

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

# MATHEMATICS A

Wednesday, June 19, 2002 — 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 35 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. Record your answers in the spaces provided on the separate answer sheet. [40]

- 1 Jamie is 5 years older than her sister Amy. If the sum of their ages is 19, how old is Jamie?

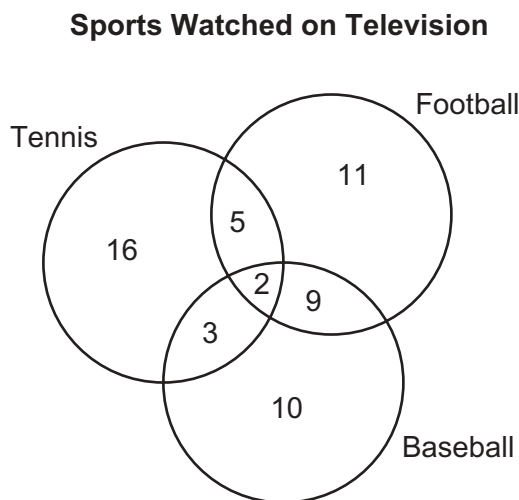
- (1) 5                                      (3) 12  
(2) 7                                      (4) 14

Use this space for computations.

- 2 If the probability that it will rain on Thursday is  $\frac{5}{6}$ , what is the probability that it will *not* rain on Thursday?

- (1) 1                                      (3)  $\frac{1}{6}$   
(2) 0                                      (4)  $\frac{5}{6}$

- 3 The accompanying diagram shows the results of a survey asking which sports the members of the Key Club watch on television.



Which statement or statements are true?

- I The most watched sport is tennis.  
II The least watched sport is baseball.  
III More Key Club members watch tennis than football.

- (1) I, only                                      (3) I and II, only  
(2) II, only                                      (4) II and III, only

**Use this space for  
computations.**

**4** During each marking period, there are five tests. If Vanita needs a 65 average to pass this marking period and her first four grades are 60, 72, 55, and 80, what is the *lowest* score she can earn on the last test to have a passing average?

- (1) 58                                      (3) 80  
(2) 65                                      (4) 100

**5** What is the slope of the linear equation  $5y - 10x = -15$ ?

- (1) 10                                      (3) -10  
(2) 2                                      (4) -15

**6** Which expression is a factor of  $n^2 + 3n - 54$ ?

- (1)  $n + 6$                                       (3)  $n - 9$   
(2)  $n^2 + 9$                                       (4)  $n + 9$

**7** If  $3.85 \times 10^6$  is divided by  $385 \times 10^4$ , the result is

- (1) 1                                      (3)  $3.85 \times 10^2$   
(2) 0.01                                      (4)  $3.85 \times 10^{10}$

**8** Two triangles are similar. The lengths of the sides of the smaller triangle are 3, 5, and 6, and the length of the longest side of the larger triangle is 18. What is the perimeter of the larger triangle?

- (1) 14                                      (3) 24  
(2) 18                                      (4) 42

9 Which letter has point symmetry?

- (1) **A**                                      (3) **H**  
(2) **B**                                      (4) **W**

Use this space for  
computations.

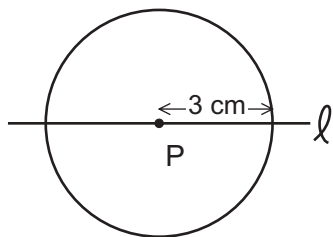
10 If two lines are parallel and the slope of one of the lines is  $m$ , what is the product of their slopes?

- (1) 1                                          (3)  $m^2$   
(2)  $2m$                                       (4) 0

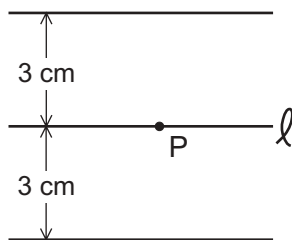
11 Which is an irrational number?

