The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

GEOMETRY

Wednesday, June 19, 2013 — 9:15 a.m. to 12:15 p.m., only

Student Name: _____

School Name: _____

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

Print your name and the name of your school on the lines above.

A separate answer sheet for Part I has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet.

This examination has four parts, with a total of 38 questions. You must answer all questions in this examination. Record 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.

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. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet. [56]
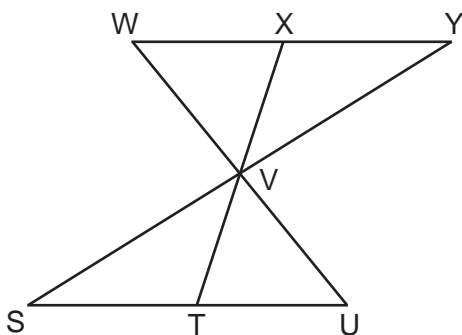
Use this space for computations.

1 In trapezoid $RSTV$ below with bases $\overline{RS}$ and $\overline{VT}$, diagonals $\overline{RT}$ and $\overline{SV}$ intersect at Q.
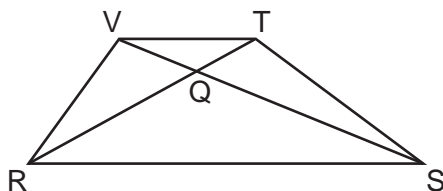
If trapezoid $RSTV$ is *not* isosceles, which triangle is equal in area to $\triangle RSV$?

(1) $\triangle RQV$ (3) $\triangle RVT$

(2) $\triangle RST$ (4) $\triangle SVT$

2 In the diagram below, $\triangle XYV \cong \triangle TSV$.

Which statement can *not* be proven?

(1) $\angle XVY \cong \angle TVS$ (3) $\overline{XY} \cong \overline{TS}$

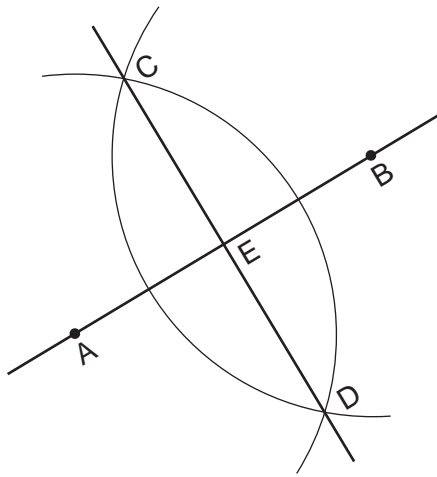(2) $\angle VYX \cong \angle VUT$ (4) $\overline{YV} \cong \overline{SV}$

3 In a park, two straight paths intersect. The city wants to install lampposts that are both equidistant from each path and also 15 feet from the intersection of the paths. How many lampposts are needed?

(1) 1   (3) 3

(2) 2   (4) 4

4 What are the coordinates of A', the image of point $A(-3,4)$, after a rotation of 180° about the origin?

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

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

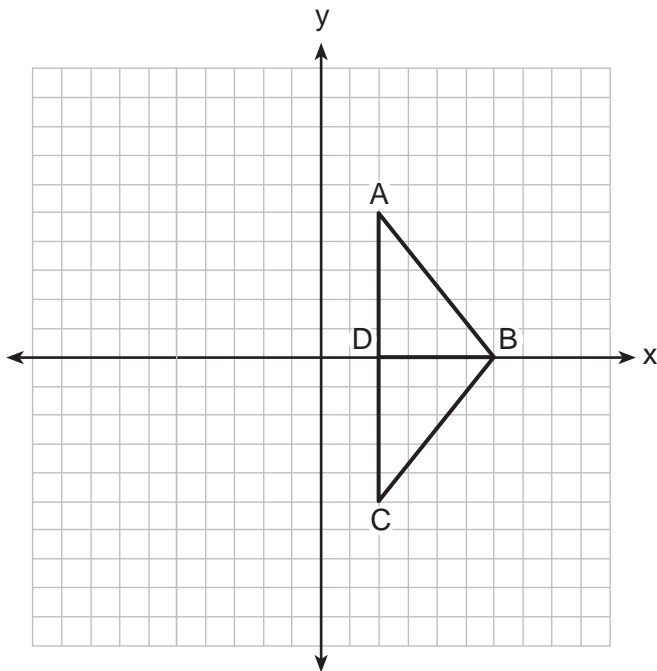**5** Based on the construction below, which conclusion is *not* always true?

(1) $\overline{AB} \perp \overline{CD}$ (3) $AE = EB$

(2) $AB = CD$ (4) $CE = DE$

6 Which equation represents the circle whose center is $(-5,3)$ and that passes through the point $(-1,3)$?

(1) $(x + 1)^2 + (y - 3)^2 = 16$

(2) $(x - 1)^2 + (y + 3)^2 = 16$

(3) $(x + 5)^2 + (y - 3)^2 = 16$

(4) $(x - 5)^2 + (y + 3)^2 = 16$

7 As shown in the diagram below, when right triangle DAB is reflected over the x-axis, its image is triangle DCB.

Which statement justifies why $\overline{AB} \cong \overline{CB}$?

(1) Distance is preserved under reflection.

(2) Orientation is preserved under reflection.

(3) Points on the line of reflection remain invariant.

(4) Right angles remain congruent under reflection.

8 In $\triangle ABC$, $m\angle A = 3x + 1$, $m\angle B = 4x - 17$, and $m\angle C = 5x - 20$.
Which type of triangle is $\triangle ABC$?

