

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS A

Tuesday, August 13, 2002 — 8:30 to 11:30 a.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

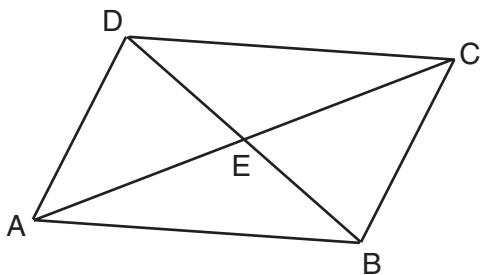
Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Record your answers in the spaces provided on the separate answer sheet. [40]

- 1 On a map, 1 centimeter represents 40 kilometers. How many kilometers are represented by 8 centimeters?

(1) 5
(2) 48
(3) 280
(4) 320

Use this space for computations.

- 2 In the accompanying diagram of parallelogram $ABCD$, diagonals \overline{AC} and \overline{DB} intersect at E , $AE = 3x - 4$, and $EC = x + 12$.



What is the value of x ?

(1) 8
(2) 16
(3) 20
(4) 40

- 3 What is the total number of points equidistant from two intersecting straight roads and also 300 feet from the traffic light at the center of the intersection?

(1) 1
(2) 2
(3) 3
(4) 4

- 4 Juan has three blue shirts, two green shirts, seven red shirts, five pairs of denim pants, and two pairs of khaki pants. How many different outfits consisting of one shirt and one pair of pants are possible?

(1) 19
(2) 84
(3) 130
(4) 420

**Use this space for
computations.**

- 5 Given the statement: “If two lines are cut by a transversal so that the corresponding angles are congruent, then the lines are parallel.”

What is true about the statement and its converse?

- (1) The statement and its converse are both true.
- (2) The statement and its converse are both false.
- (3) The statement is true, but its converse is false.
- (4) The statement is false, but its converse is true.

- 6 If the area of a square garden is 48 square feet, what is the length, in feet, of one side of the garden?

- (1) $12\sqrt{2}$
- (2) $4\sqrt{3}$
- (3) $16\sqrt{3}$
- (4) $4\sqrt{6}$

- 7 The sum of $\frac{3}{x} + \frac{2}{5}$, $x \neq 0$, is

- (1) $\frac{1}{x}$
- (2) $\frac{2x+15}{5x}$
- (3) $\frac{5}{x+5}$
- (4) $\frac{2x+15}{x+5}$

- 8 The number 0.14114111411114... is

- (1) integral
- (2) rational
- (3) irrational
- (4) whole

- 9 When $-2x^2 + 4x + 2$ is subtracted from $x^2 + 6x - 4$, the result is

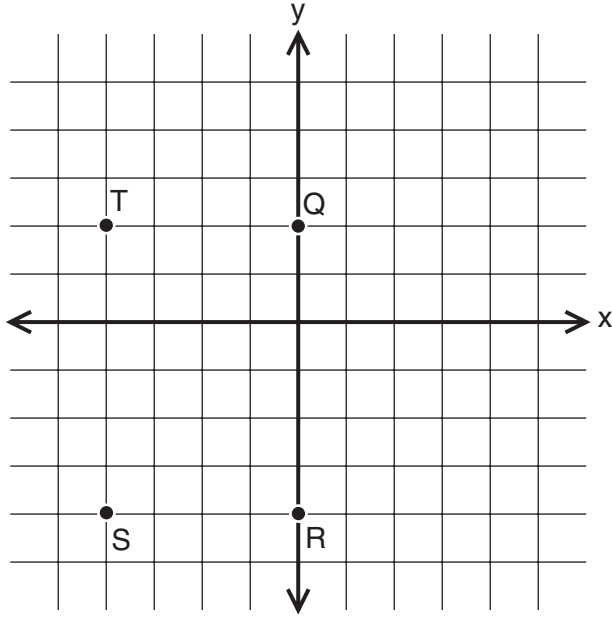
- (1) $-3x^2 - 2x + 6$
- (2) $-x^2 + 10x - 2$
- (3) $2x^2 - 2x - 6$
- (4) $3x^2 + 2x - 6$

