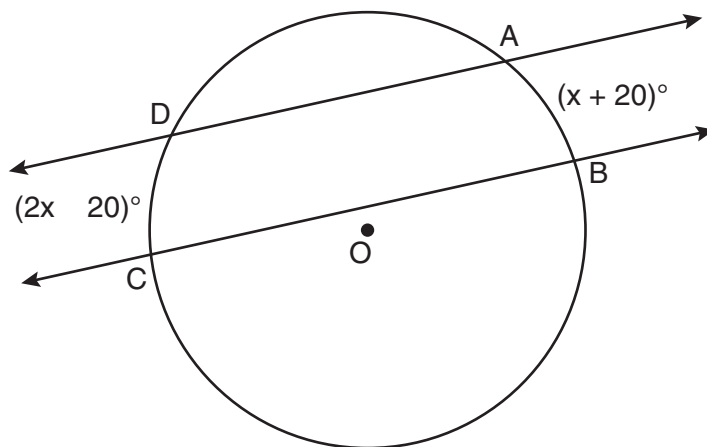
30 In the diagram below, point M is located on $\overleftrightarrow{AB}$.

Sketch the locus of points that are 1 unit from $\overleftrightarrow{AB}$ and the locus of points 2 units from point M.

Label with an **X** all points that satisfy both conditions.

A ———————●——————— B
            M

31 Determine whether the two lines represented by the equations $y = 2x + 3$ and $2y + x = 6$ are parallel, perpendicular, or neither.

Justify your response.

32 The coordinates of the vertices of $\triangle RST$ are $R(-2,3)$, $S(4,4)$, and $T(2,-2)$. Triangle $R'S'T'$ is the image of $\triangle RST$ after a rotation of 90° about the origin.

State the coordinates of the vertices of $\triangle R'S'T'$.

[The use of the set of axes below is optional.]
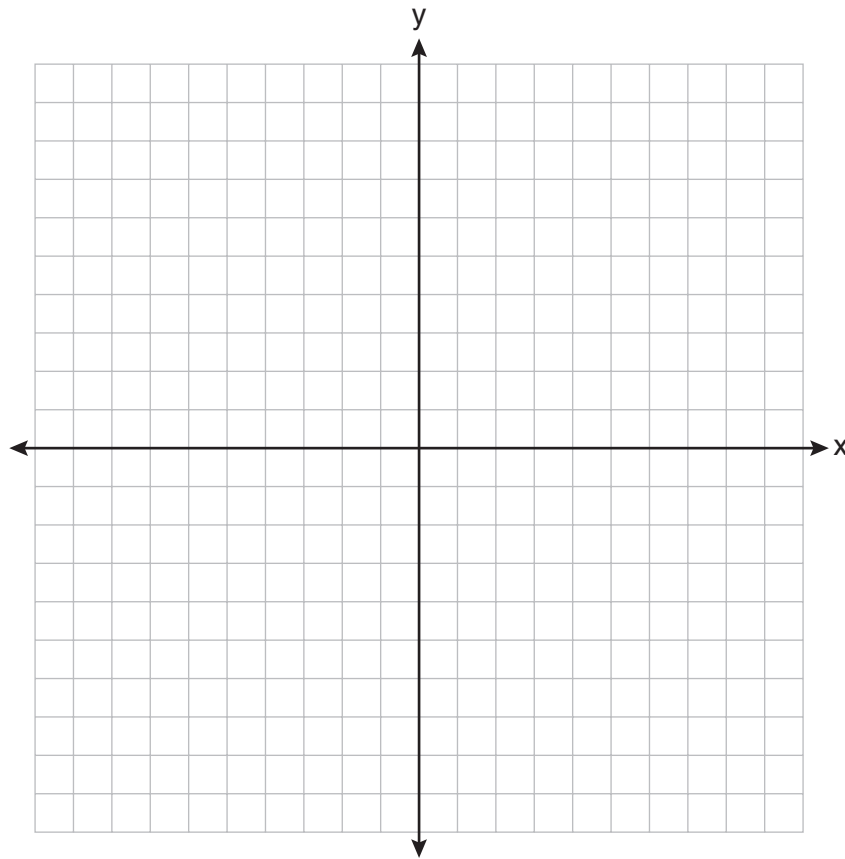
33 On the diagram below, use a compass and straightedge to construct the bisector of ∠*XYZ*. [Leave all construction marks.]