(1) right   (3) isosceles

(2) scalene   (4) equilateral

9 What is the equation for circle O shown in the graph below?
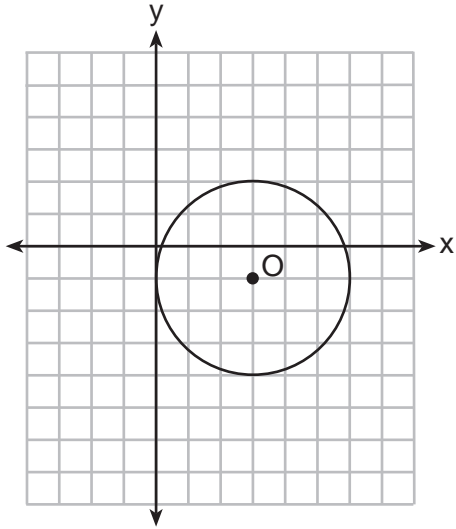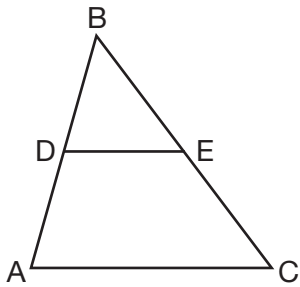

(1) $(x - 3)^2 + (y + 1)^2 = 6$

(2) $(x + 3)^2 + (y - 1)^2 = 6$

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

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

10 Point A is on line m. How many distinct planes will be perpendicular to line m and pass through point A?

(1) one

(3) zero

(2) two

(4) infinite

11 In $\triangle ABC$, D is the midpoint of $\overline{AB}$ and E is the midpoint of $\overline{BC}$. If $AC = 3x - 15$ and $DE = 6$, what is the value of x?

(1) 6

(3) 9

(2) 7

(4) 12

12 What are the coordinates of the center of a circle if the endpoints of its diameter are $A(8,-4)$ and $B(-3,2)$?

(1) $(2.5,1)$

(3) $(5.5,-3)$

(2) $(2.5,-1)$

(4) $(5.5,3)$

13 Which graph could be used to find the solution to the following system of equations?

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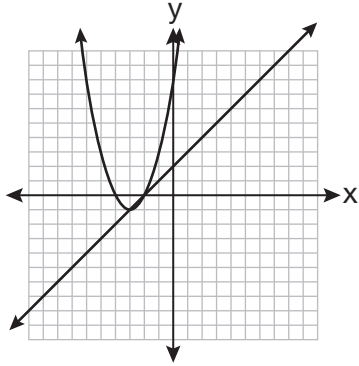
(1)
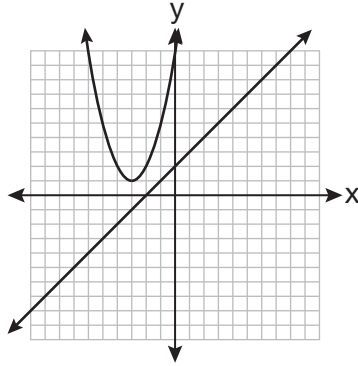
(3)
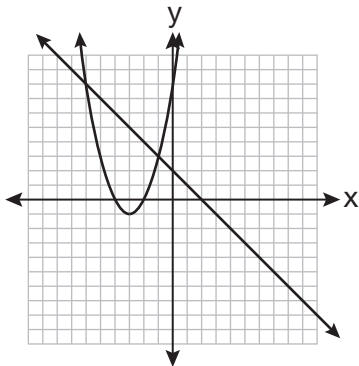
(2)
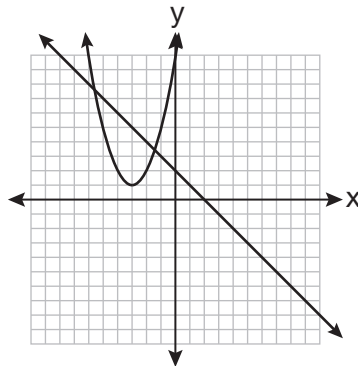
(4)

14 What is the converse of "If an angle measures 90 degrees, then it is a right angle"?

(1) If an angle is a right angle, then it measures 90 degrees.

(2) An angle is a right angle if it measures 90 degrees.

(3) If an angle is not a right angle, then it does not measure 90 degrees.

(4) If an angle does not measure 90 degrees, then it is not a right angle.

15 As shown in the diagram below, a right pyramid has a square base, *ABCD*, and $\overline{EF}$ is the slant height.
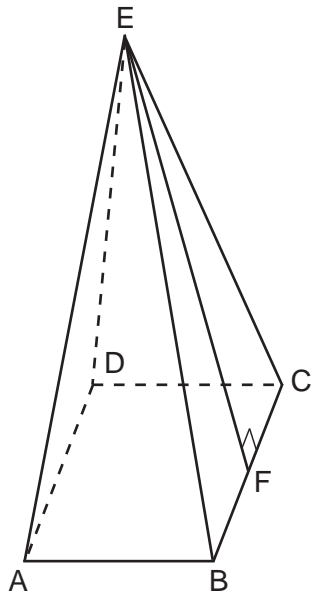
Which statement is *not* true?

(1) $\overline{EA} \cong \overline{EC}$ (3) $\triangle AEB \cong \triangle BEC$

(2) $\overline{EB} \cong \overline{EF}$ (4) $\triangle CED$ is isosceles

16 What is the equation of a line passing through the point (6,1) and parallel to the line whose equation is $3x = 2y + 4$?

(1) $y = -\dfrac{2}{3}x + 5$ (3) $y = \dfrac{3}{2}x - 8$

(2) $y = -\dfrac{2}{3}x - 3$ (4) $y = \dfrac{3}{2}x - 5$

17 The volume of a sphere is approximately 44.6022 cubic centimeters. What is the radius of the sphere, to the *nearest tenth of a centimeter*?