- 10 If 0.0347 is written by a scientist in the form 3.47×10^n , the value of n is

- (1) -2
- (2) 2
- (3) 3
- (4) -3

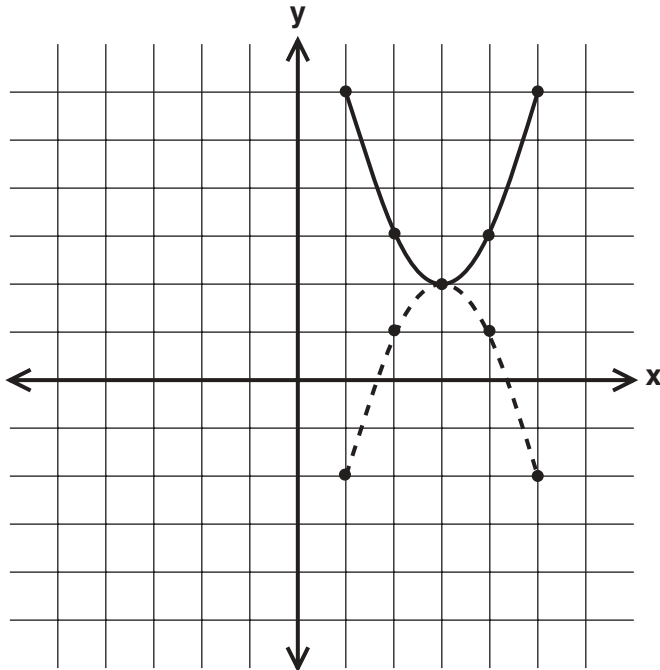
11 If $x = -2$ and $y = -1$, which point on the accompanying set of axes represents the translation $(x,y) \rightarrow (x + 2, y - 3)$?

Use this space for computations.



- | | |
|---------|---------|
| (1) Q | (3) S |
| (2) R | (4) T |

12 In the accompanying diagram, which transformation changes the solid-line parabola to the dotted-line parabola?



- | | |
|---------------------------|---------------------------------|
| (1) translation | (3) rotation, only |
| (2) line reflection, only | (4) line reflection or rotation |

13 How many times larger than $\frac{1}{4}x$ is $5x$?

(1) 20

(3) $\frac{5}{4}$

(2) 9

(4) $\frac{4}{5}$

Use this space for
computations.

14 If the lengths of two sides of a triangle are 4 and 10, what could be the length of the third side?

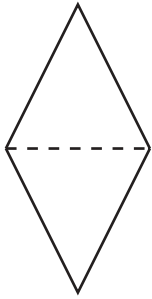
(1) 6

(3) 14

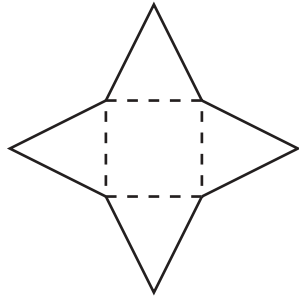
(2) 8

(4) 16

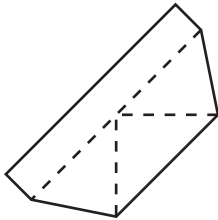
15 Which piece of paper can be folded into a pyramid?



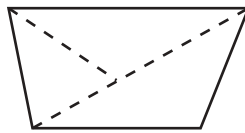
(1)



(3)



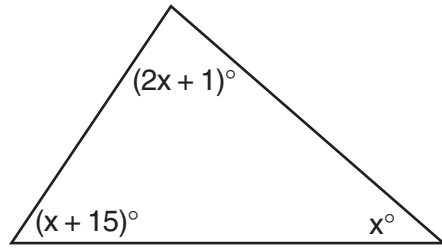
(2)



(4)

16 What is the measure of the largest angle in the accompanying triangle?

Use this space for computations.