Y

X

Z
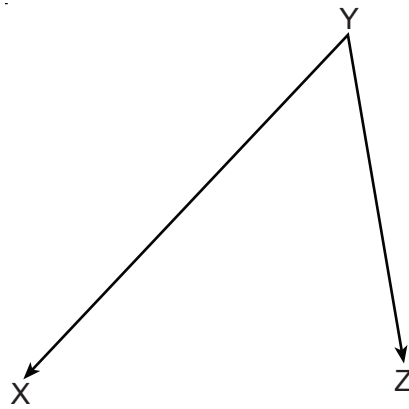
34 In the diagram below of circle O, diameter $\overline{AB}$ is perpendicular to chord $\overline{CD}$ at E.

If $AO = 10$ and $BE = 4$, find the length of $\overline{CE}$.
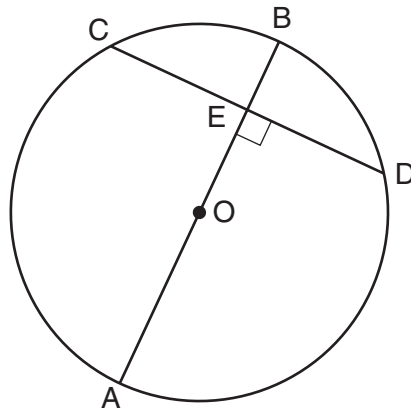
Answer all 3 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [12]

35 Triangle ABC has coordinates $A(2,-2)$, $B(2,1)$, and $C(4,-2)$. Triangle $A'B'C'$ is the image of $\triangle ABC$ under $T_{5,-2}$.

On the set of axes below, graph and label $\triangle ABC$ and its image, $\triangle A'B'C'$.

Determine the relationship between the area of $\triangle ABC$ and the area of $\triangle A'B'C'$.

Justify your response.
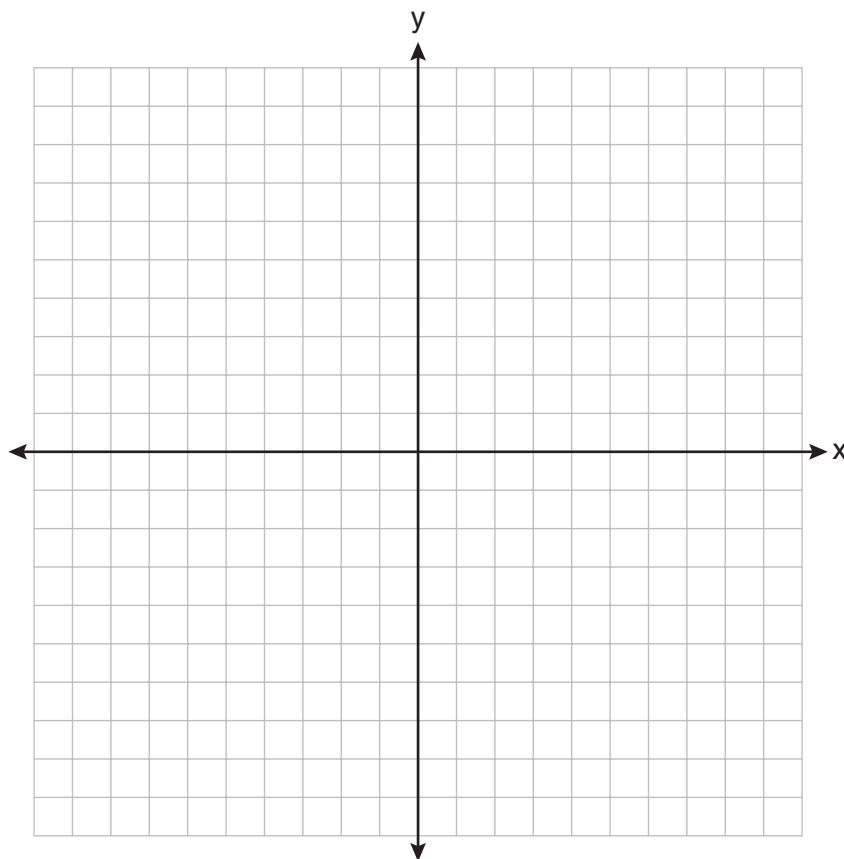
36 A paint can is in the shape of a right circular cylinder. The volume of the paint can is 600π cubic inches and its altitude is 12 inches.