(1) 2.2   (3) 4.4

(2) 3.3   (4) 4.7

18 Points $A(5,3)$ and $B(7,6)$ lie on $\overleftrightarrow{AB}$. Points $C(6,4)$ and $D(9,0)$ lie on $\overleftrightarrow{CD}$. Which statement is true?

(1) $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$

(2) $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$

(3) $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are the same line.

(4) $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect, but are not perpendicular.

19 Which set of equations represents two circles that have the same center?

(1) $x^2 + (y + 4)^2 = 16$ and $(x + 4)^2 + y^2 = 16$

(2) $(x + 3)^2 + (y - 3)^2 = 16$ and $(x - 3)^2 + (y + 3)^2 = 25$

(3) $(x - 7)^2 + (y - 2)^2 = 16$ and $(x + 7)^2 + (y + 2)^2 = 25$

(4) $(x - 2)^2 + (y - 5)^2 = 16$ and $(x - 2)^2 + (y - 5)^2 = 25$

20 Transversal $\overleftrightarrow{EF}$ intersects $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$, as shown in the diagram below.
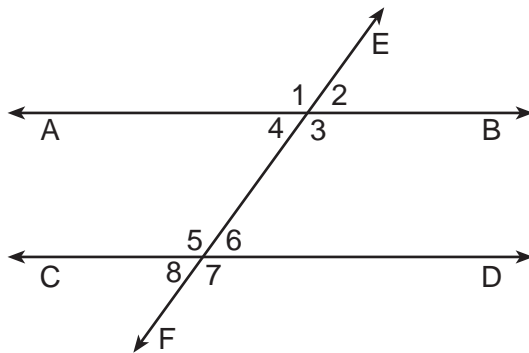
Which statement could always be used to prove $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$?

(1) $\angle 2 \cong \angle 4$

(2) $\angle 7 \cong \angle 8$

(3) $\angle 3$ and $\angle 6$ are supplementary

(4) $\angle 1$ and $\angle 5$ are supplementary

21 In $\triangle ABC$, $m\angle A = 60$, $m\angle B = 80$, and $m\angle C = 40$. Which inequality is true?

(1) $AB > BC$ (3) $AC < BA$

(2) $AC > BC$ (4) $BC < BA$

22 Circle O with $\angle AOC$ and $\angle ABC$ is shown in the diagram below.
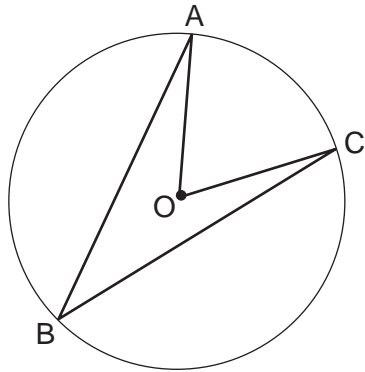
What is the ratio of $m\angle AOC$ to $m\angle ABC$?

(1) 1:1   (3) 3:1

(2) 2:1   (4) 1:2

23 A rectangular prism has a base with a length of 25, a width of 9, and a height of 12. A second prism has a square base with a side of 15. If the volumes of the two prisms are equal, what is the height of the second prism?

(1) 6   (3) 12

(2) 8   (4) 15

24 In triangles ABC and DEF, $AB = 4$, $AC = 5$, $DE = 8$, $DF = 10$, and $\angle A \cong \angle D$. Which method could be used to prove $\triangle ABC \sim \triangle DEF$?

(1) AA   (3) SSS

(2) SAS   (4) ASA

25 Which graph represents a circle whose equation is $x^2 + (y - 1)^2 = 9$?

(1)

(3)

(2)

(4)
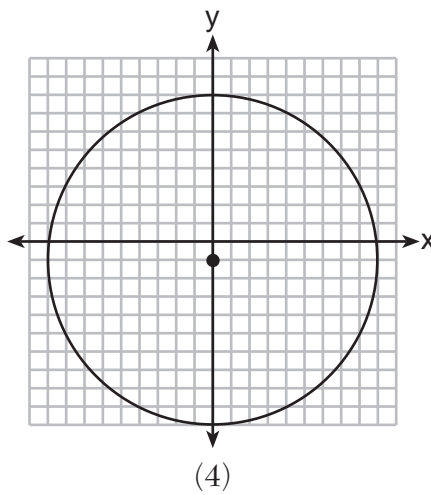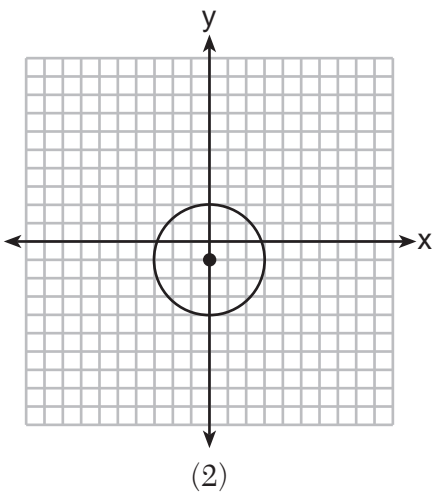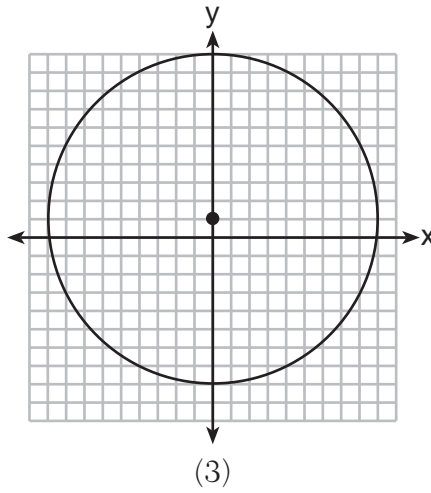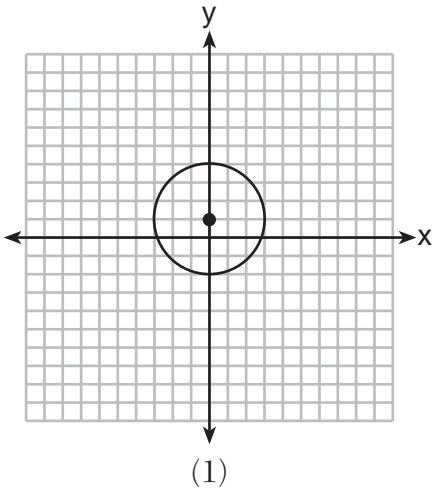
26 What is the perimeter of a rhombus whose diagonals are 16 and 30?

