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

ALGEBRA I

Wednesday, June 18, 2025 — 1:15 to 4:15 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 35 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. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale.

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.

Part I

Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. 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. [48]

Use this space for computations.

1 The expression $\frac{10}{\sqrt{2}}$ is equivalent to

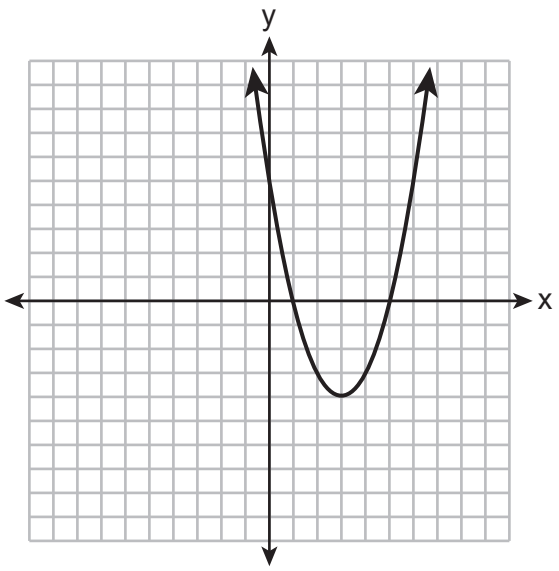
(1) 5

(2) 20

(3) $5\sqrt{2}$

(4) $10\sqrt{2}$

2 A parabola is graphed on the set of axes below.



Over which interval is the parabola only increasing?

(1) [1,4]

(2) [3,∞)

(3) (−∞,3]

(4) [−1,1]

3 Which scenario represents an exponential relationship?

(1) Kirsten's New Year's resolution is to lose one pound each week.

(2) Sarah wants to increase her grade by 5 points each quarter.

(3) Tommy wants to reduce his spending by $50 each month.

(4) Dylan hopes to grow his business by 5% each month.

Use this space for computations.

4 The geometry test scores for Andrea and Joe are shown in the table below.

Andrea	Joe
82	91
87	78
90	94
84	67

Which statement about their test scores is correct?

(1) Both the mean and standard deviation of Andrea's test scores are higher than Joe's.

(2) Both the mean and standard deviation of Joe's test scores are higher than Andrea's.

(3) The mean of Andrea's test scores is higher than Joe's, but Joe's standard deviation is higher than Andrea's.

(4) The mean of Joe's test scores is higher than Andrea's, but Andrea's standard deviation is higher than Joe's.

5 Which polynomial has a degree of 3 and a leading coefficient of 2?

(1) $2x^2 + 3x + 1$

(2) $6x^3 + 3x^2 - 2x$

(3) $3x^2 + 2x + 2$

(4) $2x^3 + x^2 + 4x$

6 The expression $(-3x^2 + 9) - (7x^2 - 5x + 4)$ is equivalent to

(1) $-10x^2 + 5x + 5$

(2) $-10x^2 + 5x + 13$

(3) $-10x^2 - 5x + 5$

(4) $-10x^2 - 5x + 13$

Use this space for computations.

7 The function $h(x)$ is used to calculate the average height, in inches, of a tomato plant x weeks after it is transplanted. These data are represented in the table below.

x	h(x)
2	6
4	12
6	24
9	51
12	60
16	64

Between weeks 4 and 12, the average rate of change, in inches per week, is

(1) 6

(2) 8

(3) 48

(4) 58

8 Chloe is solving the equation $x^2 + 5x = 3x + 3$. Her first step is shown below.

Given: $x^2 + 5x = 3x + 3$

Step 1: $x^2 + 2x - 3 = 0$

Which property justifies this step?

(1) the zero product property

(2) the commutative property

(3) the distributive property

(4) the subtraction property of equality

9 Which function represents the graph of $w(x) = |x|$ shifted 2 units to the right?

(1) $g(x) = |x + 2|$

(2) $h(x) = |x - 2|$

(3) $q(x) = |x| + 2$

(4) $r(x) = |x| - 2$

Use this space for computations.