Find the radius, in inches, of the base of the paint can. Express the answer in simplest radical form.

Find, to the *nearest tenth of a square inch,* the lateral area of the paint can.

37 Triangle *HKL* has vertices *H*(−7,2), *K*(3,−4), and *L*(5,4). The midpoint of $\overline{HL}$ is *M* and the midpoint of $\overline{LK}$ is *N*.

Determine and state the coordinates of points *M* and *N*.

Justify the statement: $\overline{MN}$ is parallel to $\overline{HK}$.

[The use of the set of axes below is optional.]
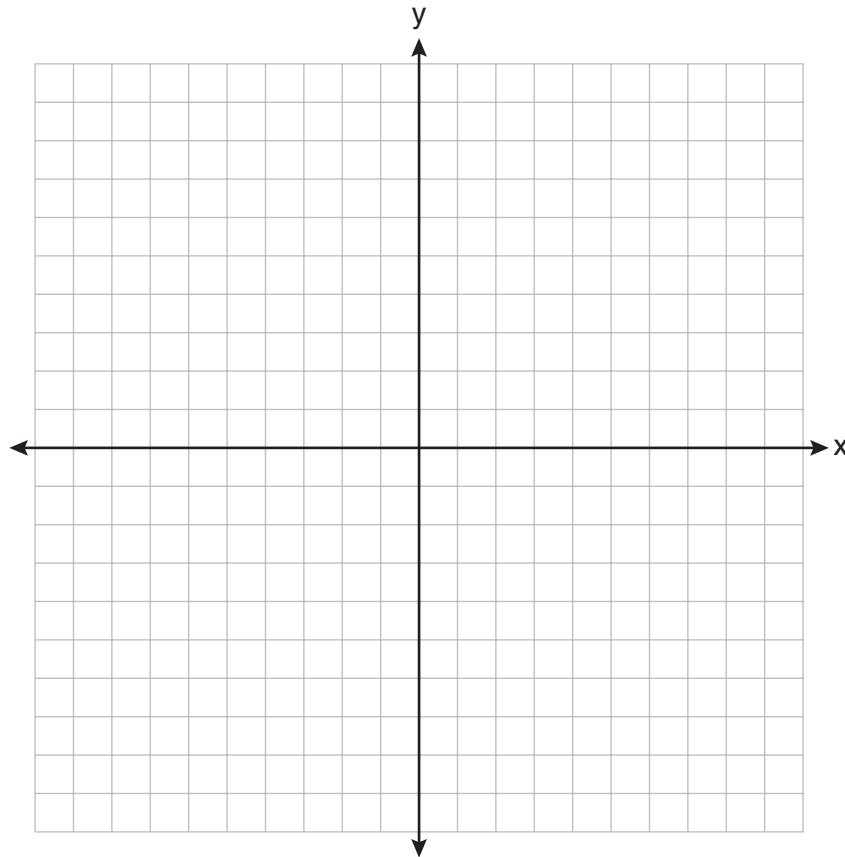
Part IV

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]

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38 In the diagram below of quadrilateral $ABCD$, $\overline{AD} \cong \overline{BC}$ and $\angle DAE \cong \angle BCE$.

Line segments AC, DB, and FG intersect at E.

Prove: $\triangle AEF \cong \triangle CEG$
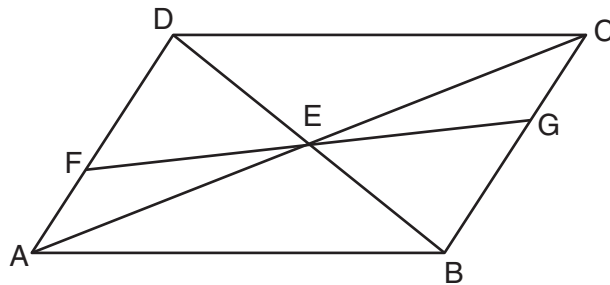
Reference Sheet