- (1) 0                                          (3)  $-\frac{1}{3}$   
(2)  $\pi$                                         (4)  $\sqrt{9}$

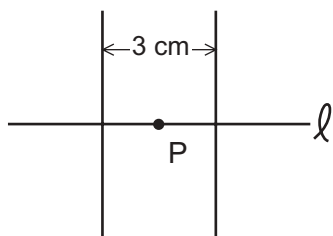
12 If point  $P$  lies on line  $\ell$ , which diagram represents the locus of points 3 centimeters from point  $P$ ?



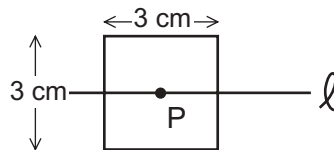
(1)



(3)



(2)



(4)

Use this space for computations.

13 What is the measure, in degrees, of each exterior angle of a regular hexagon?

- (1) 45
- (2) 60
- (3) 120
- (4) 135

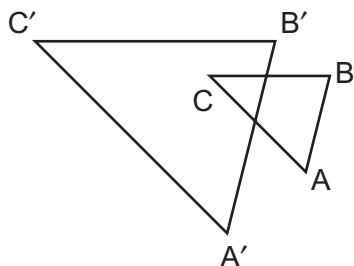
14 What is the solution of the equation  $3y - 5y + 10 = 36$ ?

- (1) -13
- (2) 2
- (3) 4.5
- (4) 13

15 If the circumference of a circle is doubled, the diameter of the circle

- (1) remains the same
- (2) increases by 2
- (3) is multiplied by 4
- (4) is doubled

16 In the accompanying diagram,  $\triangle ABC$  is similar to but not congruent to  $\triangle A'B'C'$ .



Which transformation is represented by  $\triangle A'B'C'$ ?

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

17 The expression  $15 - 3[2 + 6(-3)]$  simplifies to

- (1) -45
- (2) -33
- (3) 63
- (4) 192

18 The expression  $\sqrt{90} \cdot \sqrt{40} - \sqrt{8} \cdot \sqrt{18}$  simplifies to

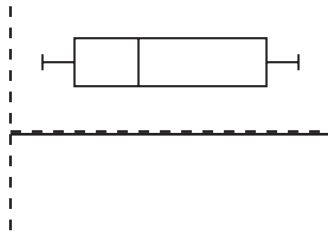
- (1) 22.9                                      (3) 864  
(2) 48                                          (4) 3,456

**Use this space for  
computations.**

19 If  $x = 2a - b^2$ , then  $a$  equals

- (1)  $\frac{x-b^2}{2}$                                       (3)  $\frac{b^2-x}{2}$   
(2)  $\frac{x+b^2}{2}$                                       (4)  $x + b^2$

20 The accompanying diagram is an example of which type of graph?



- (1) bar graph                                      (3) histogram  
(2) stem-and-leaf plot                              (4) box-and-whisker plot
-

## 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]

**21** Given the true statement “John is not handsome” and the false statement “John is handsome or smart.” Determine the truth value for the statement “John is smart.”

**22** Ninety percent of the ninth grade students at Richbartville High School take algebra. If 180 ninth grade students take algebra, how many ninth grade students do *not* take algebra?