(1) 92   (3) 60

(2) 68   (4) 17

27 In right triangle ABC shown in the diagram below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$, $CD = 12$, and $AD = 3$.
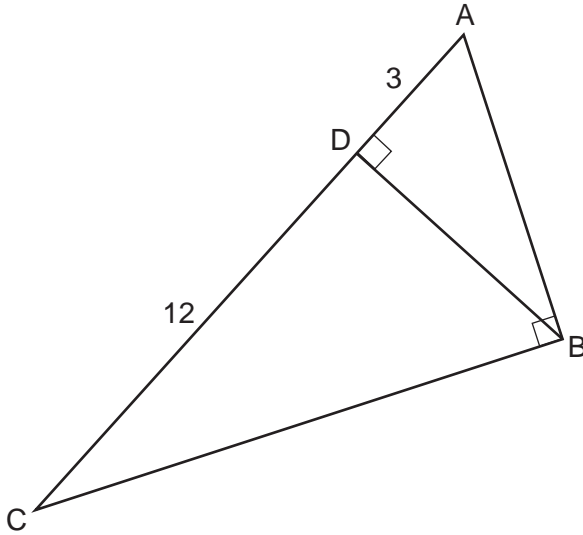
What is the length of $\overline{AB}$?

(1) $5\sqrt{3}$ (3) $3\sqrt{5}$

(2) 6   (4) 9

28 Secants $\overline{JKL}$ and $\overline{JMN}$ are drawn to circle O from an external point, J. If $JK = 8$, $LK = 4$, and $JM = 6$, what is the length of $\overline{JN}$?

(1) 16   (3) 10

(2) 12   (4) 8

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 A right circular cylinder has a height of 7 inches and the base has a diameter of 6 inches. Determine the lateral area, in square inches, of the cylinder in terms of π.

[13]

30 Determine, in degrees, the measure of each interior angle of a regular octagon.

31 Triangle *ABC* has vertices at *A*(3,0), *B*(9,−5), and *C*(7,−8). Find the length of $\overline{AC}$ in simplest radical form.

32 On the ray drawn below, using a compass and straightedge, construct an equilateral triangle with a vertex at *R*. The length of a side of the triangle must be equal to a length of the diagonal of rectangle *ABCD*.

D   C

A   B

R

33 On the set of axes below, graph the locus of points 4 units from the *x*-axis and equidistant from the points whose coordinates are $(-2,0)$ and $(8,0)$.
Mark with an **X** all points that satisfy *both* conditions.
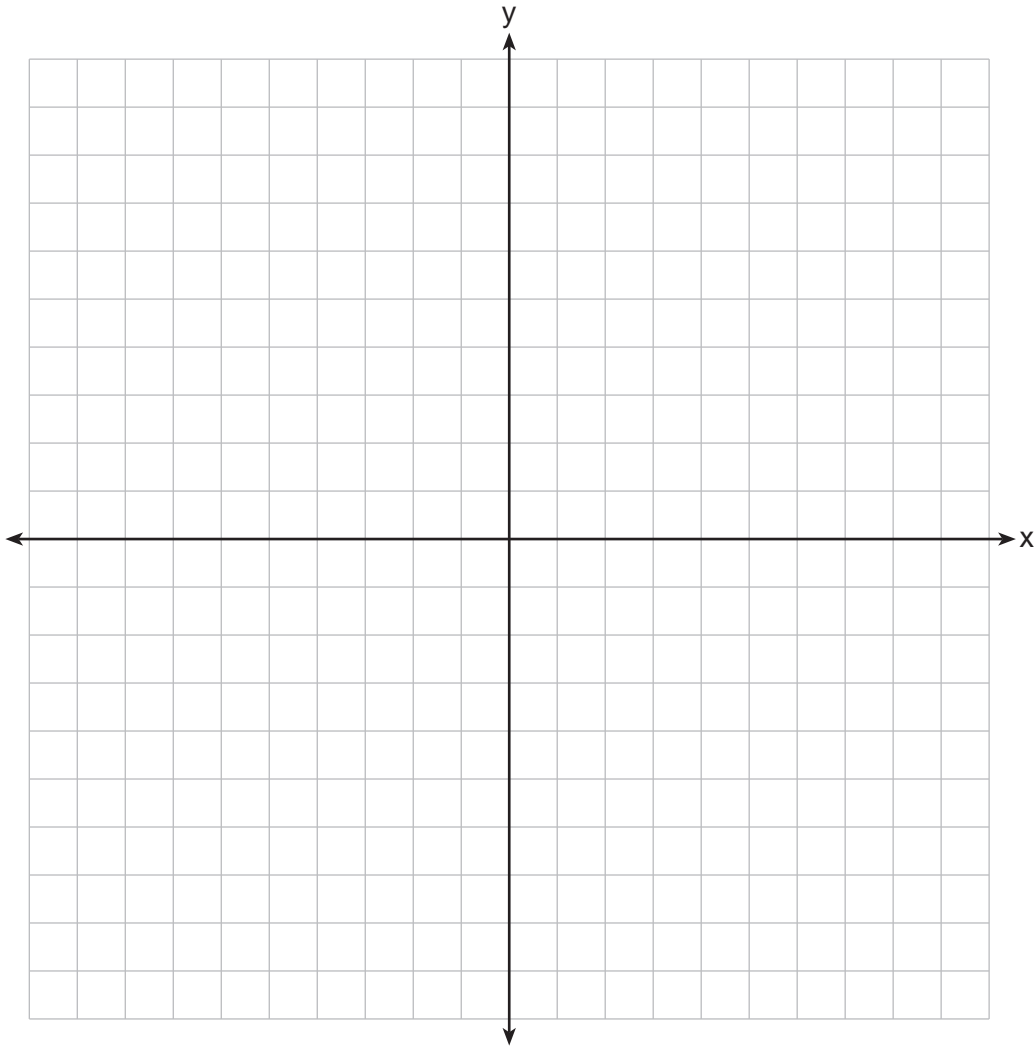
34 The coordinates of two vertices of square $ABCD$ are $A(2,1)$ and $B(4,4)$. Determine the slope of side $\overline{BC}$.