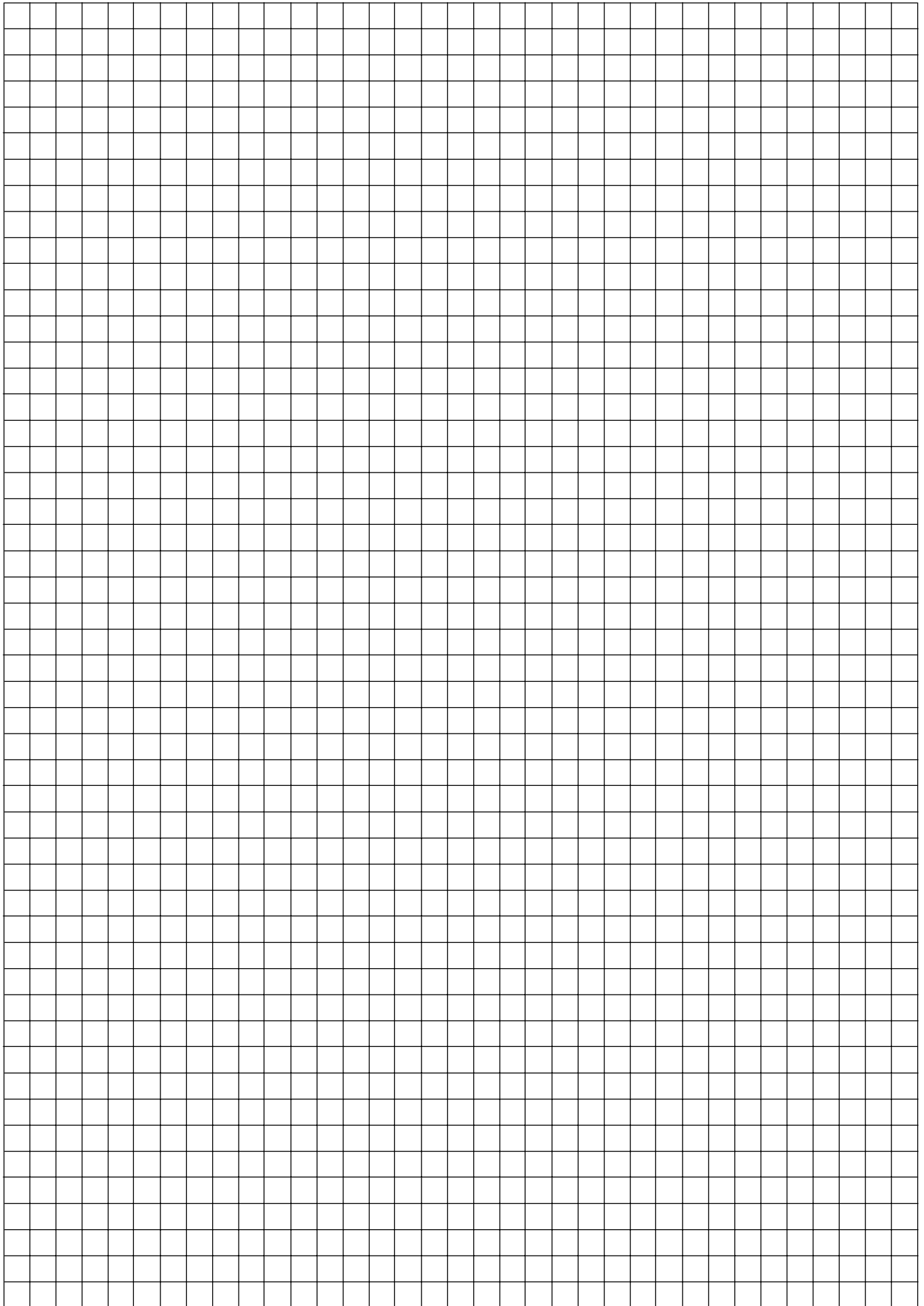| Volume	Cylinder	$V = Bh$ where B is the area of the base
	Pyramid	$V = \frac{1}{3}Bh$ where B is the area of the base
	Right Circular Cone	$V = \frac{1}{3}Bh$ where B is the area of the base
	Sphere	$V = \frac{4}{3}\pi r^3$