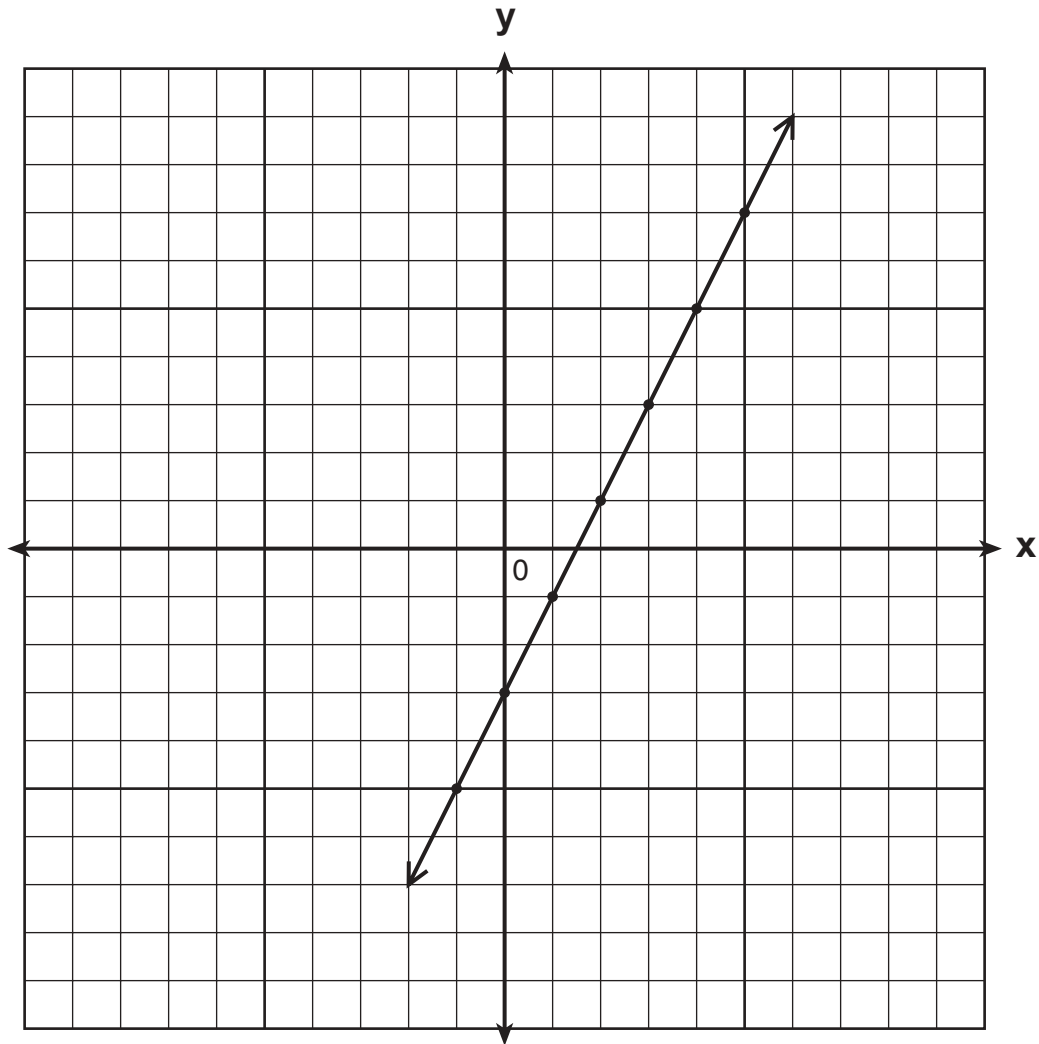
**23** If the instructions for cooking a turkey state “Roast turkey at  $325^\circ$  for 20 minutes per pound,” how many *hours* will it take to roast a 20-pound turkey at  $325^\circ$ ?

**24** An addition table for a subset of real numbers is shown below. Which number is the identity element? Explain your answer.

+	0	1	2	3
0	0	1	2	3
1	1	2	3	4
2	2	3	4	0
3	3	4	0	1



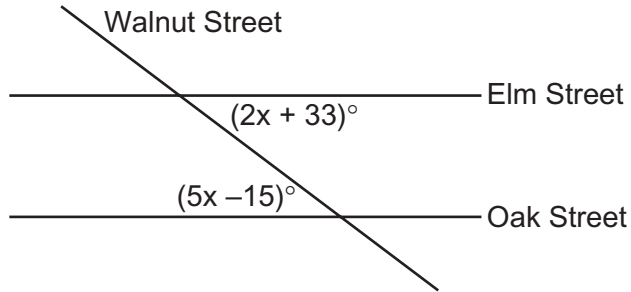
25 Write the equation for the line shown in the accompanying graph.  
Explain your answer.



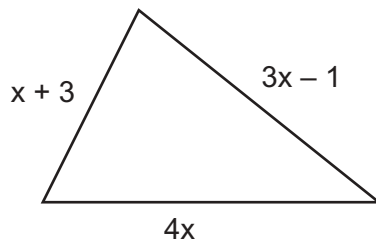
### Part III

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. [15]

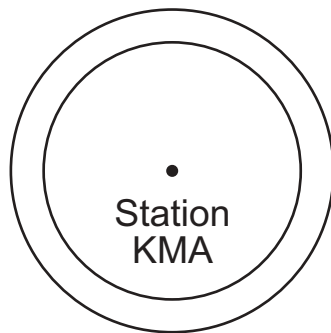
- 26 Two parallel roads, Elm Street and Oak Street, are crossed by a third, Walnut Street, as shown in the accompanying diagram. Find the number of degrees in the acute angle formed by the intersection of Walnut Street and Elm Street.