10 Given the system of equations:

$$y + 4x = 5$$
$$2x - 3y = 10$$

A step in solving this system by using the substitution method would be

(1) $2(5 - 4x) + 4x = 5$

(2) $2(5 + 4x) + 4x = 5$

(3) $2x - 3(5 - 4x) = 10$

(4) $2x - 3(5 + 4x) = 10$

11 Which equation is equivalent to $x^2 - 6x = 27$?

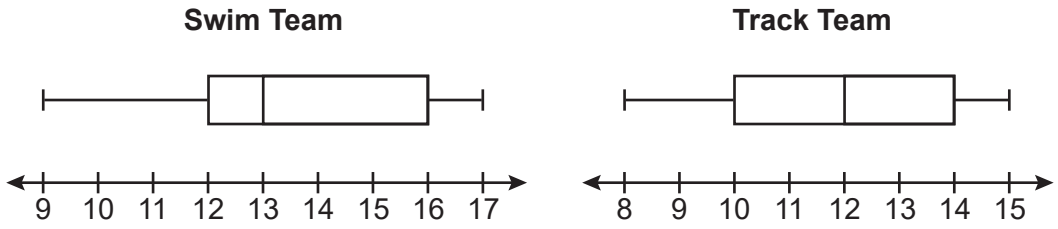
(1) $(x - 3)^2 = 27 - 9$

(2) $(x - 3)^2 = 27 + 9$

(3) $(x - 3)^2 = 27 + 36$

(4) $(x - 3)^2 = 27 - 36$

12 The box plots below summarize the ages of athletes on the swim team and the track team.



Based on the box plots, which statement must be true?

(1) The IQR of both teams is the same.

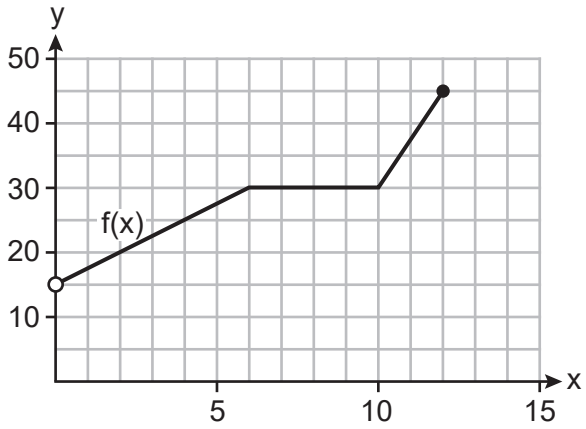
(2) There are more athletes on the swim team than on the track team.

(3) The median age of the swim team is less than the median age of the track team.

(4) The range of ages of the swim team is smaller than the range of ages of the track team.

Use this space for computations.

13 The graph of $f(x)$ is shown below.



The domain of this function is

(1) [0,12]

(2) [15,45]

(3) $0 < x \leq 12$

(4) $15 < x \leq 45$

14 The sum of 3 and $\sqrt{5}$ is

(1) rational, since the sum can be expressed as an integer

(2) rational, since the sum can be expressed as a nonterminating decimal

(3) irrational, since the sum can be expressed as a terminating decimal

(4) irrational, since the sum cannot be expressed as a terminating or repeating decimal

15 Which expression is equivalent to $a^8 - b^6$?

(1) $(a^4 - b^3)^2$

(2) $(a^6 - b^4)^2$

(3) $(a^4)^2 - (b^3)^2$

(4) $(a^6)^2 - (b^4)^2$

16 The sum of $2\sqrt{27}$ and $4\sqrt{12}$ is

(1) $14\sqrt{3}$

(2) $34\sqrt{3}$

(3) $6\sqrt{39}$

(4) $8\sqrt{39}$

Use this space for computations.

17 The sum of Tim's age and Jack's age is 44. Tim's age is 4 less than 7 times Jack's age, x. An equation that could be used to model this scenario is