- (1) 41
(2) 46.5
(3) 56
(4) 83

17 M is the midpoint of \overline{AB} . If the coordinates of A are $(-1,5)$ and the coordinates of M are $(3,3)$, what are the coordinates of B ?

- (1) $(1,4)$
(2) $(2,8)$
(3) $(7,1)$
(4) $(-5,7)$

18 If $2m + 2p = 16$, p equals

- (1) $8 - m$
(2) $16 - m$
(3) $16 + 2m$
(4) $9m$

19 If $2x + 5 = -25$ and $-3m - 6 = 48$, what is the product of x and m ?

- (1) -270
(2) -33
(3) 3
(4) 270

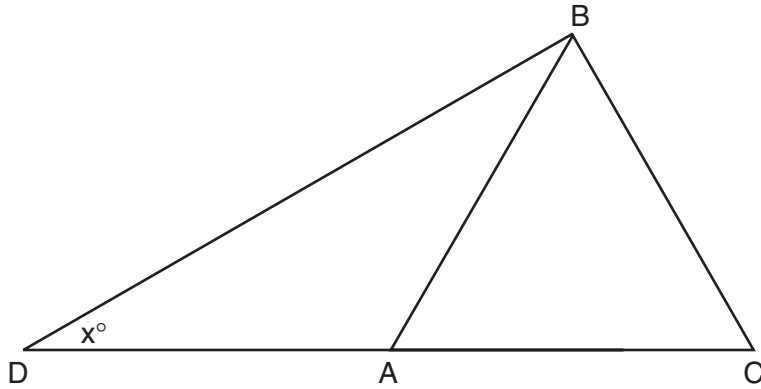
20 In the graph of $y \leq -x$, which quadrant is completely shaded?

- (1) I
(2) II
(3) III
(4) IV
-

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 In the accompanying diagram of $\triangle BCD$, $\triangle ABC$ is an equilateral triangle and $AD = AB$. What is the value of x , in degrees?



22 In the addition table for a subset of real numbers shown below, which number is the inverse of 3? Explain your answer.

\oplus	1	2	3	4
1	2	3	4	1
2	3	4	1	2
3	4	1	2	3
4	1	2	3	4

23 An image of a building in a photograph is 6 centimeters wide and 11 centimeters tall. If the image is similar to the actual building and the actual building is 174 meters wide, how tall is the actual building, in meters?

24 A doughnut shop charges \$0.70 for each doughnut and \$0.30 for a carryout box. Shirley has \$5.00 to spend. At most, how many doughnuts can she buy if she also wants them in one carryout box?

25 In bowling leagues, some players are awarded extra points called their “handicap.” The “handicap” in Anthony’s league is 80% of the difference between 200 and the bowler’s average. Anthony’s average is 145. What is Anthony’s “handicap”?

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]