- 27 The plot of land illustrated in the accompanying diagram has a perimeter of 34 yards. Find the length, in yards, of *each* side of the figure. Could these measures actually represent the measures of the sides of a triangle? Explain your answer.

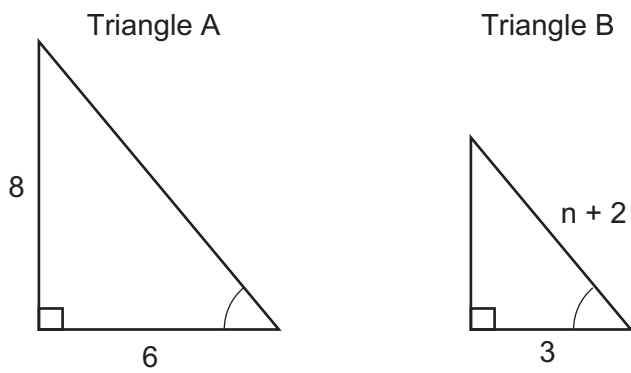


- 28 As shown in the accompanying diagram, radio station KMA is increasing its radio listening radius from 40 miles to 50 miles. How many additional square miles of listening area, to the *nearest tenth*, will the radio station gain?



29 Solve for  $x$ :  $x^2 + 3x - 28 = 0$

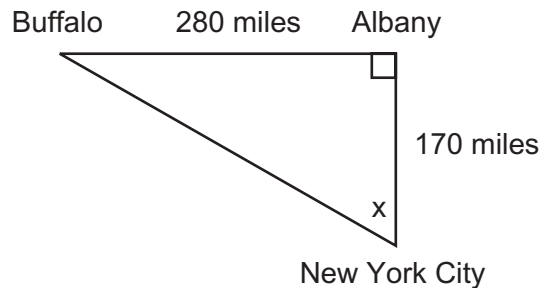
30 In the accompanying diagram, triangle  $A$  is similar to triangle  $B$ . Find the value of  $n$ .



### 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. [20]

- 31 As seen in the accompanying diagram, a person can travel from New York City to Buffalo by going north 170 miles to Albany and then west 280 miles to Buffalo.



