

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

INTEGRATED ALGEBRA

Tuesday, January 22, 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 39 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 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 and a straightedge (ruler) must be available for you to use while taking this examination.

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

Use this space for computations.

3 If Angelina's weekly allowance is d dollars, which expression represents her allowance, in dollars, for x weeks?

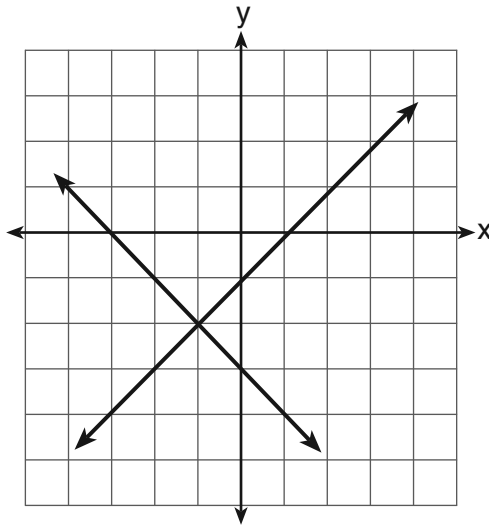
(1) dx

(3) $x + 7d$

(2) $7dx$

(4) $\frac{d}{x}$

4 What is the solution of the system of equations shown in the graph below?



(1) $(1,0)$ and $(-3,0)$

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

(2) $(0,-3)$ and $(0,-1)$

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

5 The solution of the equation $5 - 2x = -4x - 7$ is

(1) 1

(3) -2

(2) 2

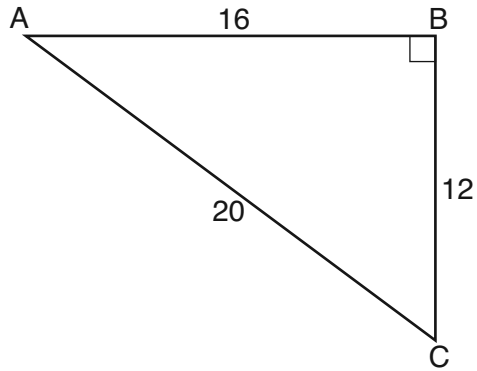
(4) -6

Use this space for computations.

6 The expression $100n^2 - 1$ is equivalent to

- (1) $(10n + 1)(10n - 1)$ (3) $(50n + 1)(50n - 1)$
(2) $(10n - 1)(10n - 1)$ (4) $(50n - 1)(50n - 1)$

7 In right triangle ABC shown below, what is the value of $\cos A$?



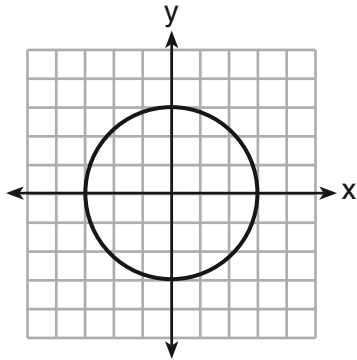
- (1) $\frac{12}{20}$ (3) $\frac{20}{12}$
(2) $\frac{16}{20}$ (4) $\frac{20}{16}$

8 A bag contains five green gumdrops and six red gumdrops. If Kim pulls a green gumdrop out of the bag and eats it, what is the probability that the next gumdrop she pulls out will be red?

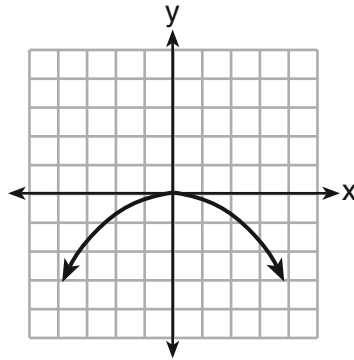
- (1) $\frac{5}{11}$ (3) $\frac{6}{11}$
(2) $\frac{5}{10}$ (4) $\frac{6}{10}$

Use this space for
computations.

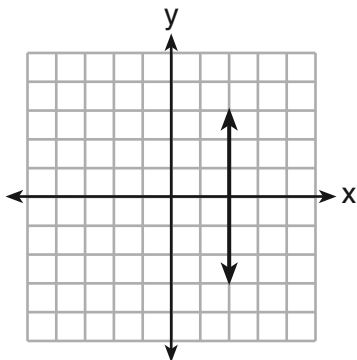
9 Which graph represents a function?