(1) $(7x - 4) + x = 44$

(2) $(4 - 7x) + x = 44$

(3) $7x - 4 = 44$

(4) $4 - 7x = 44$

18 Given the function $g(x) = \frac{2^{x+3}}{x^2 - 2}$, what is the value of $g(-2)$?

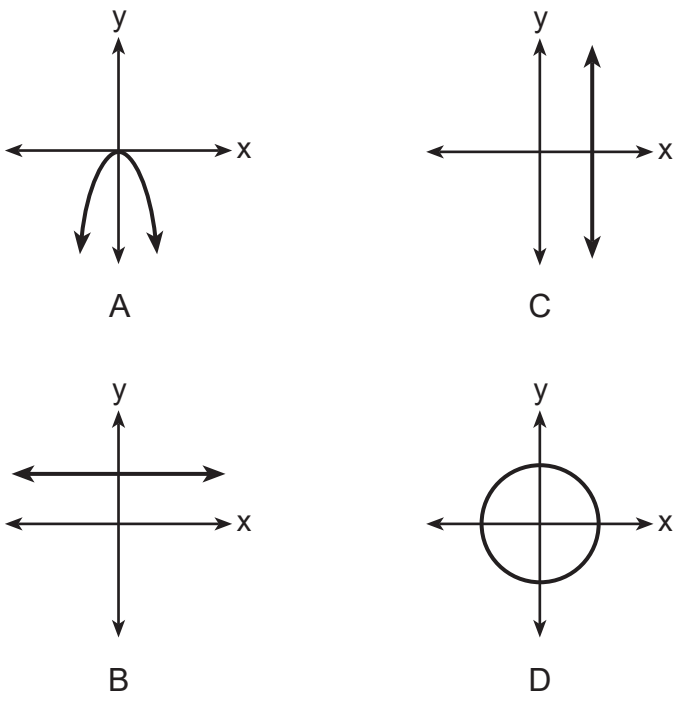
(1) 1

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

(3) -1

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

19 Four graphs are shown below.



Which of the graphs represent(s) a function?

(1) *A*, only

(2) *A* and *B*, only

(3) *A*, *B*, and *C*, only

(4) *A*, *B*, *C*, and *D*

Use this space for computations.

20 The formula to calculate kinetic energy is $K = \frac{1}{2}mv^2$, where K is kinetic energy, m is mass, and v is velocity. When m is written in terms of K and v, the equation is

(1) $m = \frac{2K}{v^2}$

(2) $m = 2Kv^2$

(3) $m = \sqrt{2Kv^2}$

(4) $m = \frac{K}{2v^2}$

21 The solution to the equation $\frac{2(3x-1)}{3} = x + 2$ is

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

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

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

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

22 Which equation represents the sequence 12, 6, 3, $\frac{3}{2}$,…, where $a_1 = 12$?

(1) $a_n = 12 \bullet \left(\frac{1}{2}\right)^{n-1}$

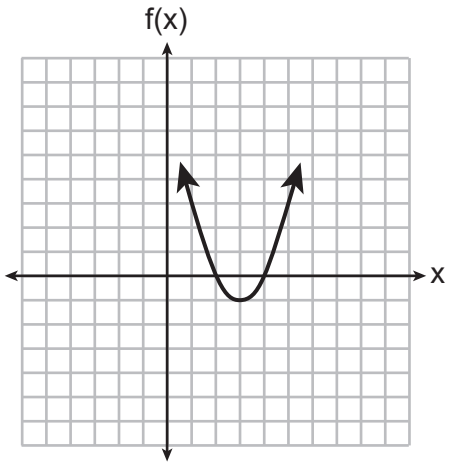
(2) $a_n = 12 \bullet \left(\frac{1}{2}\right)^{n}$

(3) $a_n = 12 \bullet (2)^{n-1}$

(4) $a_n = 12 \bullet (2)^{n}$

Use this space for computations.

23 The axis of symmetry is $x = 2$ for which quadratic function?



(1)

x	g(x)
–2	6
–1	3
0	2
1	3
2	6

(3)

$j(x) = 2x^2 + 8x$

(2)

$h(x) = x^2 - 4x - 5$

(4)

24 Each day, a freight train passes by Anna's house. This freight train travels at 49 miles per hour. Each railroad car is 56 feet long. Which expression represents the number of railroad cars that pass by Anna's house per minute?