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 The coordinates of the vertices of parallelogram *SWAN* are $S(2,-2)$, $W(-2,-4)$, $A(-4,6)$, and $N(0,8)$. State and label the coordinates of parallelogram $S''W''A''N''$, the image of *SWAN* after the transformation $T_{4,-2} \circ D_{\frac{1}{2}}$. [The use of the set of axes below is optional.]
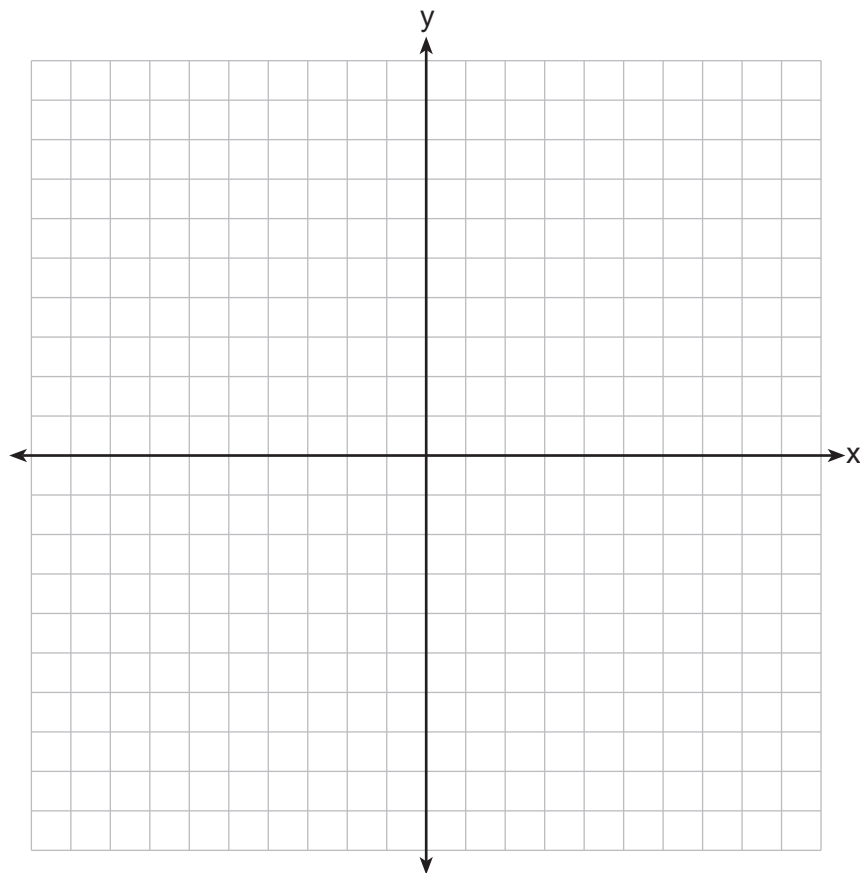
36 In circle O shown below, chords $\overline{AB}$ and $\overline{CD}$ and radius $\overline{OA}$ are drawn, such that $\overline{AB} \cong \overline{CD}$, $\overline{OE} \perp \overline{AB}$, $\overline{OF} \perp \overline{CD}$, $OF = 16$, $CF = y + 10$, and $CD = 4y - 20$.
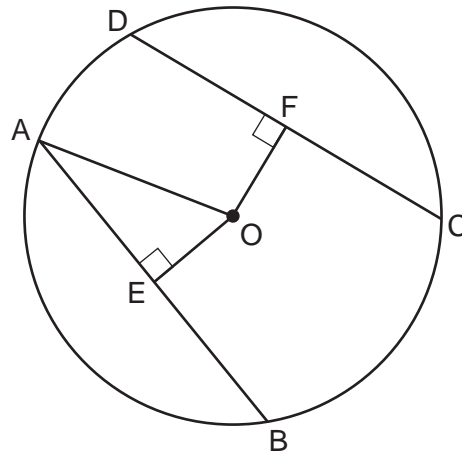
Determine the length of $\overline{DF}$.

Determine the length of $\overline{OA}$.

37 If $\triangle RST \sim \triangle ABC$, m$\angle A = x^2 - 8x$, m$\angle C = 4x - 5$, and m$\angle R = 5x + 30$, find m$\angle C$.

[Only an algebraic solution can receive full credit.]

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, except for graphs and drawings, which should be done in pencil. [6]

38 In the diagram of $\triangle MAH$ below, $\overline{MH} \cong \overline{AH}$ and medians $\overline{AB}$ and $\overline{MT}$ are drawn.