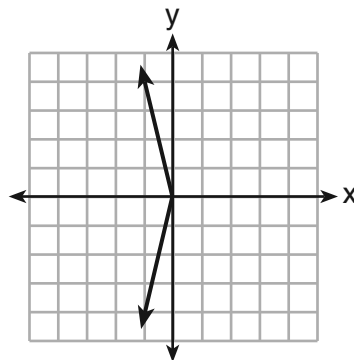
(1)



(3)



(2)



(4)

10 The current population of a town is 10,000. If the population, P , increases by 20% each year, which equation could be used to find the population after t years?

(1) $P = 10,000(0.2)^t$

(3) $P = 10,000(1.2)^t$

(2) $P = 10,000(0.8)^t$

(4) $P = 10,000(1.8)^t$

**Use this space for
computations.**

11 Which verbal expression is represented by $2(x + 4)$?

- (1) twice the sum of a number and four
- (2) the sum of two times a number and four
- (3) two times the difference of a number and four
- (4) twice the product of a number and four

12 How many cubes with 5-inch sides will completely fill a cube that is 10 inches on a side?

- (1) 50
- (2) 25
- (3) 8
- (4) 4

13 A school newspaper will survey students about the quality of the school's lunch program. Which method will create the *least* biased results?

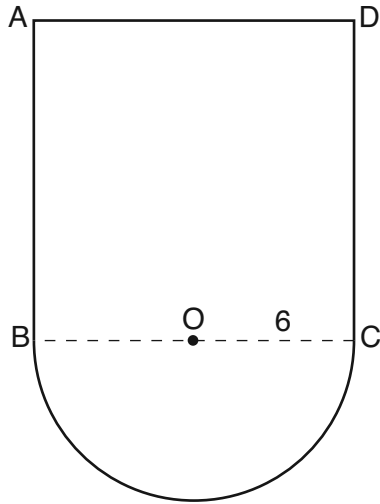
- (1) Twenty-five vegetarians are randomly surveyed.
- (2) Twenty-five students are randomly chosen from each grade level.
- (3) Students who dislike the school's lunch program are chosen to complete the survey.
- (4) A booth is set up in the cafeteria for the students to voluntarily complete the survey.

14 The vertex of the parabola $y = x^2 + 8x + 10$ lies in Quadrant

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

Use this space for
computations.

- 15 In the figure below, $ABCD$ is a square and semicircle O has a radius of 6.



What is the area of the figure?

- (1) $36 + 6\pi$ (3) $144 + 18\pi$
(2) $36 + 18\pi$ (4) $144 + 36\pi$
- 16 What is $24x^2y^6 - 16x^6y^2 + 4xy^2$ divided by $4xy^2$?
- (1) $6xy^4 - 4x^5$ (3) $6x^2y^3 - 4x^6y$
(2) $6xy^4 - 4x^5 + 1$ (4) $6x^2y^3 - 4x^6y + 1$

- 17 Which expression can be used to change 75 kilometers per hour to meters per minute?

- (1) $\frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1 \text{ km}}{1,000 \text{ m}} \times \frac{1 \text{ hr}}{60 \text{ min}}$
(2) $\frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1 \text{ km}}{1,000 \text{ m}} \times \frac{60 \text{ min}}{1 \text{ hr}}$
(3) $\frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1,000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ hr}}{60 \text{ min}}$
(4) $\frac{75 \text{ km}}{1 \text{ hr}} \times \frac{1,000 \text{ m}}{1 \text{ km}} \times \frac{60 \text{ min}}{1 \text{ hr}}$

Use this space for
computations.

27 The expression $\frac{2x^2 + 10x - 28}{4x + 28}$ is equivalent to

(1) $\frac{x - 2}{2}$

(3) $\frac{x + 2}{2}$

(2) $x - 1$

(4) $\frac{x + 5}{2}$

28 Which value of x is the solution of the equation $\frac{1}{7} + \frac{2x}{3} = \frac{15x - 3}{21}$?

(1) 6

(3) $\frac{4}{13}$

(2) 0

(4) $\frac{6}{29}$

29 Which statement is true about the data set 4, 5, 6, 6, 7, 9, 12?

(1) mean = mode

(3) mean < median

(2) mode = median

(4) mode > mean

30 How is the graph of $y = x^2 + 4x + 3$ affected when the coefficient of x^2 is changed to a smaller positive number?

(1) The graph becomes wider, and the y -intercept changes.