(1) $\frac{49 \text{ mi}}{1 \text{ hr}} \bullet \frac{1 \text{ mi}}{5280 \text{ ft}} \bullet \frac{1 \text{ hr}}{60 \text{ min}} \bullet \frac{1 \text{ car}}{56 \text{ ft}}$

(2) $\frac{49 \text{ mi}}{1 \text{ hr}} \bullet \frac{1 \text{ mi}}{5280 \text{ ft}} \bullet \frac{60 \text{ min}}{1 \text{ hr}} \bullet \frac{1 \text{ car}}{56 \text{ ft}}$

(3) $\frac{49 \text{ mi}}{1 \text{ hr}} \bullet \frac{5280 \text{ ft}}{1 \text{ mi}} \bullet \frac{1 \text{ hr}}{60 \text{ min}} \bullet \frac{1 \text{ car}}{56 \text{ ft}}$

(4) $\frac{49 \text{ mi}}{1 \text{ hr}} \bullet \frac{5280 \text{ ft}}{1 \text{ mi}} \bullet \frac{60 \text{ min}}{1 \text{ hr}} \bullet \frac{1 \text{ car}}{56 \text{ ft}}$

Part II

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. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. 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]

25 A survey was taken to determine whether students preferred to watch videos or listen to music. Of the 100 students surveyed, 44 were seniors. Of the 65 students who preferred to watch videos, 42 were juniors. Use this information to complete the frequency table below.

	Juniors	Seniors	Total
Watch Videos			
Listen to Music			
Total			

26 Solve the inequality for y:

$$5(2 - y) > -11y - 8$$

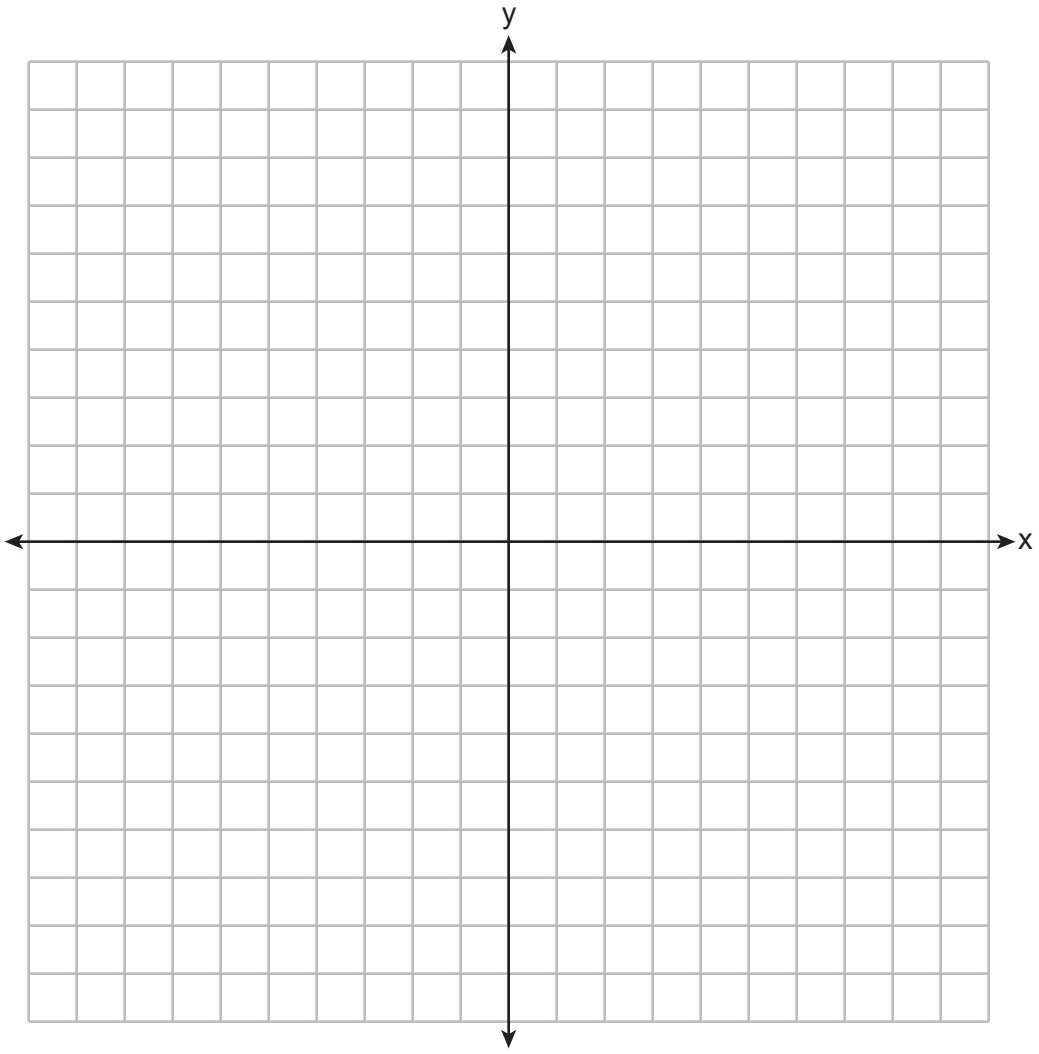
27 Express $(5x - 3)(-2x + 7)$ as a trinomial in standard form.