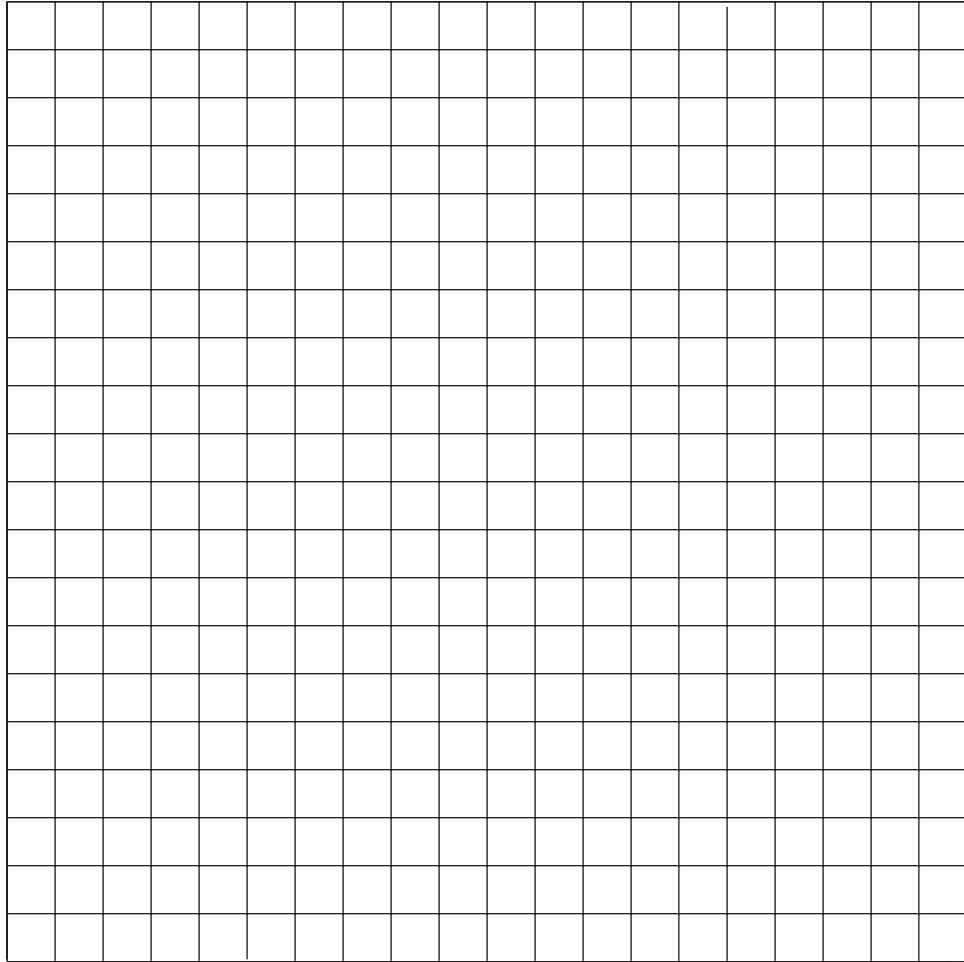
26 In a telephone survey of 100 households, 32 households purchased Brand A cereal and 45 purchased Brand B cereal. If 10 households purchased both items, how many of the households surveyed did *not* purchase either Brand A or Brand B cereal?

27 Tamika could not remember her scores from five mathematics tests. She did remember that the mean (average) was exactly 80, the median was 81, and the mode was 88. If all her scores were integers with 100 the highest score possible and 0 the lowest score possible, what was the *lowest* score she could have received on any one test?

28 There are 28 students in a mathematics class. If $\frac{1}{4}$ of the students are called to the guidance office, $\frac{1}{3}$ of the remaining students are called to the nurse, and, finally, $\frac{1}{2}$ of those left go to the library, how many students remain in the classroom?

29 On a bookshelf, there are five different mystery books and six different biographies. How many different sets of four books can Emilio choose if two of the books must be mystery books and two of the books must be biographies?

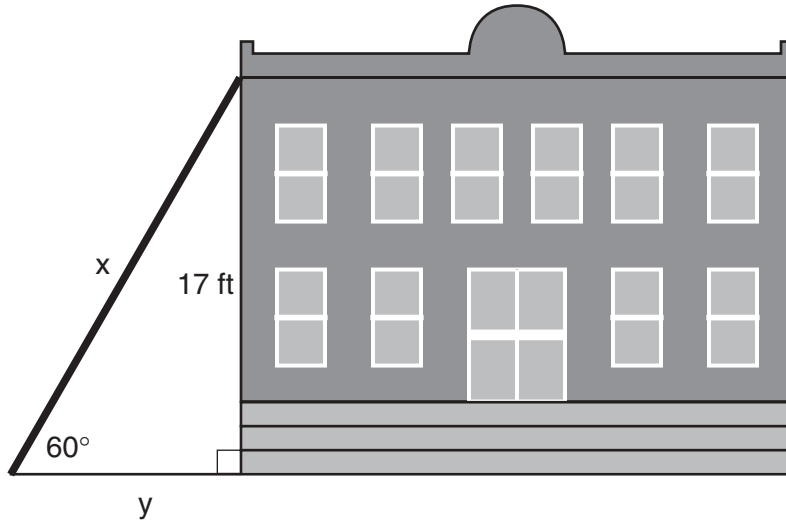
30 On the accompanying grid, graph a circle whose center is at $(0,0)$ and whose radius is 5. Determine if the point $(5,-2)$ lies on the circle.