(2) The graph becomes wider, and the y -intercept stays the same.

(3) The graph becomes narrower, and the y -intercept changes.

(4) The graph becomes narrower, and the y -intercept stays the same.

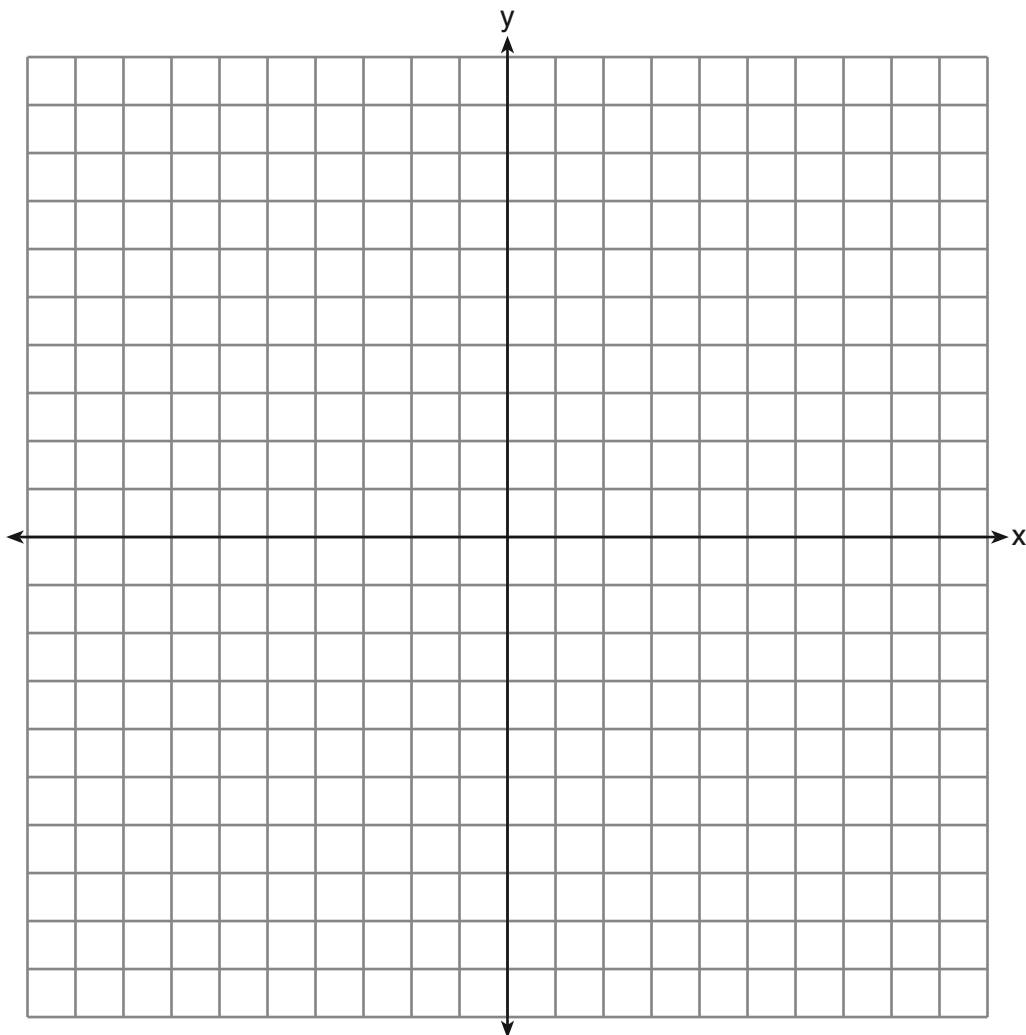
Part II

Answer all 3 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. [6]

31 Express $4\sqrt{75}$ in simplest radical form.

32 Factor completely: $5x^3 - 20x^2 - 60x$

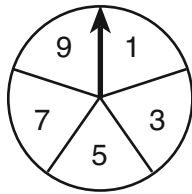
33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.



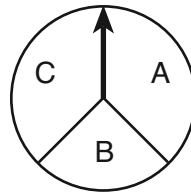
Part III

Answer all 3 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. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [9]

34 In a game, a player must spin each spinner shown in the diagram below once.



Spinner 1



Spinner 2

Draw a tree diagram or list a sample space showing all possible outcomes.