28 The first and fourth terms in an arithmetic sequence are given below.

$$-20, \_\_\_\_\_, \_\_\_\_\_, -2$$

Determine the eighth term.

29 Write an equation in slope-intercept form for the line that passes through $(-2,5)$ and has a slope of -3. [Use of the set of axes below is optional.]

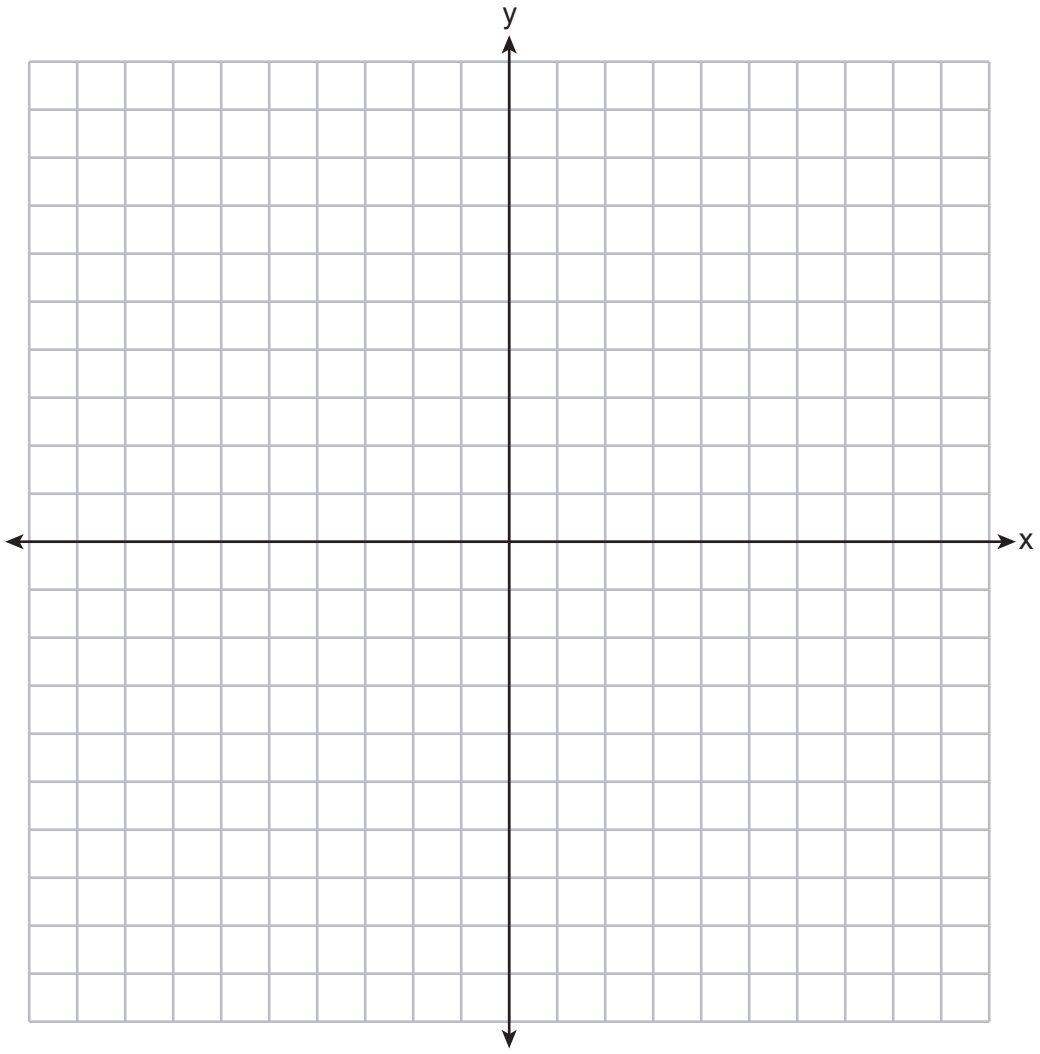


30 Factor the expression $x^3 - 36x$ completely.

Part III

Answer all 4 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. 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. [16]

31 Graph $f(x) = -3x$ and $g(x) = x^2 + 2$ on the set of axes below.



State the values of x that satisfy the equation $f(x) = g(x)$.