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 In the accompanying diagram, x represents the length of a ladder that is leaning against a wall of a building, and y represents the distance from the foot of the ladder to the base of the wall. The ladder makes a 60° angle with the ground and reaches a point on the wall 17 feet above the ground. Find the number of feet in x and y .



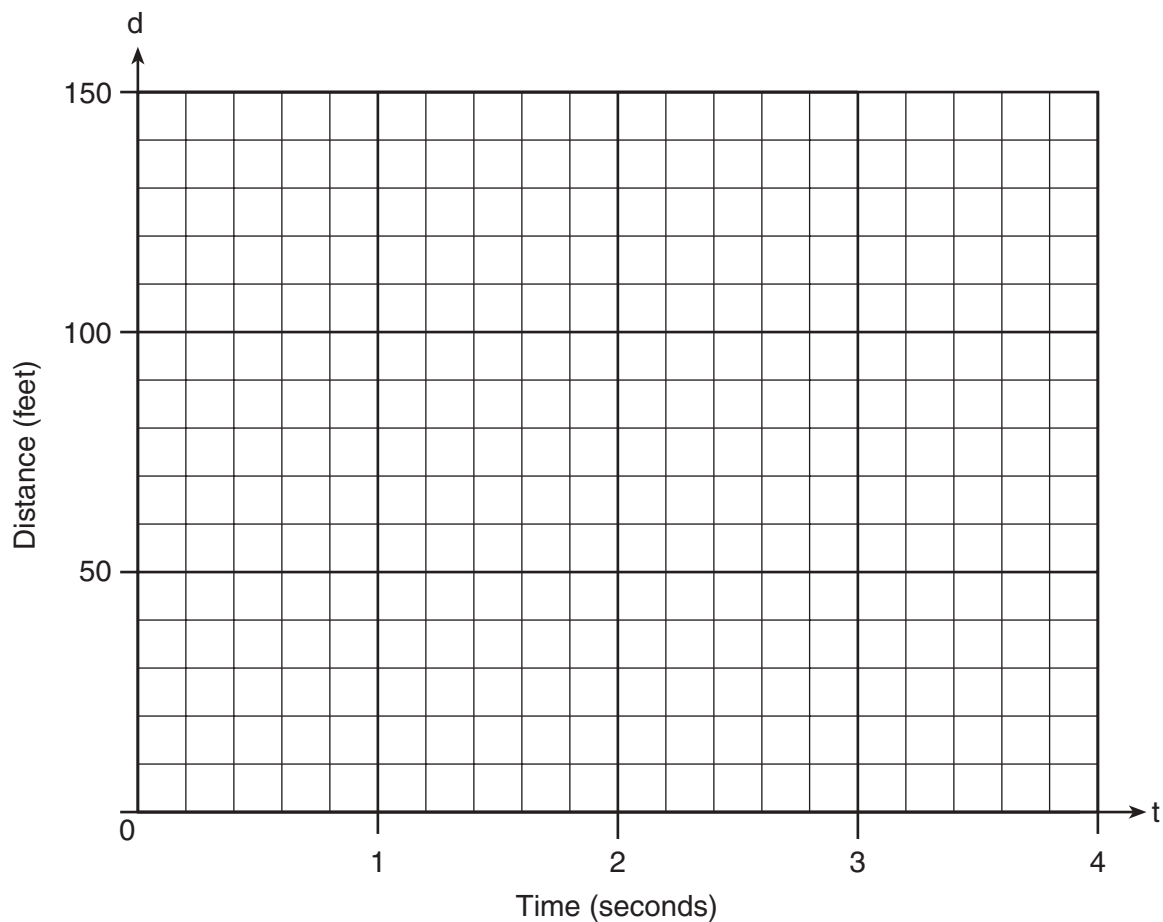
32 A rectangular park is three blocks longer than it is wide. The area of the park is 40 square blocks. If w represents the width, write an equation in terms of w for the area of the park. Find the length and the width of the park.