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

35 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

Part IV

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]

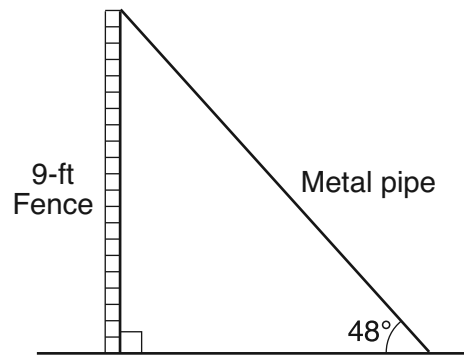
37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10



Determine the number of scores that lie above the 75th percentile.

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.



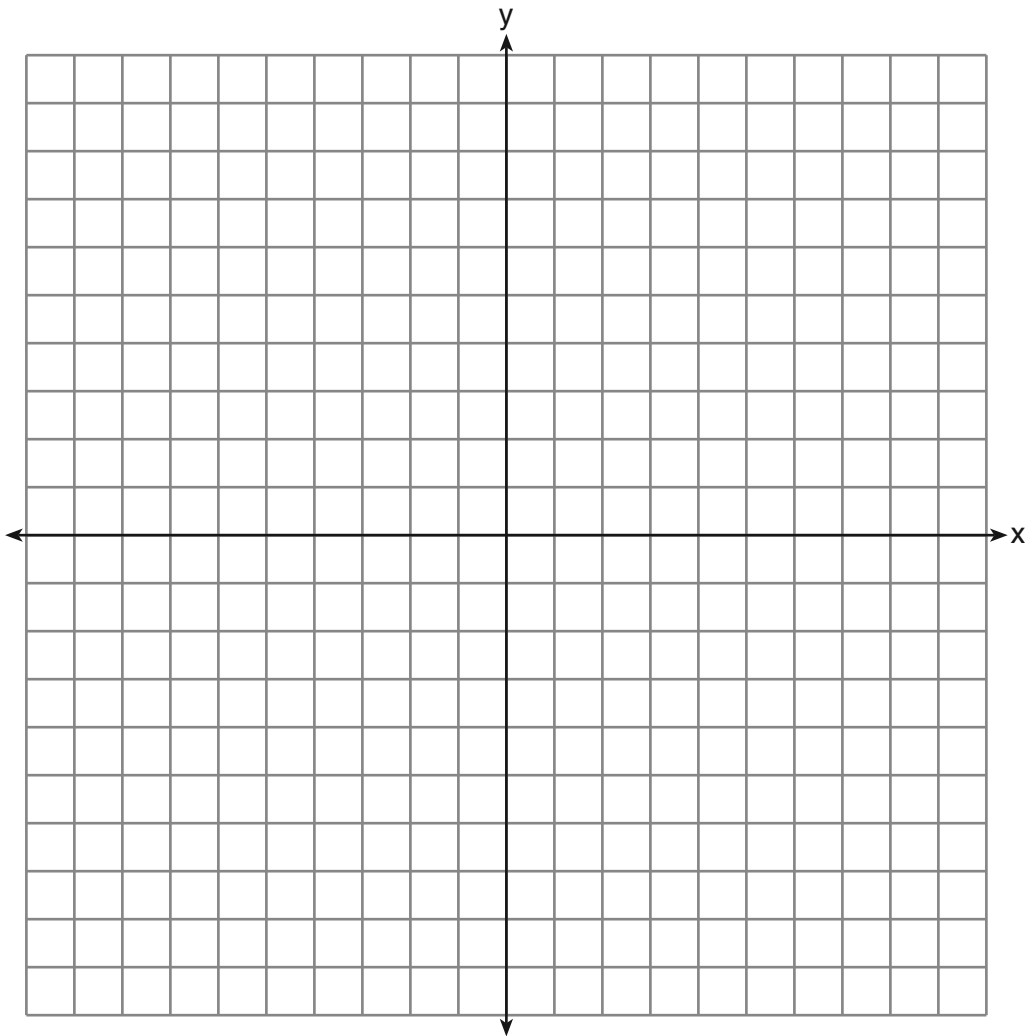
Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

Determine, to the *nearest foot*, the length of the metal pipe.