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	$SA = 4\pi r^2$

Scrap Graph Paper — This sheet will *not* be scored.
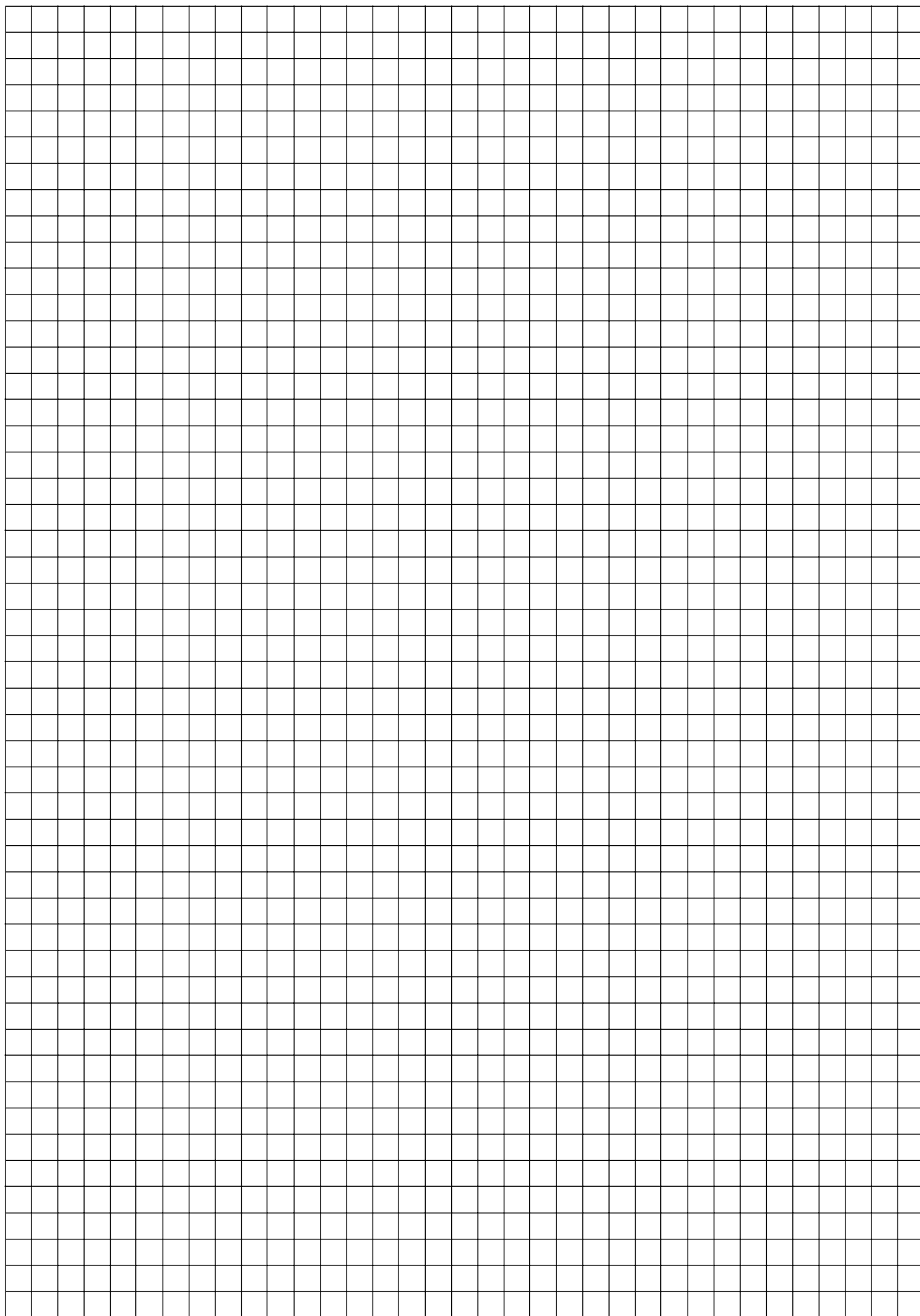
The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

GEOMETRY

Thursday, January 26, 2012 — 9:15 a.m. to 12:15 p.m., only

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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

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		

Total Raw Score   **Checked by**   **Scale Score** (from conversion chart)

Rater's/Scorer's Name
(minimum of three)

FOR TEACHERS ONLY

GEOMETRY

Thursday, January 26, 2012 — 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 Mathematics*.