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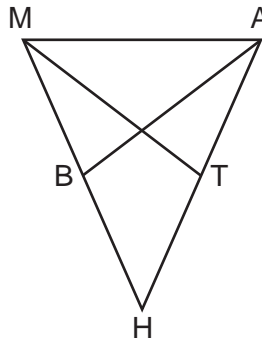
Volume	Cylinder	$V = Bh$ where B is the area of the base
	Pyramid	$V = \frac{1}{3}Bh$ where B is the area of the base
	Right Circular Cone	$V = \frac{1}{3}Bh$ where B is the area of the base
	Sphere	$V = \frac{4}{3}\pi r^3$

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	$SA = 4\pi r^2$
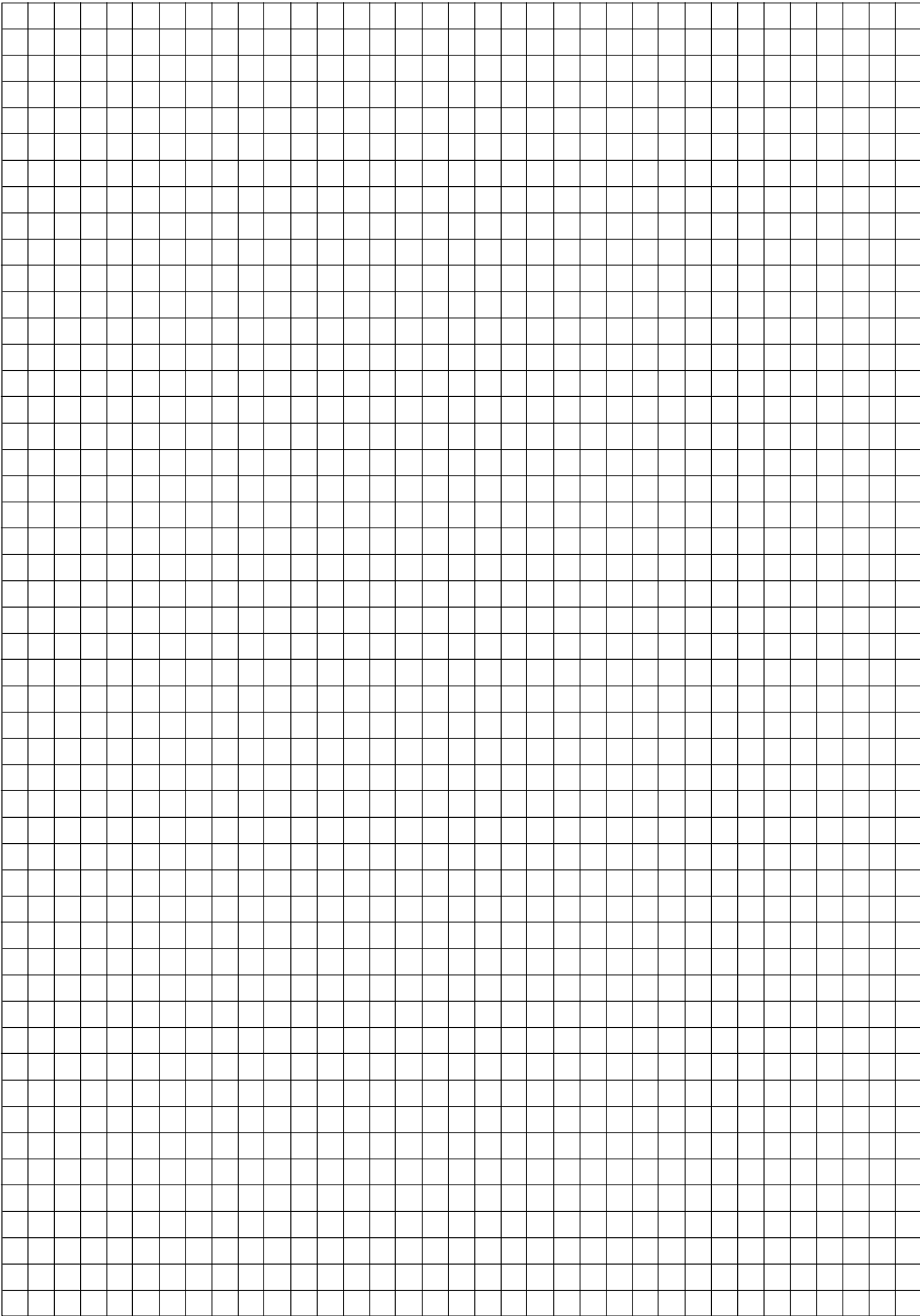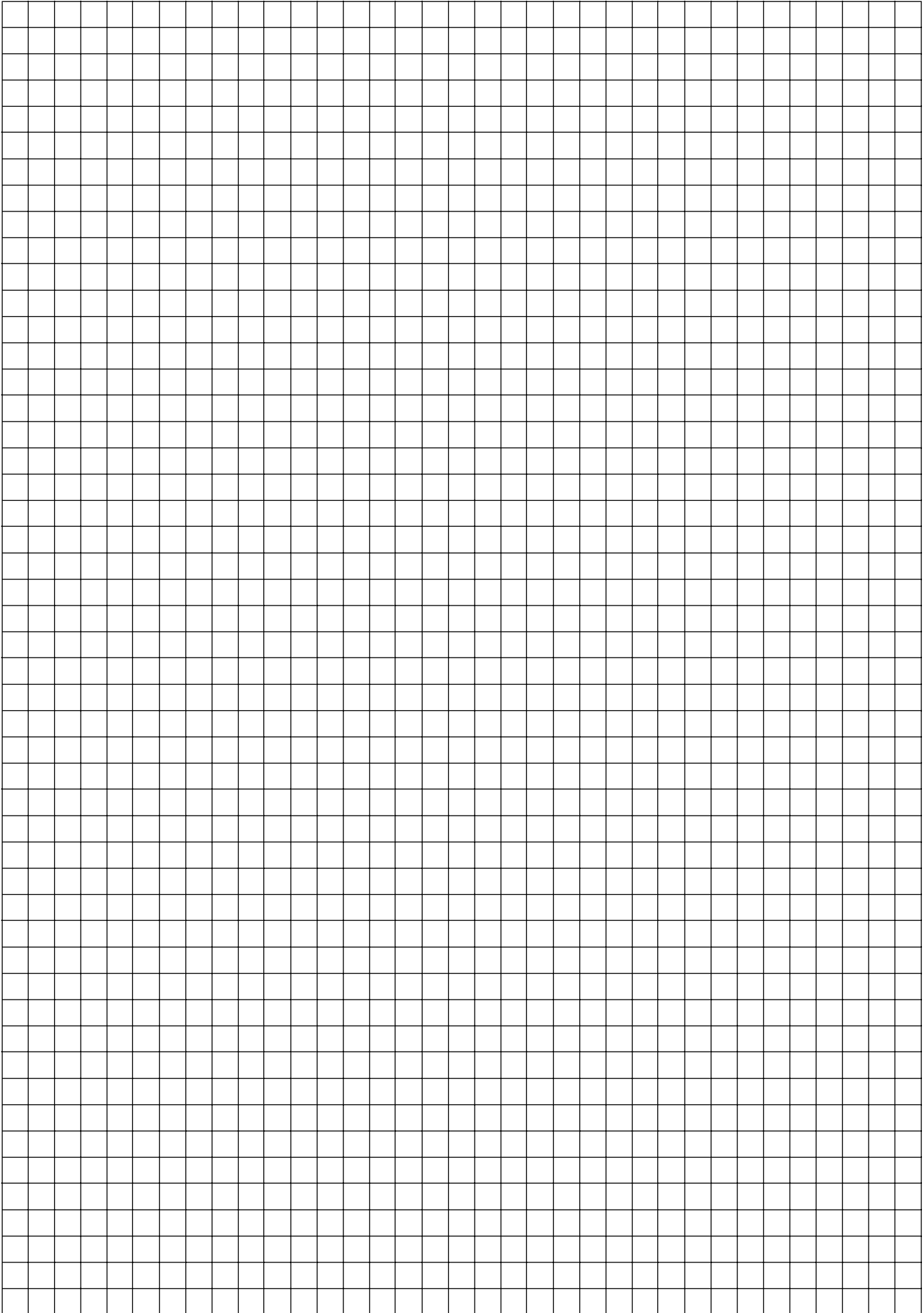
FOR TEACHERS ONLY