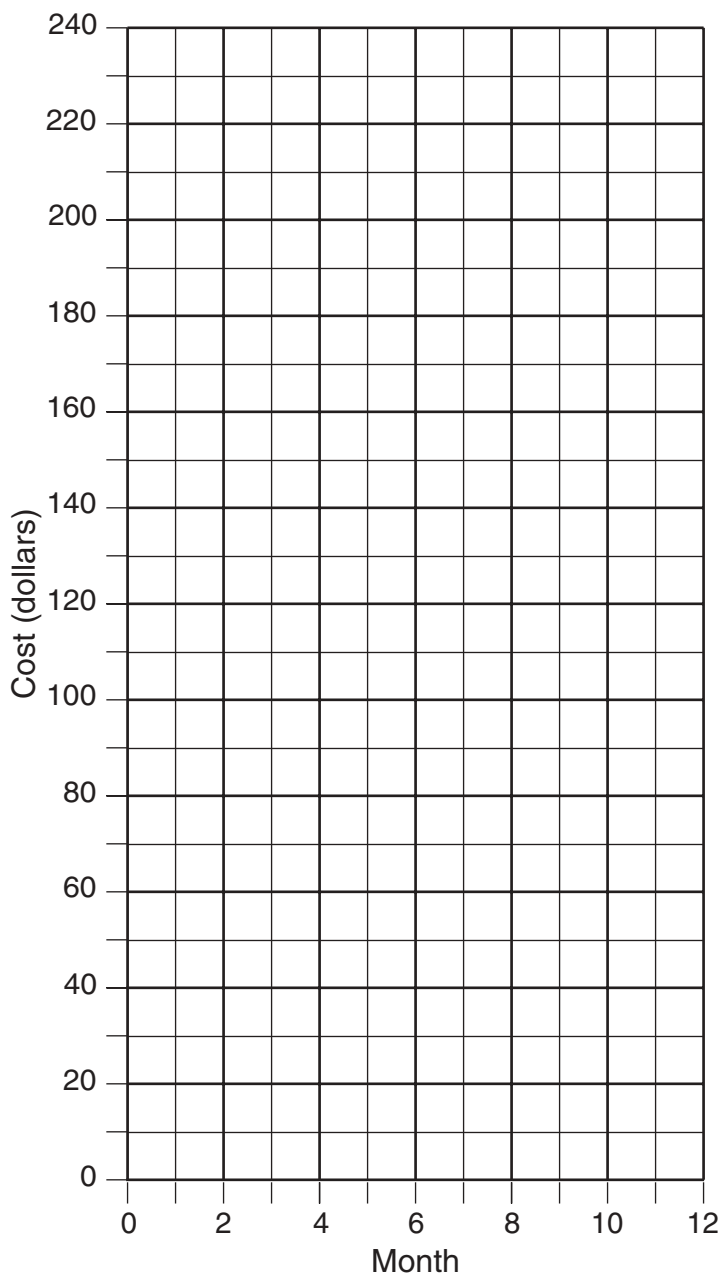
- a** If an engineer wants to design a highway to connect New York City directly to Buffalo, at what angle,  $x$ , would she need to build the highway? Find the angle to the *nearest degree*.
- b** To the *nearest mile*, how many miles would be saved by traveling directly from New York City to Buffalo rather than by traveling first to Albany and then to Buffalo?

**32** At Ron's Rental, a person can rent a big-screen television for \$10 a month plus a one-time "wear-and-tear" fee of \$100. At Josie's Rental, the charge is \$20 a month and an additional charge of \$20 for delivery with no "wear-and-tear" fee.

**a** If  $c$  equals the cost, write one equation representing the cost of the rental for  $m$  months at Ron's Rental and one equation representing the cost of the rental for  $m$  months at Josie's Rental.