33 Tanisha and Rachel had lunch at the mall. Tanisha ordered three slices of pizza and two colas. Rachel ordered two slices of pizza and three colas. Tanisha's bill was \$6.00, and Rachel's bill was \$5.25. What was the price of one slice of pizza? What was the price of one cola?

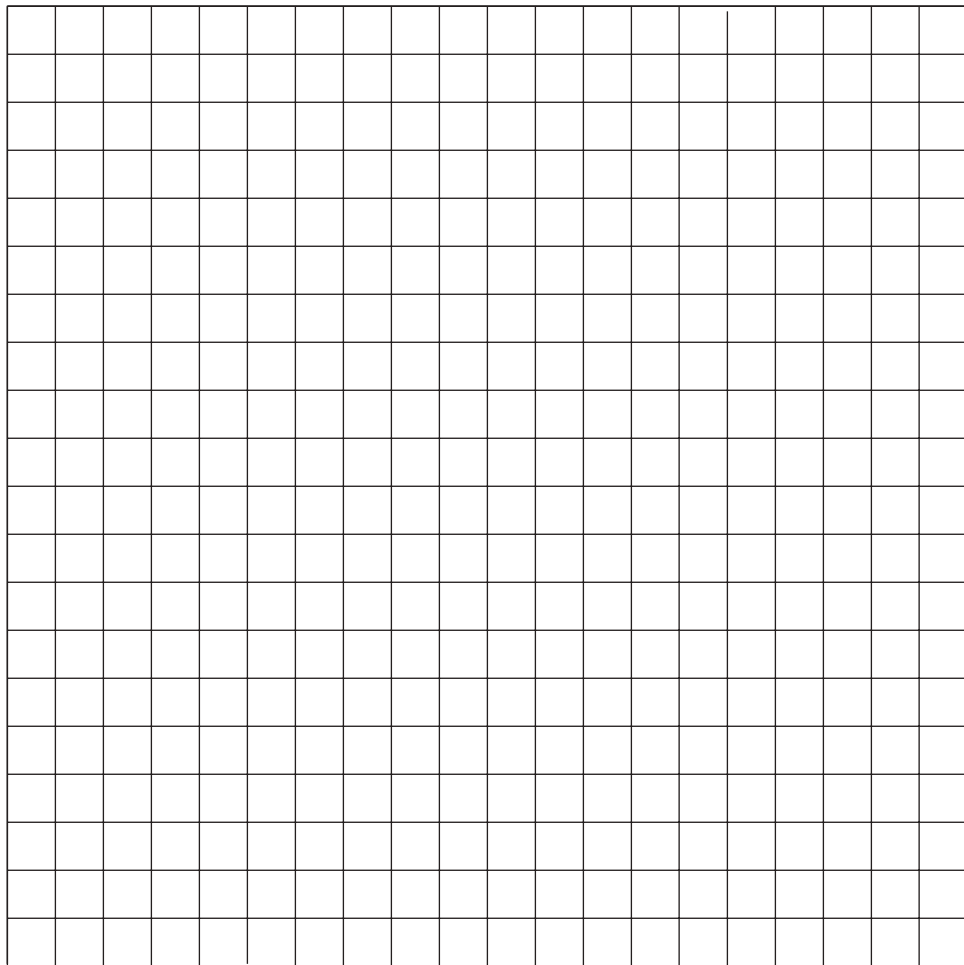
34 Greg is in a car at the top of a roller-coaster ride. The distance, d , of the car from the ground as the car descends is determined by the equation $d = 144 - 16t^2$, where t is the number of seconds it takes the car to travel down to each point on the ride. How many seconds will it take Greg to reach the ground?

For an algebraic solution show your work here.

For a graphic solution show your work here.