32 Using the quadratic formula, solve $6x^2 + 2x - 1 = 0$.

Express the answer in simplest radical form.

33 The table below shows the price of a new cell phone and the length of time, in months, since its release.

Time Since Release, in Months (x)	0	3	6	9	12
Price, in Dollars (y)	1200	1150	1100	1000	920

State the linear regression equation for this set of data. Round all values to the *nearest hundredth*.

State the correlation coefficient for this data set, to the *nearest hundredth*.

State what the correlation coefficient indicates about the linear fit of the data.

34 Solve the following system of equations algebraically for all values of x and y.

$$y = x^2 + 9x + 4$$
$$y - 2x = -6$$

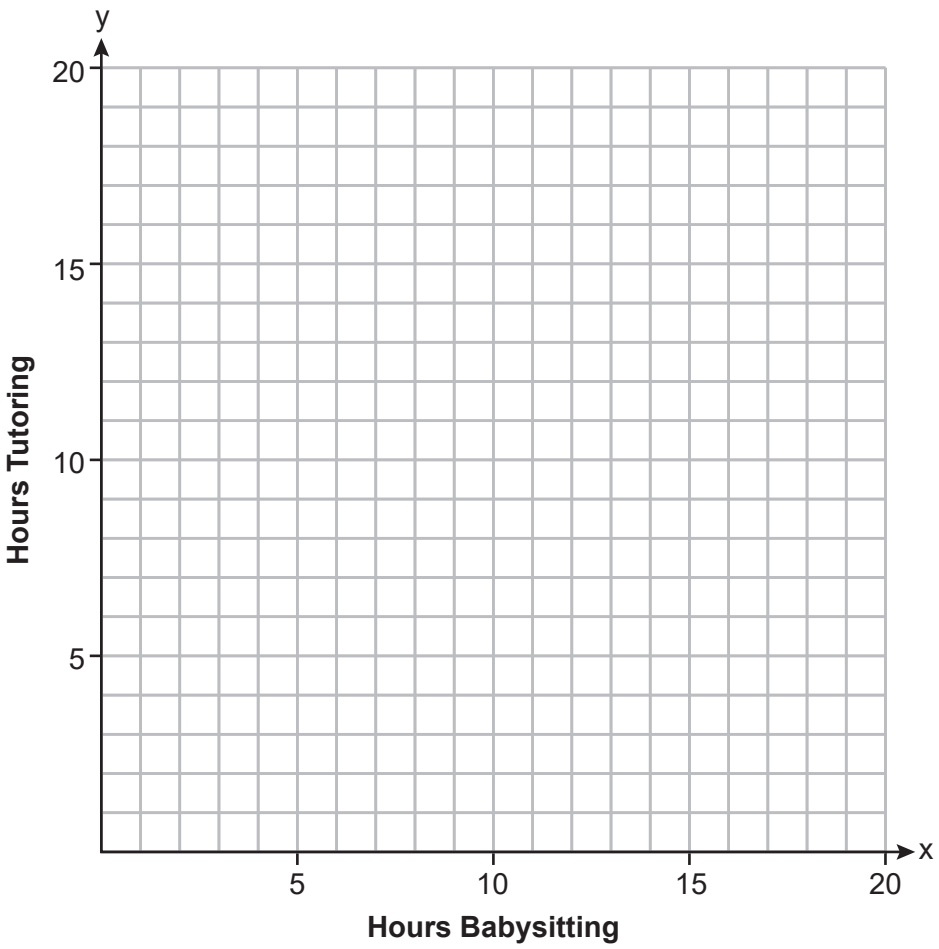
Part IV

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. Utilize the information provided to determine your answer. Note that diagrams are not necessarily drawn to scale. 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]

35 Sarah earns \$6 per hour babysitting and \$12 per hour tutoring. Her goal is to earn at least \$120 per week. Sarah is allowed to work a maximum of 14 hours per week doing both jobs.