**b** On the accompanying grid, graph and label *each* equation.

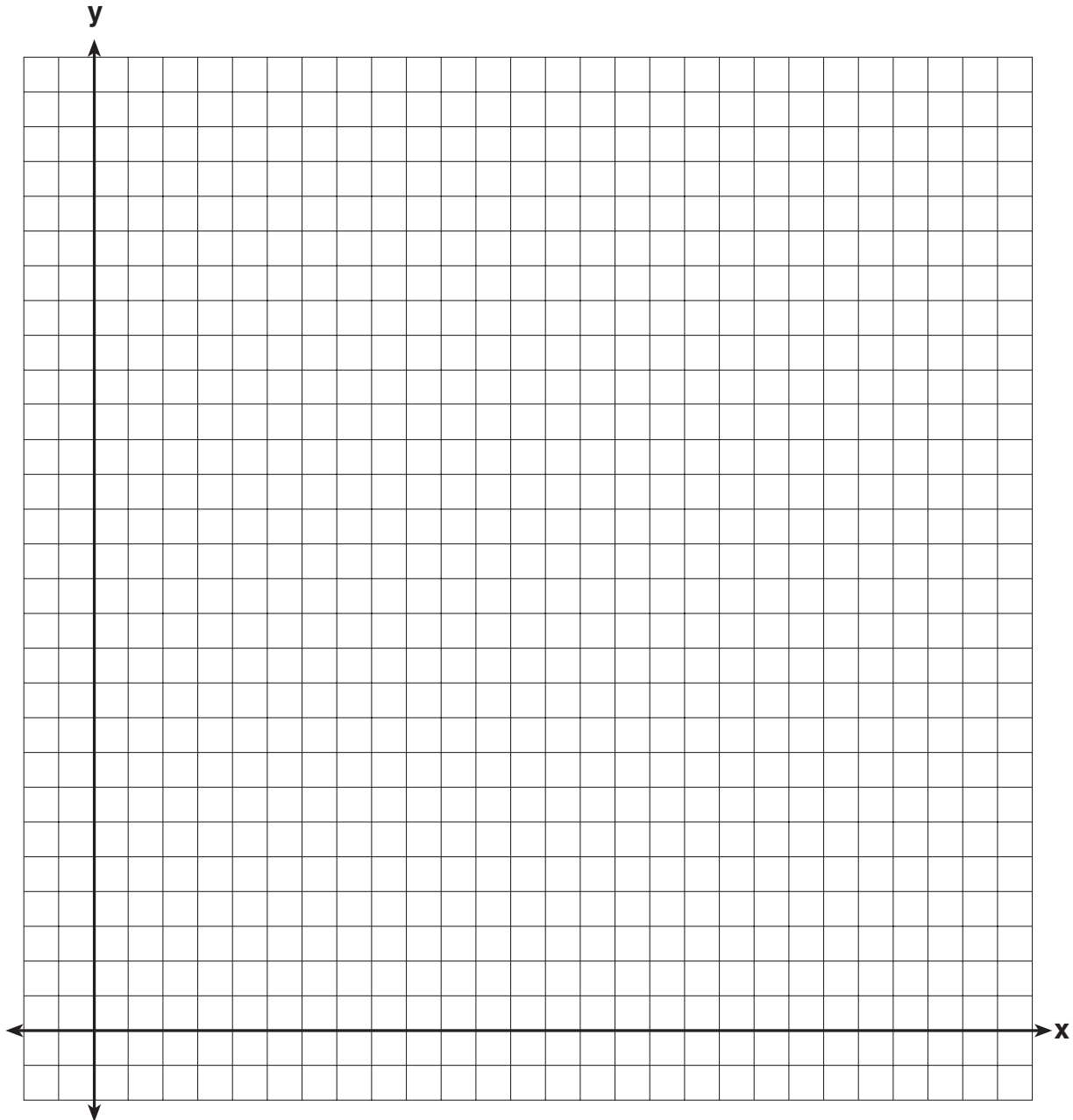
**c** From your graph, determine in which month Josie's cost will equal Ron's cost.



**33** Mr. Perez owns a sneaker store. He bought 350 pairs of basketball sneakers and 150 pairs of soccer sneakers from the manufacturers for \$62,500. He sold all the sneakers and made a 25% profit. If he sold the soccer sneakers for \$130 per pair, how much did he charge for one pair of basketball sneakers?

**34** Alexi's wallet contains four \$1 bills, three \$5 bills, and one \$10 bill. If Alexi randomly removes two bills without replacement, determine whether the probability that the bills will total \$15 is greater than the probability that the bills will total \$2.

**35** A rocket is launched from the ground and follows a parabolic path represented by the equation  $y = -x^2 + 10x$ . At the same time, a flare is launched from a height of 10 feet and follows a straight path represented by the equation  $y = -x + 10$ . Using the accompanying set of axes, graph the equations that represent the paths of the rocket and the flare, and find the coordinates of the point or points where the paths intersect.

