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

**REGENTS HIGH SCHOOL EXAMINATION**

# MATHEMATICS A

**Tuesday,** January 25, 2005 — 1:15 to 4:15 p.m., only

**Print Your Name:**

**Print Your School's Name:**

Print your name and the name of your school in the boxes 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.

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. Any work done on this sheet of scrap graph paper will *not* be scored. All work should be written in pen, except graphs and drawings, which should be done in pencil.

This examination has four parts, with a total of 39 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. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc.

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 minimum of a scientific calculator, a straightedge (ruler), and a compass must be available for your use while taking this examination.

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

# Part I

Answer all 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. [60]

**1** Stan was trying to guess Melanie's age. She told him her age was an even number and a multiple of three. What could be Melanie's age?

(1) 10          (3) 15

(2) 12          (4) 16

**2** In the accompanying diagram, lines *a* and *b* are parallel, and lines *c* and *d* are transversals.
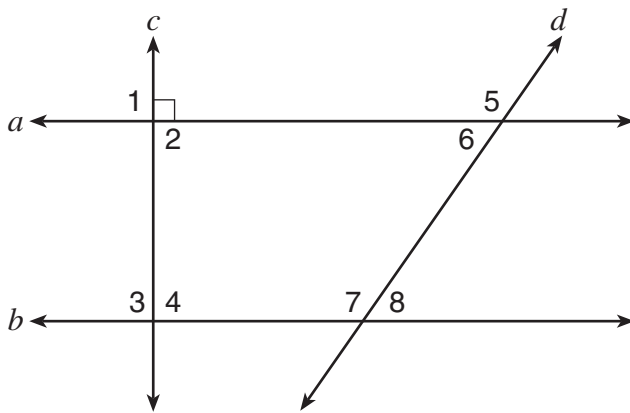


Which angle is congruent to angle 8?

(1) 6          (3) 3

(2) 5          (4) 4

**3** A deli has five types of meat, two types of cheese, and three types of bread. How many different sandwiches, consisting of one type of meat, one type of cheese, and one type of bread, does the deli serve?

(1) 10          (3) 30

(2) 25          (4) 75

**4** The accompanying histogram shows the heights of the students in Kyra's health class.

What is the total number of students in the class?

(1) 5    (3) 16
(2) 15    (4) 209

**5** The perimeter of $\triangle A'B'C'$, the image of $\triangle ABC$, is twice as large as the perimeter of $\triangle ABC$. Which type of transformation has taken place?

(1) dilation    (3) rotation
(2) translation    (4) reflection

**6** If $n + 4$ represents an odd integer, the next larger odd integer is represented by

(1) $n + 2$    (3) $n + 5$
(2) $n + 3$    (4) $n + 6$

**7** What is the solution set of the equation $\frac{x}{5} + \frac{x}{2} = 14$?

(1) {4}    (3) {20}
(2) {10}    (4) {49}

**8** The NuFone Communications Company must run a telephone line between two poles at opposite ends of a lake, as shown in the accompanying diagram. The length and width of the lake are 75 feet and 30 feet, respectively.
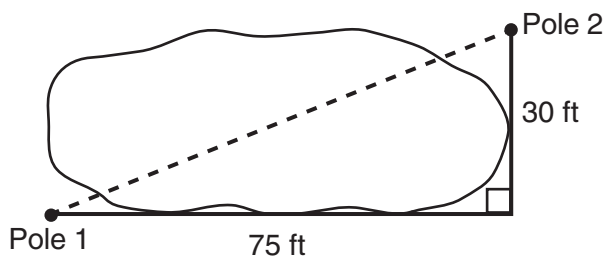
What is the distance between the two poles, to the *nearest foot*?