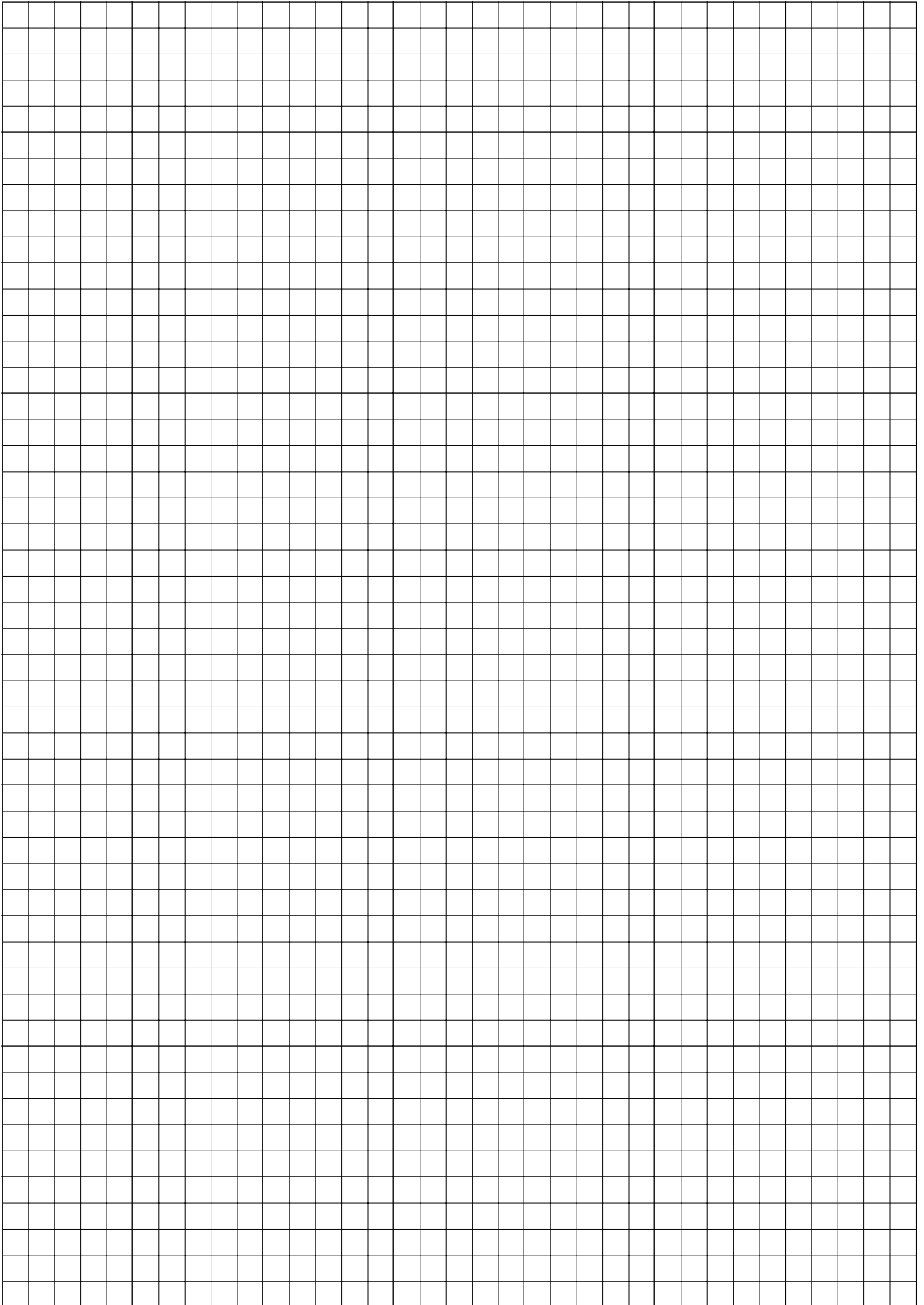
35 Determine the distance between point $A(-1,-3)$ and point $B(5,5)$.
Write an equation of the perpendicular bisector of \overline{AB} . [The use of
the accompanying grid is optional.]