Do *not* attempt to correct the student's work by making insertions or changes of any kind. In rating the open-ended questions, you may make check marks in the exam booklet to indicate student errors. If the students were given scannable answer sheets for the multiple-choice questions, be careful not to make any stray marks on the answer sheet that might later interfere with the accuracy of the scanning.

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. No one teacher is to score more than approximately one-third of the open-ended questions on a student's paper. 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."

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

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 scale score by using the conversion chart that will be posted on the Department's web site at: http://www.p12.nysed.gov/apda/ on Thursday, January 26, 2012. Because scale scores corresponding to raw scores in the conversion chart may change from one administration 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 student's scale score should be entered in the box provided on the student's detachable answer sheet. The scale 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) . . . . . 4 . . . . .
(2) 3	(9) 3	(16) 4	(23) . . . . . 3 . . . . .
(3) 2	(10) 3	(17) 3	(24) . . . . . 3 . . . . .
(4) 2	(11) 2	(18) 1	(25) . . . . . 4 . . . . .
(5) 1	(12) 4	(19) 4	(26) . . . . . 1 . . . . .
(6) 2	(13) 1	(20) 1	(27) . . . . . 4 . . . . .
(7) 1	(14) 2	(21) 1	(28) . . . . . 2 . . . . .

General Rules for Applying Mathematics Rubrics

I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents Examination 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 Mathematics*, 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 State 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 2 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(29) **[2]** 60, and appropriate work is shown.

    [1] Appropriate work is shown, but one computational error is made, but an appropriate measure for $\overset{\frown}{AB}$ is found.

                  or

    [1] Appropriate work is shown, but one conceptual error is made, but an appropriate measure for $\overset{\frown}{AB}$ is found.

                  or

    [1] Appropriate work is shown to find $x = 40$, but no further correct work is shown.

                  or

    [1] 60, but no work is shown.

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

(30) **[2]** Both loci are sketched correctly, and four points of intersection are labeled with an **X**.

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

                  or

    [1] Appropriate work is shown, but one conceptual error is made, but appropriate points of intersection are labeled with an **X**.

                  or

    [1] One locus is sketched 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.

(31)   **[2]** Perpendicular, and appropriate work is shown, and an appropriate justification is given.

      [1] Appropriate work is shown, but one computational error is made, but an appropriate determination is made, and an appropriate justification is given.

<div align="center">*or*</div>

      [1] Appropriate work is shown, but one conceptual error is made, but an appropriate determination is made, and an appropriate justification is given.

<div align="center">*or*</div>

      [1] Appropriate work is shown to find 2 and $-\dfrac{1}{2}$, the slopes of the given equations, but no further correct work is shown.

      [0] Perpendicular, but no work is shown and no justification is given.

<div align="center">*or*</div>

      [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]** $R'(-3,-2)$, $S'(-4,4)$, and $T'(2,2)$.

      [1] One graphing error is made, but appropriate coordinates are stated and labeled.

<div align="center">*or*</div>

      [1] One conceptual error is made, but appropriate coordinates are stated and labeled.

<div align="center">*or*</div>

      [1] $(-3,-2)$, $(-4,4)$, and $(2,2)$ are stated, but the coordinates are not labeled or are labeled incorrectly.

<div align="center">*or*</div>

      [1] Two of the three points are stated and labeled correctly, but no further correct work is shown.

<div align="center">*or*</div>

      [1] $\triangle R'S'T'$ is graphed and labeled correctly, but coordinates are not stated or are stated incorrectly.

      [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]** A correct construction is drawn showing all appropriate arcs, and the angle bisector is drawn.

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

or

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

[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.

(34) **[2]** 8, 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] 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.

Part III

For each question, use the specific criteria to award a maximum of 4 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(35) **[4]** $\triangle ABC$ and its image $\triangle A'B'C'$ are graphed and labeled correctly, and the areas are equal or the area remains the same is stated, and an appropriate justification is written, such as finding the areas of both triangles or stating that distance is preserved under a translation.