(1) 105           (3) 69

(2) 81            (4) 45

**9** The image of point $(3,-5)$ under the translation that shifts $(x,y)$ to $(x-1, y-3)$ is

(1) $(-4,8)$         (3) $(2,8)$

(2) $(-3,15)$        (4) $(2,-8)$

**10** Which letter has point symmetry but *not* line symmetry?

(1) **H**           (3) **T**

(2) **S**           (4) **X**

**11** Which expression is equivalent to $x^{-4}$?

(1) $\dfrac{1}{x^4}$         (3) $-4x$

(2) $x^4$           (4) $0$

**12** If $x^3 < x < \dfrac{1}{x}$, then $x$ could be equal to

(1) $1$           (3) $\dfrac{6}{5}$

(2) $5$           (4) $\dfrac{1}{5}$

**13** Which statement is logically equivalent to the statement "If you are an elephant, then you do not forget"?

(1) If you do not forget, then you are an elephant.
(2) If you do not forget, then you are not an elephant.
(3) If you are an elephant, then you forget.
(4) If you forget, then you are not an elephant.

**14** What is the sum, in degrees, of the measures of the interior angles of a pentagon?

(1) 180          (3) 540
(2) 360          (4) 900

**15** How many different three-member teams can be selected from a group of seven students?

(1) 1            (3) 210
(2) 35           (4) 5,040

**16** What is the multiplicative inverse of $\frac{3}{4}$ ?

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

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

**17** Sean knows the length of the base, $b$, and the area, $A$, of a triangular window in his bedroom. Which formula could he use to find the height, $h$, of this window?

(1) $h = 2A - b$            (3) $h = (2A)(b)$

(2) $h = \frac{A}{2b}$            (4) $h = \frac{2A}{b}$

**18** The expression $-|-7|$ is equivalent to

  (1) 1                (3) 7

  (2) 0                (4) −7

**19** In Ms. Wright's English class, 16 students are in band, 7 students play sports, 3 students participate in both activities, and 9 students are not in band and do not play sports. How many students are in Ms. Wright's English class?

  (1) 10             (3) 29

  (2) 26             (4) 35

**20** What is the solution set for the equation $x^2 - 5x + 6 = 0$?

  (1) $\{-6,1\}$        (3) $\{-2,-3\}$

  (2) $\{6,-1\}$        (4) $\{2,3\}$

**21** If the midpoints of the sides of a triangle are connected, the area of the triangle formed is what part of the area of the original triangle?

  (1) $\frac{1}{4}$           (3) $\frac{3}{8}$

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

**22** Which equation represents a line that is parallel to the line whose equation is $2x + 3y = 12$?

  (1) $6y - 4x = 2$      (3) $4x - 6y = 2$

  (2) $6y + 4x = 2$      (4) $6x + 4y = -2$

**23** When $3x^2 - 8x$ is subtracted from $2x^2 + 3x$, the difference is

(1) $-x^2 + 11x$            (3) $-x^2 - 5x$

(2) $x^2 - 11x$             (4) $x^2 - 5x$

**24** The coordinates of point $R$ are $(-3,2)$ and the coordinates of point $T$ are $(4,1)$. What is the length of $\overline{RT}$?

(1) $2\sqrt{2}$            (3) $4\sqrt{3}$

(2) $5\sqrt{2}$            (4) $\sqrt{10}$

**25** A student council has seven officers, of which five are girls and two are boys. If two officers are chosen at random to attend a meeting with the principal, what is the probability that the first officer chosen is a girl and the second is a boy?