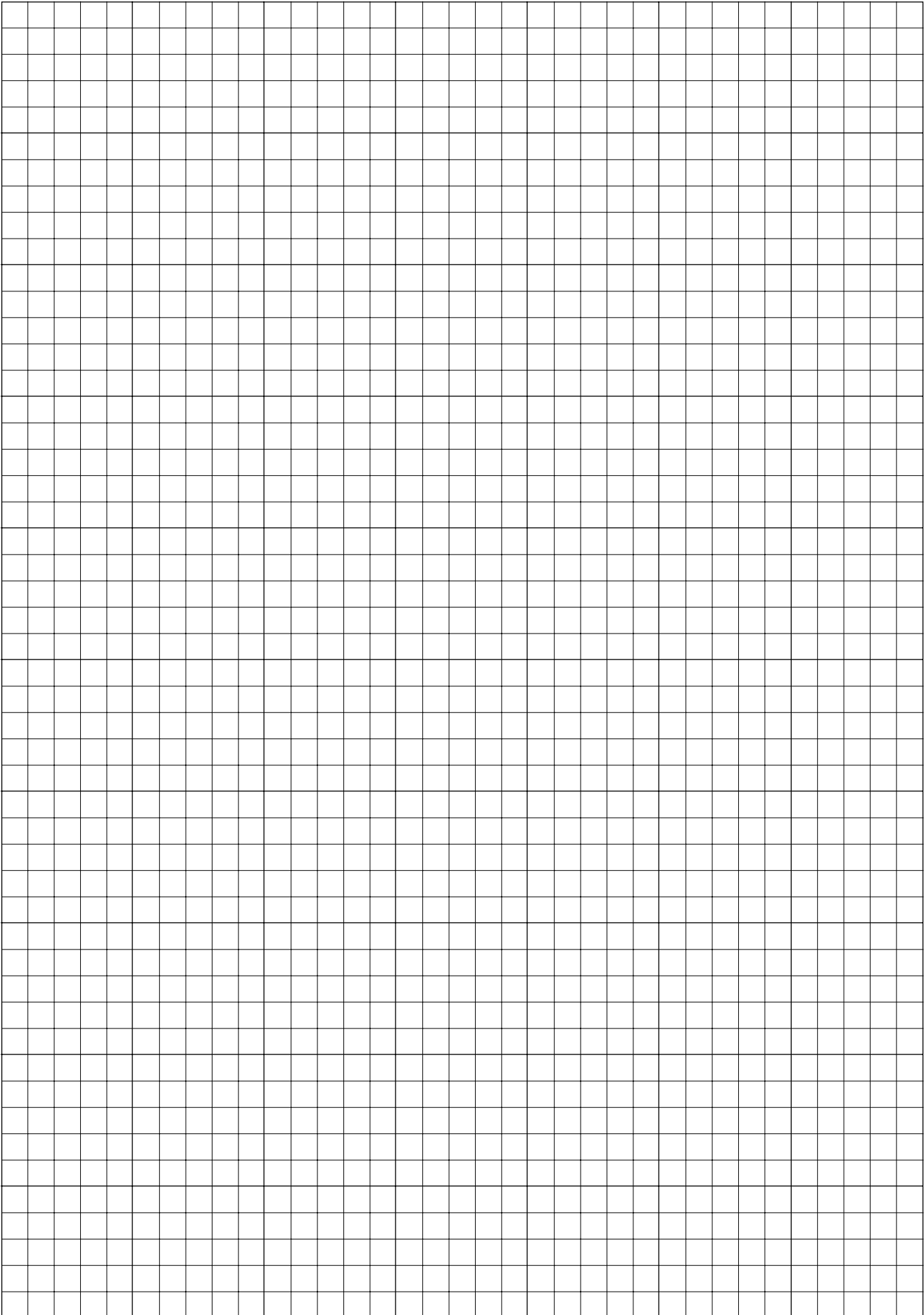
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REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS A

Tuesday, August 13, 2002 — 8:30 to 11:30 a.m., only

ANSWER SHEET

Student Sex: Male Female Grade

Teacher School

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

Part I

Answer all 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

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

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

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.