GEOMETRY

Wednesday, June 19, 2013 — 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 scoring the open-ended questions, 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. No one teacher is to score more than approximately one-third of the open-ended questions on a student's paper. Teachers may not score their own students' answer papers. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

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 separate 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/assessment/ on Wednesday, June 19, 2013. 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 separate answer sheet. The scale score is the student's final examination score.

If the student's responses for the multiple-choice questions are being hand scored prior to being scanned, the scorer must be careful not to make any marks on the answer sheet except to record the scores in the designated score boxes. Marks elsewhere on the answer sheet will interfere with the accuracy of the scanning.

Part I

Allow a total of 56 credits, 2 credits for each of the following.

(1) 2	(11) 3	(21) . . . . . 2 . . . . .
(2) 2	(12) 2	(22) . . . . . 2 . . . . .
(3) 4	(13) 2	(23) . . . . . 3 . . . . .
(4) 4	(14) 1	(24) . . . . . 2 . . . . .
(5) 2	(15) 2	(25) . . . . . 1 . . . . .
(6) 3	(16) 3	(26) . . . . . 2 . . . . .
(7) 1	(17) 1	(27) . . . . . 3 . . . . .
(8) 3	(18) 4	(28) . . . . . 1 . . . . .
(9) 3	(19) 4	
(10) 1	(20) 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 at: http://www.p12.nysed.gov/assessment/ and select the link "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.

Beginning in June 2013, the Department is providing supplemental scoring guidance, the "Sample Response Set," for the Regents Examination in Geometry. This guidance is not required as part of the scorer training. It is at the school's discretion to incorporate it into the scorer training or to use it as supplemental information during scoring. While not reflective of all scenarios, the sample student responses selected for the Sample Response Set illustrate how less common student responses to open-ended questions may be scored. The Sample Response Set will be available on the Department's web site at: http://www.p12.nysed.gov/assessment/scoring/home-hs.html.

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 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]** 42π, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made, but an appropriate lateral area is found.

or

[1] Appropriate work is shown, but one conceptual error is made, but an appropriate answer is found.

or

[1] Appropriate work is shown, but the answer is written as a decimal.

or

[1] 42π, 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]** 135, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made, but an appropriate interior angle measure is found.

or

[1] Appropriate work is shown, but one conceptual error is made, but an appropriate interior angle measure is found.

or

[1] Appropriate work is shown to find 1,080, the sum of the interior angles, but no further correct work is shown.

or

[1] Appropriate work is shown to find 45, an exterior angle, but no further correct work is shown.

or

[1] 135, 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]** $4\sqrt{5}$, and appropriate work is shown.

[1] Appropriate work is shown, but one computational or simplification error is made, but an appropriate length is found.

or

[1] Appropriate work is shown, but one conceptual error is made, but an appropriate length is found.

or

[1] Appropriate work is shown, but the answer is expressed as a decimal.

or

[1] Appropriate work is shown to find $AB = \sqrt{61}$ or $BC = \sqrt{13}$, but no further correct work is shown.

or

[1] $4\sqrt{5}$, 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.