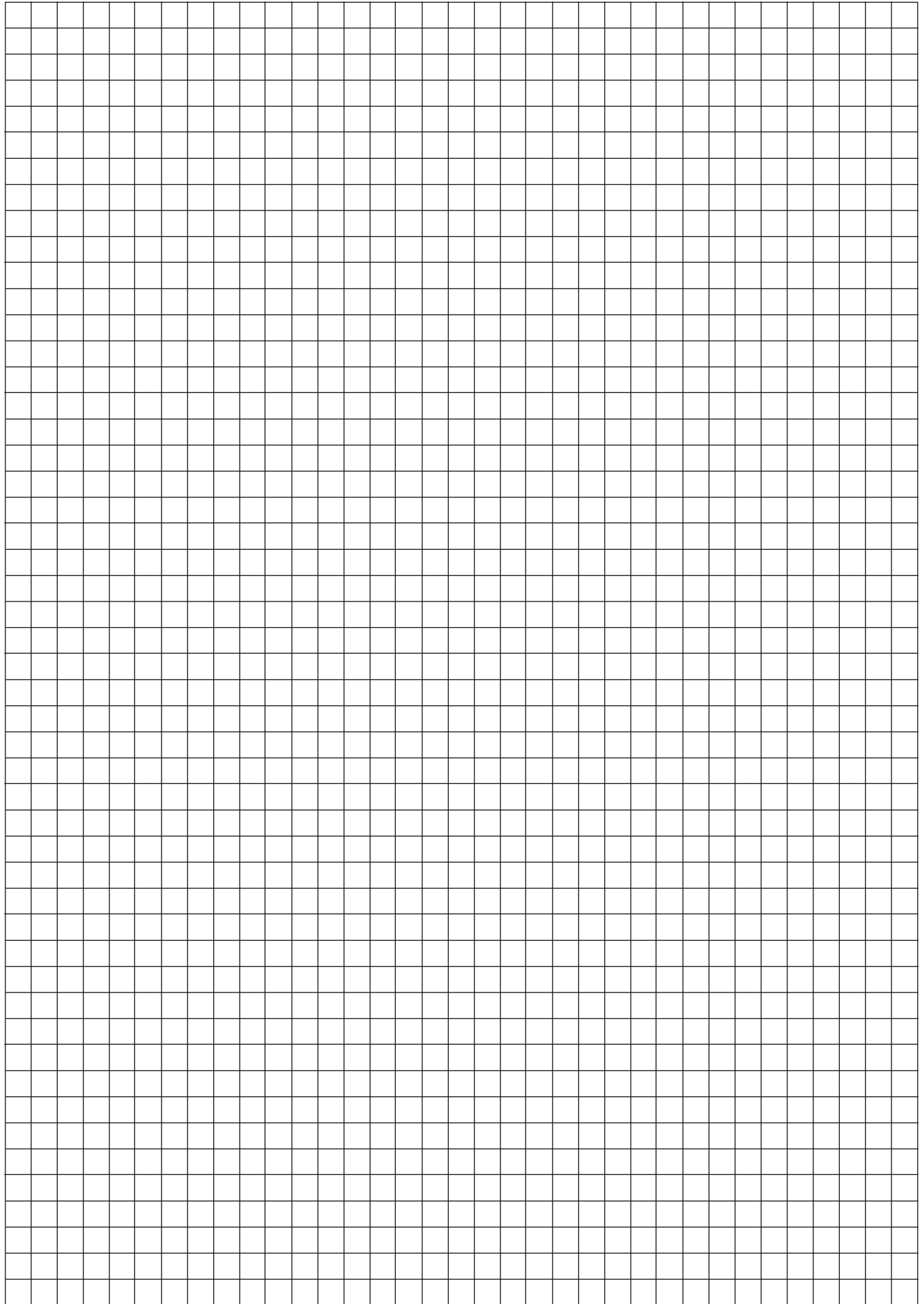
39 On the set of axes below, graph the following system of equations.

$$\begin{aligned}y + 2x &= x^2 + 4 \\ y - x &= 4\end{aligned}$$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.