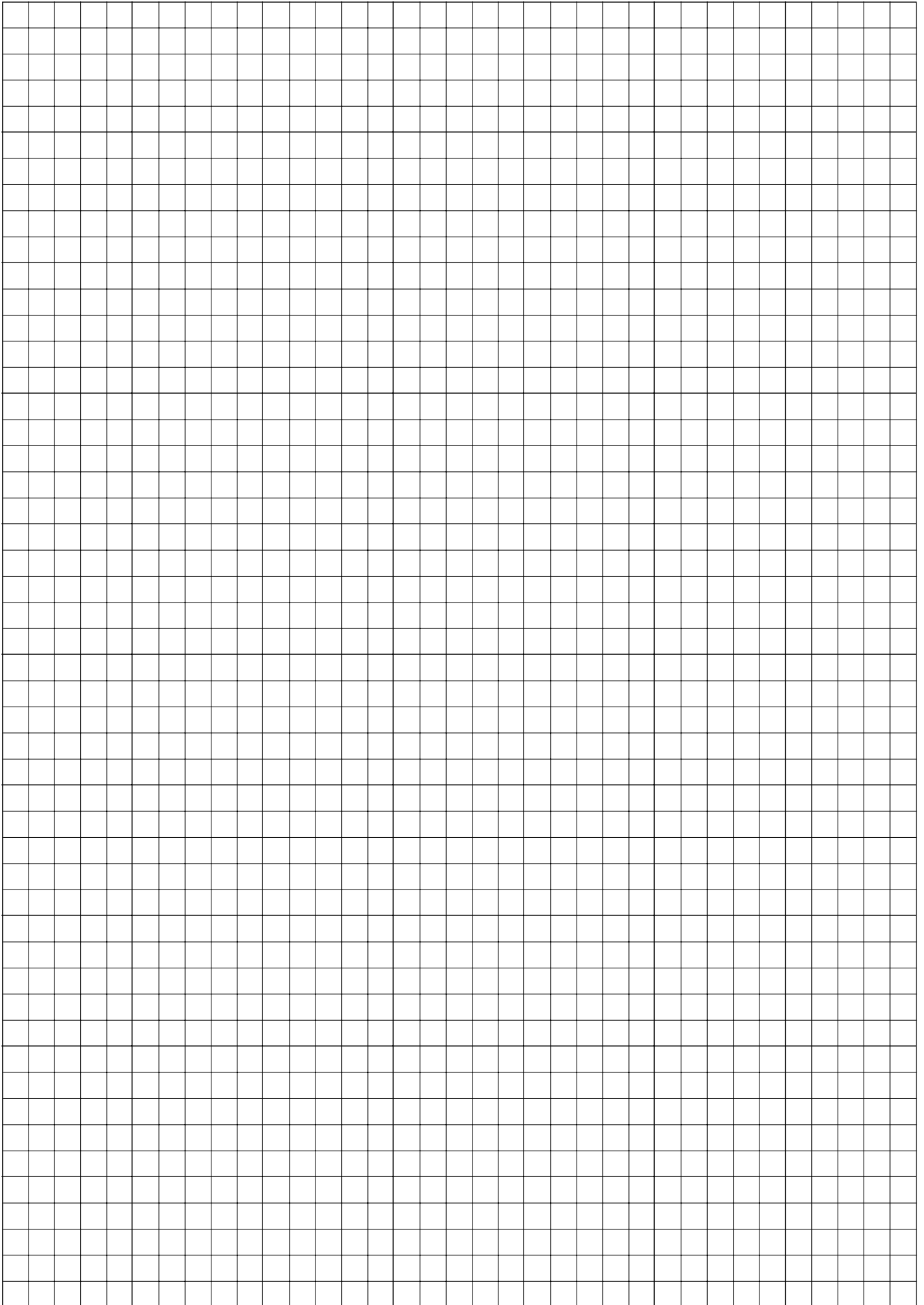




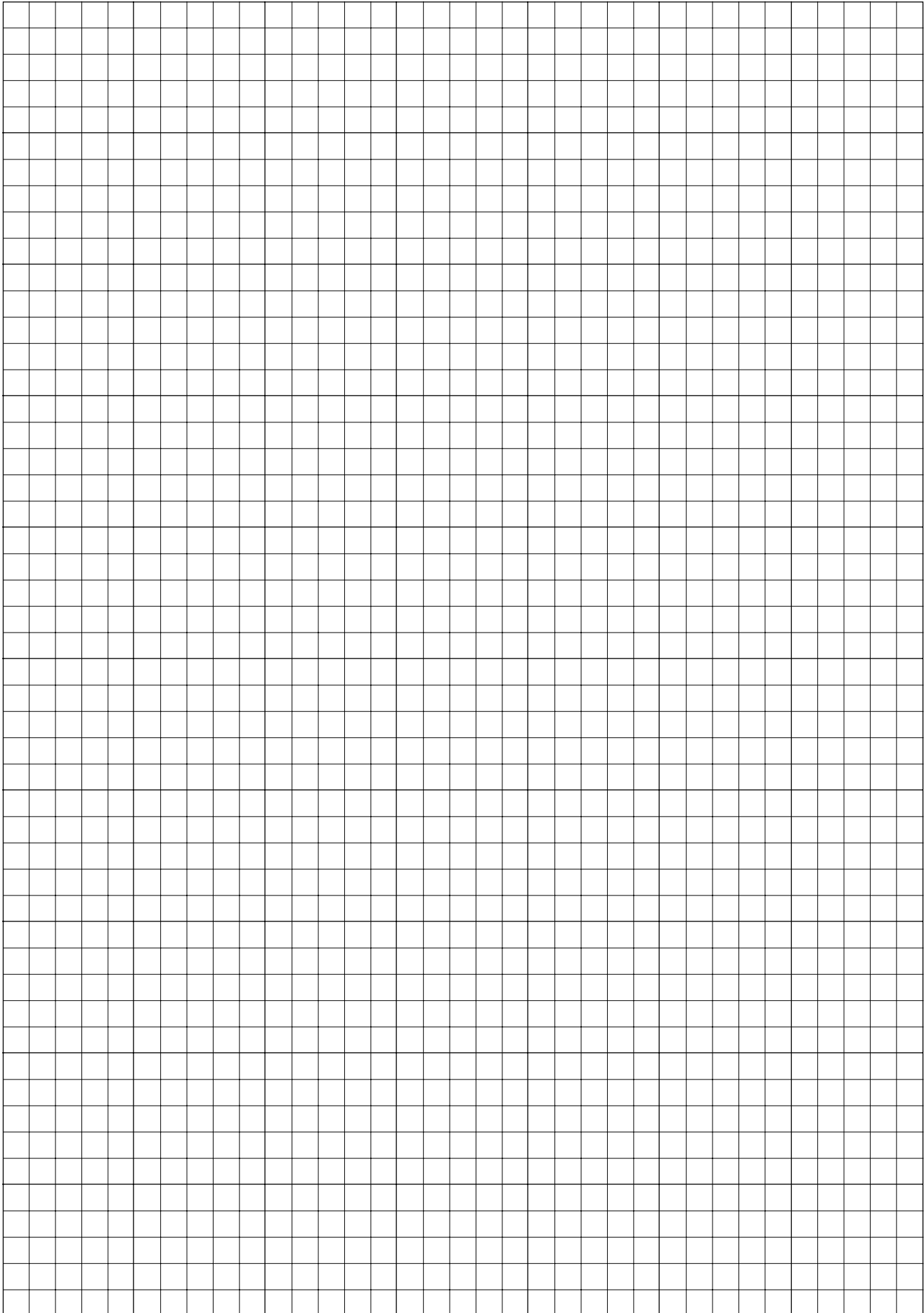
Scrap Graph Paper — This sheet will *not* be scored.

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REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS A

Wednesday, June 19, 2002 — 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 20 questions in this part.

- 1 ..... 6 ..... 11 ..... 16 .....
2 ..... 7 ..... 12 ..... 17 .....
3 ..... 8 ..... 13 ..... 18 .....
4 ..... 9 ..... 14 ..... 19 .....
5 ..... 10 ..... 15 ..... 20 .....

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

Tear Here

<b>MATHEMATICS A</b>			
<b>Question</b>	<b>Maximum Credit</b>	<b>Credits Earned</b>	<b>Rater's/Scorer's Initials</b>
<b>Part I 1–20</b>	<b>40</b>		
<b>Part II 21</b>	<b>2</b>		
<b>22</b>	<b>2</b>		
<b>23</b>	<b>2</b>		
<b>24</b>	<b>2</b>		
<b>25</b>	<b>2</b>		
<b>Part III 26</b>	<b>3</b>		
<b>27</b>	<b>3</b>		
<b>28</b>	<b>3</b>		
<b>29</b>	<b>3</b>		
<b>30</b>	<b>3</b>		
<b>Part IV 31</b>	<b>4</b>		
<b>32</b>	<b>4</b>		
<b>33</b>	<b>4</b>		
<b>34</b>	<b>4</b>		
<b>35</b>	<b>4</b>		
<b>Maximum Total</b>	<b>85</b>		

<b>Rater's/Scorer's Name (minimum of three)</b>

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Total Raw Score      Checked by      Scaled Score

**Notes to raters. . .**

- Each paper should be scored by a minimum of three raters.
- The table for converting the total raw score to the scaled score is provided in the scoring key for this examination.
- The scaled score is the student's final examination score.

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