(32)   **[2]** A correct construction is drawn showing all appropriate arcs, and an equilateral triangle is drawn with a vertex at R.

[1] A correct construction for an equilateral triangle is drawn showing all appropriate arcs, but an incorrect length is used for the side.

or

[1] A correct construction for an isosceles triangle is drawn using the length of the diagonal as the length of the two congruent sides with all appropriate arcs shown.

[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]** Both loci are graphed correctly, and each of the two points are marked with an **X** or the coordinates (3,4) and (3,−4) are stated.

[1] Appropriate work is shown, but one graphing error is made, but appropriate points are marked with an **X**.

or

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

or

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

or

[1] (3,4) and (3,−4) are marked with an **X**, but neither locus is graphed.

or

[1] The solution (3,4) and (3,−4) is stated, but neither locus is graphed.

[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]** $-\dfrac{2}{3}$, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made, but an appropriate slope is found.

or

[1] Appropriate work is shown, but one conceptual error is made, but an appropriate slope is found.

or

[1] Appropriate work is shown to find $\dfrac{3}{2}$, but no further correct work is shown.

or

[1] $-\dfrac{2}{3}$, 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.

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]** $S''(5,-3)$, $W''(3,-4)$, $A''(2,1)$, and $N''(4,2)$ are stated and labeled, and appropriate work is shown.

[3] Appropriate work is shown, but one computational or graphing error is made, but appropriate coordinates for $S''W''A''N''$ are stated and labeled.

or

[3] Appropriate work is shown, and $S''W''A''N''$ is graphed and labeled correctly, but the coordinates are not stated or are stated incorrectly.

[2] Appropriate work is shown, but one computational or graphing error is made, but appropriate coordinates for $S''W''A''N''$ are stated, but the coordinates are not labeled or are labeled incorrectly.

or

[2] Appropriate work is shown, but two or more computational or graphing errors are made, but appropriate coordinates for $S''W''A''N''$ are stated and labeled.

or

[2] Appropriate work is shown, but one conceptual error is made, such as performing the translation before the dilation, but appropriate coordinates for $S''W''A''N''$ are stated and labeled.

or

[2] Appropriate work is shown, and $S'(1,-1)$, $W'(-1,-2)$, $A'(-2,3)$, and $N'(0,4)$ are stated and labeled, 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 appropriate coordinates for $S''W''A''N''$ are stated.

or

[1] $S'W'A'N'$ is graphed and labeled correctly, but no further correct work is shown.

or

[1] $S''(5,-3)$, $W''(3,-4)$, $A''(2,1)$, and $N''(4,2)$, but no work is shown.

[0] $(5,-3)$, $(3,-4)$, $(2,1)$, and $(4,2)$, 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.

(36)   **[4]** 30 and 34, and appropriate work is shown.

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

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

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

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

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

     [2] Appropriate work is shown to find the length of $\overline{DF}$, but no further correct work is shown.

     [1] Appropriate work is shown, but one conceptual error and one computational error are made, but appropriate lengths are found.

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

     [1] Appropriate work is shown to find $y = 20$, but no further correct work is shown.

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

     [1] 30 and 34, 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]** 55, and appropriate algebraic work is shown.

[3] Appropriate work is shown, but one computational or factoring error is made, but an appropriate measure for $\angle C$ is found.

or

[3] Appropriate work is shown to find $x = 15$, but m$\angle C$ is not found or is found incorrectly.

[2] Appropriate work is shown, but two or more computational or factoring errors are made, but an appropriate measure for $\angle C$ is found.

or

[2] Appropriate work is shown, but one conceptual error is made, but an appropriate measure for $\angle C$ is found.

or

[2] A correct quadratic equation in standard form (set equal to zero) is written, but no further correct work is shown.

or

[2] 55, but a method other than algebraic is used.

[1] Appropriate work is shown, but one conceptual error and one computational or factoring error are made, but an appropriate measure for $\angle C$ is found.

or

[1] $x^2 - 8x = 5x + 30$ is written, but no further correct work is shown.

or

[1] 55, but no work is shown.

[0] $x = 15$, 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.

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.

(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.

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

    [5] $\triangle MBA \cong \triangle ATM$ is proven, but no further correct work is shown.

    [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.

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

    [4] $\triangle MHT \cong \triangle AHB$ is proven, but no further correct work is shown.

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

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

    [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.

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

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

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

    [2] $\overline{MB} \cong \overline{AT}$ is proven, but no further correct work is shown.

    [1] Only one or two correct relevant statements and reasons are written.

    [0] The "given" and/or the "prove" statements are written, but no further correct relevant statements are written.

<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.

Map to Core Curriculum

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

Regents Examination in Geometry

June 2013

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

The *Chart for Determining the Final Examination Score for the June 2013 Regents Examination in Geometry* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Wednesday, June 19, 2013. Conversion charts provided for previous administrations of the Regents Examination in Geometry 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.

The State Education Department / The University of the State of New York

Regents Examination in Geometry – June 2013

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	66	19	40
84	97	62	78	40	65	18	39
83	96	61	78	39	64	17	37
82	94	60	77	38	63	16	35
81	93	59	77	37	62	15	34
80	92	58	76	36	61	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	74	31	56	9	22
74	86	52	73	30	55	8	20
73	86	51	72	29	54	7	18
72	85	50	72	28	53	6	15
71	84	49	71	27	51	5	13
70	83	48	70	26	50	4	10
69	83	47	70	25	49	3	8
68	82	46	69	24	48	2	5
67	81	45	68	23	46	1	3
66	81	44	68	22	45	0	0
65	80	43	67	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 "Scale 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.