(1) $\frac{10}{42}$            (3) $\frac{7}{14}$

(2) $\frac{2}{7}$             (4) $\frac{7}{13}$
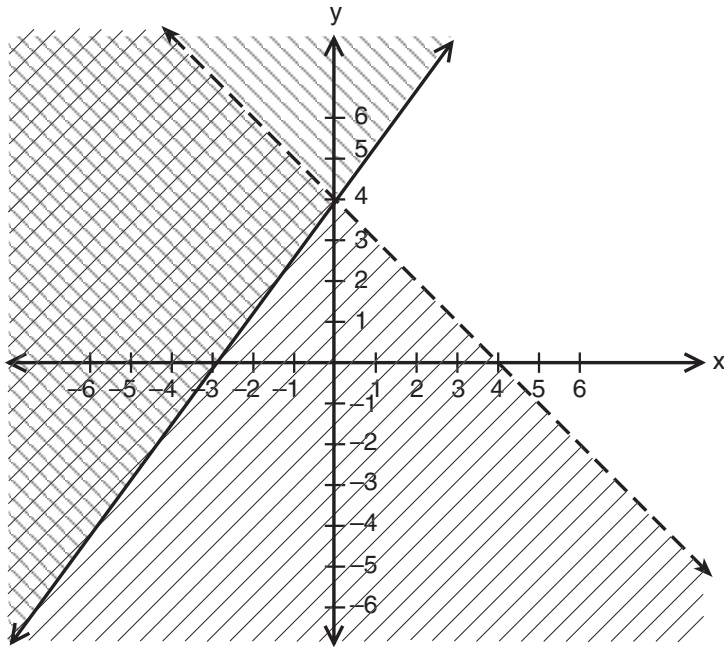
**26** Which expression has the *smallest* value?

(1) $-\pi$            (3) $\frac{-16}{5}$

(2) $-\sqrt{10}$           (4) $-3.02$

**27** How many points are equidistant from two parallel lines and also equidistant from two points on one of the lines?

(1) 1            (3) 3

(2) 2            (4) 4

**28** Which point is in the solution set of the system of inequalities shown in the accompanying graph?

(1) (0,4)　　　　　　　　(3) (−4,1)
(2) (2,4)　　　　　　　　(4) (4,−1)

**29** Expressed in simplest form, $(3x^3)(2y)^2(4x^4)$ is equivalent to
(1) $24x^{12}y^2$　　　　　　(3) $48x^{12}y^2$
(2) $24x^7y^2$　　　　　　　(4) $48x^7y^2$

**30** When $\sqrt{72}$ is expressed in simplest $a\sqrt{b}$ form, what is the value of $a$?
(1) 6　　　　　　　　　　(3) 3
(2) 2　　　　　　　　　　(4) 8

## Part II

Answer all 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. [10]

**31** In the accompanying diagram, a ladder leaning against a building makes an angle of 58° with level ground. If the distance from the foot of the ladder to the building is 6 feet, find, to the *nearest foot*, how far up the building the ladder will reach.



58°
6 ft
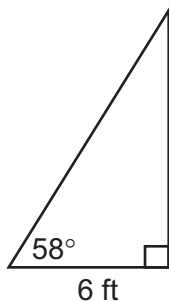
**32** Fran's favorite photograph has a length of 6 inches and a width of 4 inches. She wants to have it made into a poster with dimensions that are similar to those of the photograph. She determined that the poster should have a length of 24 inches. How many inches wide will the poster be?

**33** In rectangle *ABCD*, $AC = 3x + 15$ and $BD = 4x - 5$. Find the length of $\overline{AC}$.

**34** José wants to build a triangular pen for his pet rabbit. He has three lengths of boards already cut that measure 7 feet, 8 feet, and 16 feet. Explain why José cannot construct a pen in the shape of a triangle with sides of 7 feet, 8 feet, and 16 feet.

**35** Construct a stem-and-leaf plot listing the scores below in order from lowest to highest.

15, 25, 28, 32, 39, 40, 43, 26, 50, 75, 65, 19, 55, 72, 50
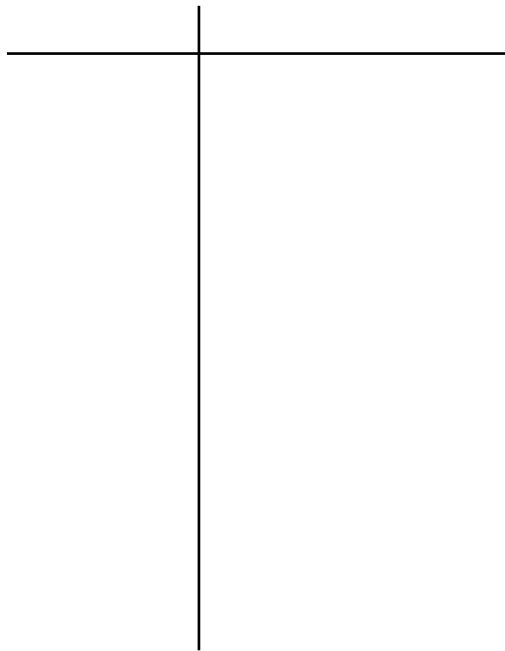
Answer all questions in this part. Each correct answer will receive 3 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit.   [6]