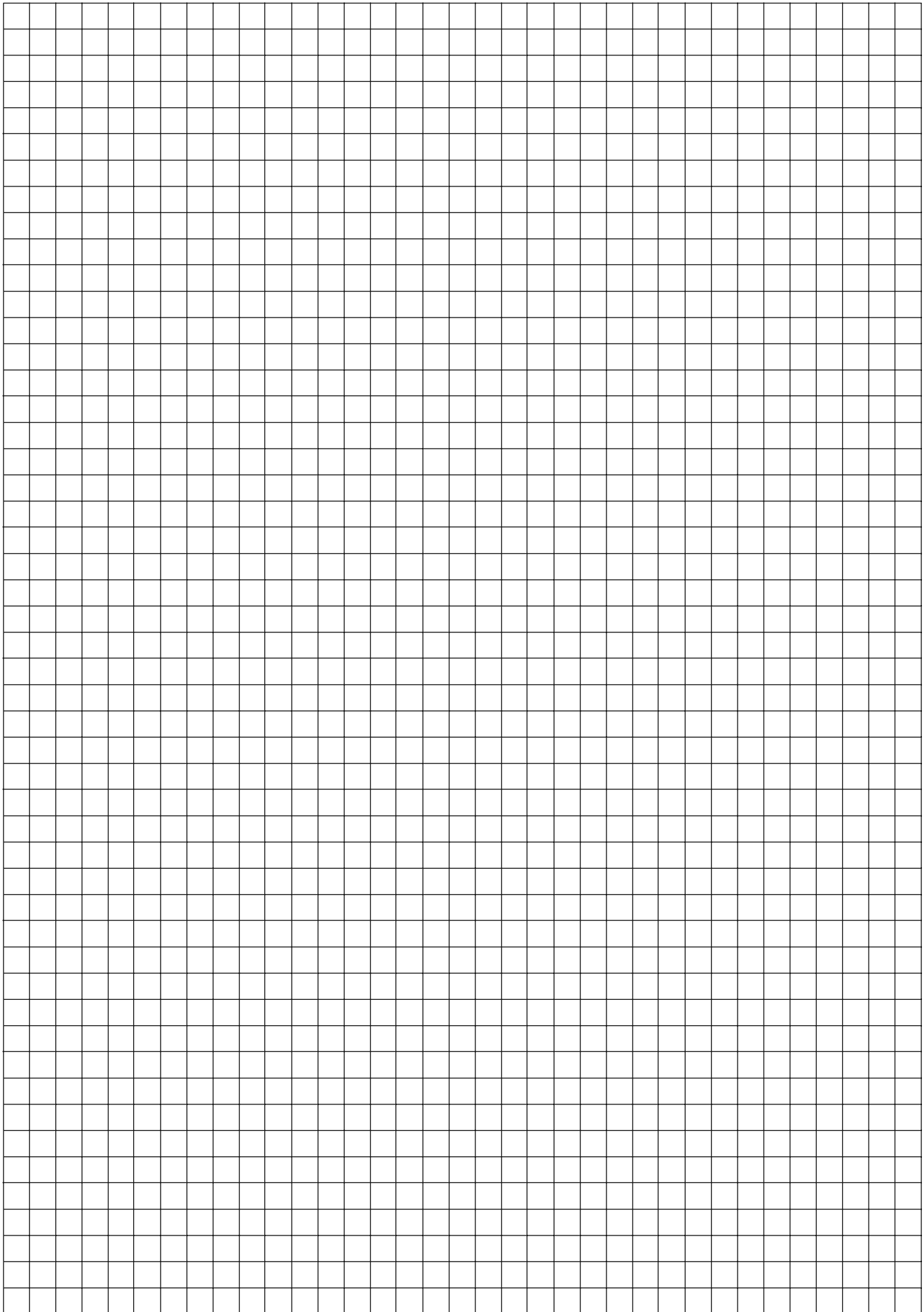
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Reference Sheet

Trigonometric Ratios

$$\sin A = \frac{\textit{opposite}}{\textit{hypotenuse}}$$

$$\cos A = \frac{\textit{adjacent}}{\textit{hypotenuse}}$$

$$\tan A = \frac{\textit{opposite}}{\textit{adjacent}}$$

Area

trapezoid $A = \frac{1}{2}h(b_1 + b_2)$

Volume

cylinder $V = \pi r^2 h$

Surface Area

rectangular prism $SA = 2lw + 2hw + 2lh$

cylinder $SA = 2\pi r^2 + 2\pi rh$

Coordinate Geometry

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

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