[3] Appropriate work is shown, but one computational, graphing, or labeling error is made, but an appropriate relationship is determined, and an appropriate justification is written.

or

[3] $\triangle ABC$ and $\triangle A'B'C'$ are graphed and labeled correctly, and the areas are equal is stated, but no justification is written.

or

[3] $\triangle ABC$ is either not graphed or is graphed incorrectly, but an appropriate image is graphed and labeled, and the areas are equal is stated, and an appropriate justification is written.

or

[3] The areas are equal is stated and an appropriate justification is written, and $A'(7,-4)$, $B'(7,-1)$, and $C'(9,-4)$ are stated and labeled, but neither triangle is graphed.

[2] Appropriate work is shown, but two or more computational, graphing, or labeling errors are made, but an appropriate relationship is determined, and an appropriate justification is written.

or

[2] Appropriate work is shown, but one conceptual error is made, such as performing an incorrect transformation, but both triangles are graphed and labeled, and an appropriate relationship is determined, and a justification is written.

or

[2] The areas are equal is stated, and an appropriate justification is written, but neither $\triangle ABC$ nor $\triangle A'B'C'$ is graphed.

or

[2] Both $\triangle ABC$ and $\triangle A'B'C'$ 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, but an appropriate relationship is determined, and an appropriate justification is written.

[1] Appropriate work is shown to find the areas of $\triangle ABC$ and $\triangle A'B'C'$, 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.

(36)   **[4]** $5\sqrt{2}$ and 533.1, and appropriate work is shown.

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

or

[3] Appropriate work is shown to find $\sqrt{50}$ and 533.1, but no further correct work is shown.

[2] Appropriate work is shown, but two or more computational, rounding, or simplification errors are made, but appropriate solutions are found.

or

[2] Appropriate work is shown, but one conceptual error is made, but appropriate solutions are found.

or

[2] Appropriate work is shown to find $5\sqrt{2}$, but no further correct work is shown.

[1] Appropriate work is shown, but one conceptual error and one computational, rounding, or simplification error are made, but appropriate solutions are found.

or

[1] Appropriate work is shown to find $\sqrt{50}$, but no further correct work is shown.

or

[1] $5\sqrt{2}$ and 533.1, but no work is shown.

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

(37)　**[4]** $M(-1,3)$ and $N(4,0)$, and appropriate work is shown, and an appropriate justification is given.

[3] Appropriate work is shown, but one computational or graphing error is made, but appropriate coordinates for M and N are stated, and an appropriate justification is given.

or

[3] Midpoints M and N are graphed correctly, but the coordinates are not stated, but a correct justification is given.

or

[3] Appropriate work is shown to find $M(-1,3)$ and $N(4,0)$ and the slopes of $\overline{MN}\left(-\dfrac{3}{5}\right)$ and $\overline{HL}\left(-\dfrac{3}{5}\right)$, but no justification is given.

[2] Appropriate work is shown, but two or more computational or graphing errors are made, but appropriate coordinates for M and N are stated, and an appropriate justification is given.

or

[2] Appropriate work is shown, but one conceptual error is made, but appropriate coordinates for M and N are stated, and an appropriate justification is given.

or

[2] An appropriate justification using the midsegment theorem is given, but the coordinates of M and N are not stated, and no further correct work is shown.

or

[2] Appropriate work is shown to find both midpoints, but no justification or an incorrect justification is given.

[1] Appropriate work is shown, but one conceptual error and one computational or graphing error are made, but appropriate coordinates for M and N are stated, and an appropriate justification is given.

or

[1] Appropriate work is shown to find one of the midpoints, 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.

Part IV

For this question, use the specific criteria to award a maximum of 6 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

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(38) **[6]** A complete and correct proof that includes a conclusion 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, or the concluding statement is missing.

[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.

[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 statement and reason are written.

[0] The "given" and/or the "prove" statements are written, 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.

Map to Core Curriculum

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

Regents Examination in Geometry

January 2012

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

The *Chart for Determining the Final Examination Score for the January 2012 Regents Examination in Geometry* will be posted on the Department's web site at: http://www.p12.nysed.gov/apda/ on Thursday, January 26, 2012. 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 http://www.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm.

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
January 2012

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

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 "Final Score" on the student's answer sheet.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart change from one administration 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.