**36** Find all negative odd integers that satisfy the following inequality:
$$-3x + 1 \le 17$$

**37** As shown in the accompanying diagram, the length, width, and height of Richard's fish tank are 24 inches, 16 inches, and 18 inches, respectively. Richard is filling his fish tank with water from a hose at the rate of 500 cubic inches per minute. How long will it take, to the *nearest minute*, to fill the tank to a depth of 15 inches?
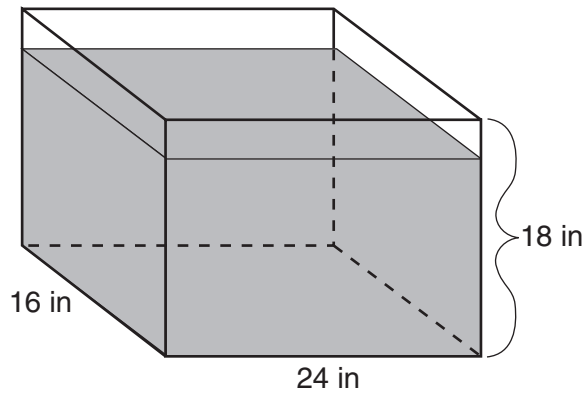
16 in

18 in

24 in

(Not drawn to scale)

## Part IV

Answer all 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. [8]

**38** In $\triangle ABC$, the measure of $\angle B$ is 21 less than four times the measure of $\angle A$, and the measure of $\angle C$ is 1 more than five times the measure of $\angle A$. Find the measure, in degrees, of *each* angle of $\triangle ABC$.

**39** The tickets for a dance recital cost $5.00 for adults and $2.00 for children. If the total number of tickets sold was 295 and the total amount collected was $1,220, how many adult tickets were sold? [Only an algebraic solution can receive full credit.]

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# MATHEMATICS A

**Tuesday,** January 25, 2005 — 1:15 to 4:15 p.m., only

**ANSWER SHEET**

Student ........................................... Sex: ☐ Male ☐ Female Grade .........

Teacher ........................................... School ...................................

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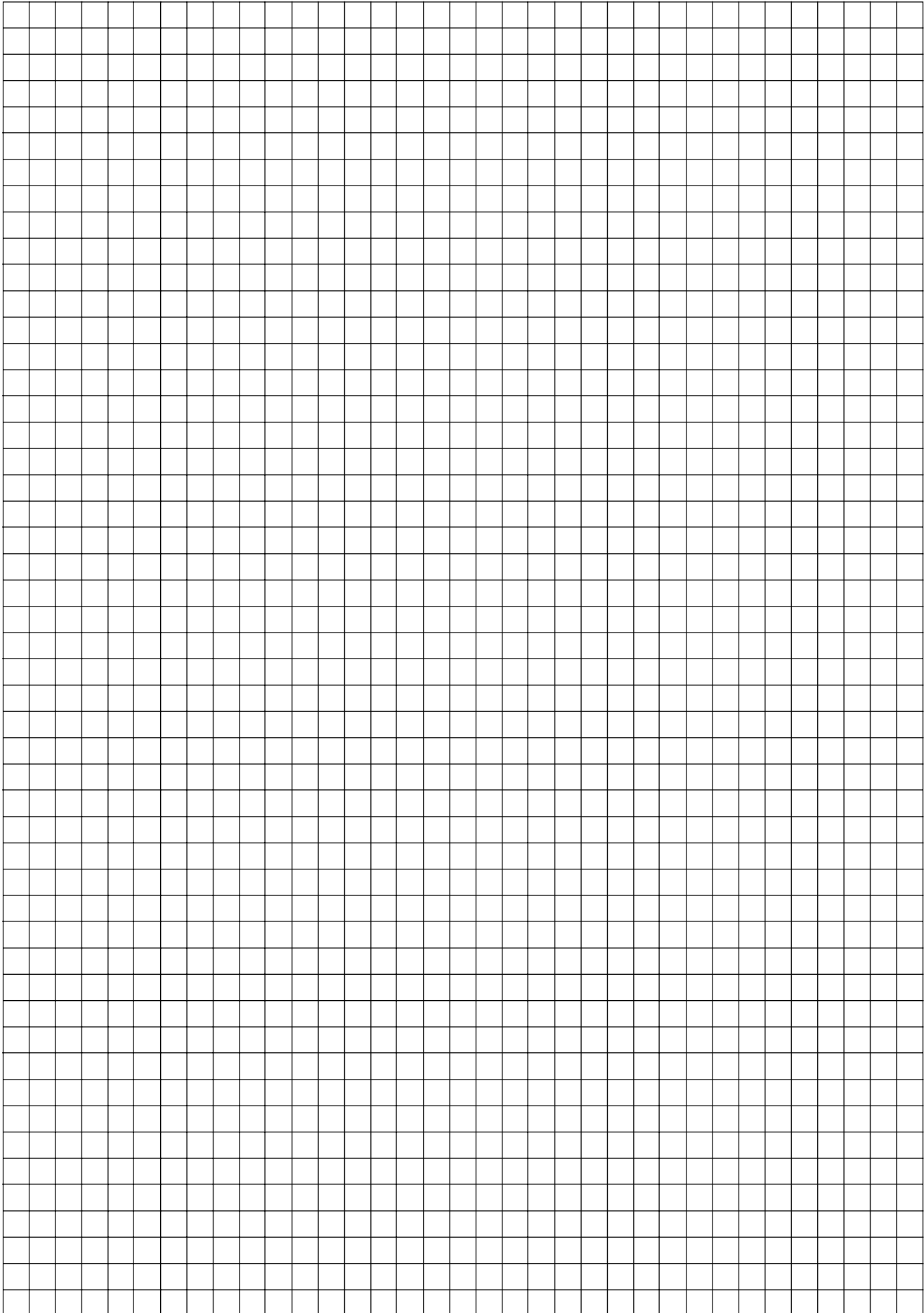
**Part I**

**Answer all 30 questions in this part.**

| | | | |
|---|---|---|---|
| 1 .................... | 9 .................... | 17 .................... | 25 .................... |
| 2 .................... | 10 .................... | 18 .................... | 26 .................... |
| 3 .................... | 11 .................... | 19 .................... | 27 .................... |
| 4 .................... | 12 .................... | 20 .................... | 28 .................... |
| 5 .................... | 13 .................... | 21 .................... | 29 .................... |
| 6 .................... | 14 .................... | 22 .................... | 30 .................... |
| 7 .................... | 15 .................... | 23 .................... | |
| 8 .................... | 16 .................... | 24 .................... | |

**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

# MATHEMATICS A

| MATHEMATICS A | | | |
|---|---|---|---|
| Question | Maximum Credit | Credits Earned | Rater's/Scorer's Initials |
| Part I  1–30 | 60 | | |
| Part II      31 | 2 | | |
|              32 | 2 | | |
|              33 | 2 | | |
|              34 | 2 | | |
|              35 | 2 | | |
| Part III    36 | 3 | | |
|              37 | 3 | | |
| Part IV    38 | 4 | | |
|              39 | 4 | | |
| Maximum Total | 84 | | |

Total Raw Score          Checked by          Scaled Score
                                                              (from conversion chart)

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