If x represents the number of hours Sarah babysits and y represents the number of hours she tutors, write a system of inequalities that could model this situation.

On the set of axes below, graph the system of inequalities that you wrote.



Question 35 is continued on the next page.

Question 35 continued

State a combination of hours babysitting and tutoring that would satisfy this situation. Justify your answer.

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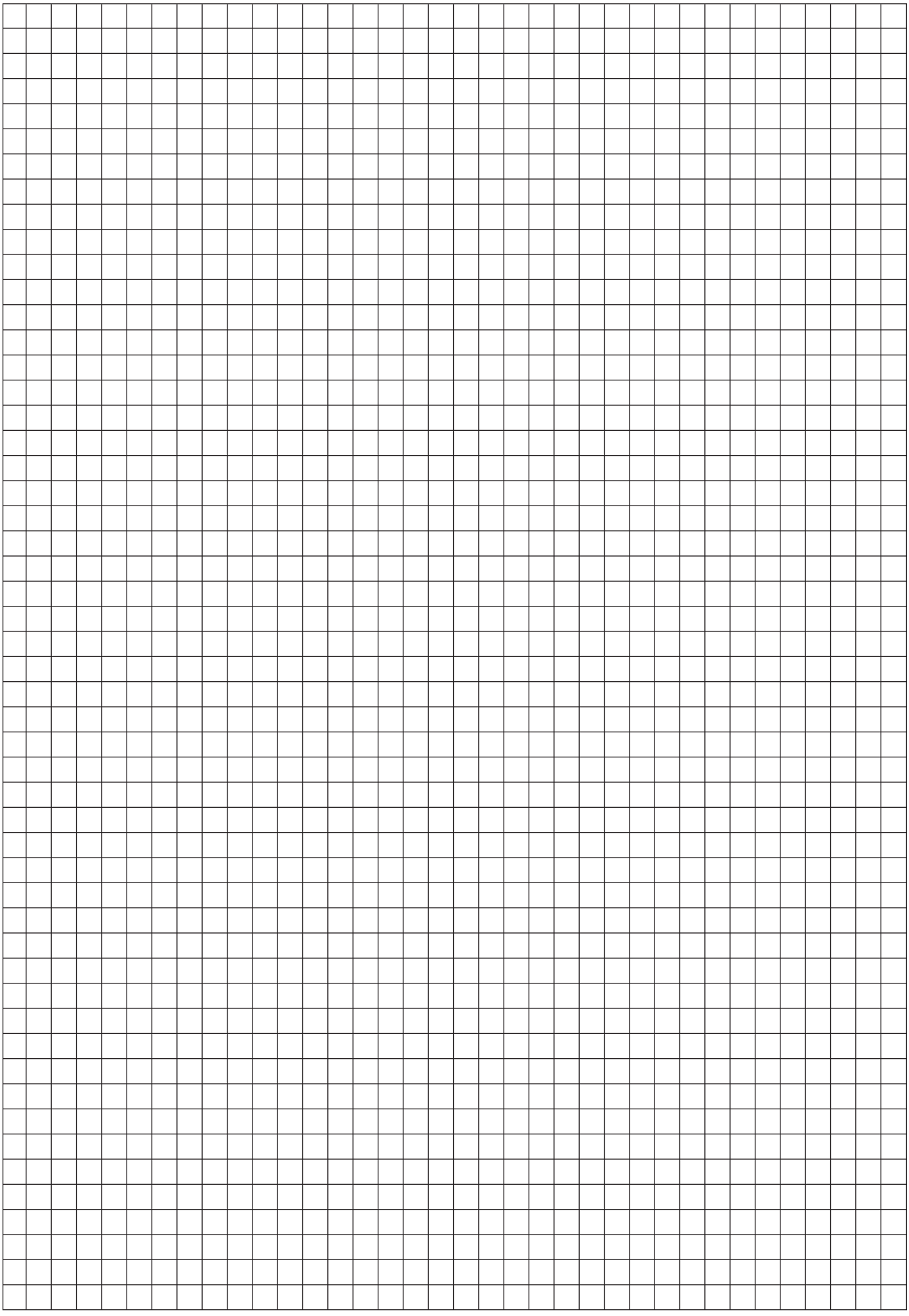

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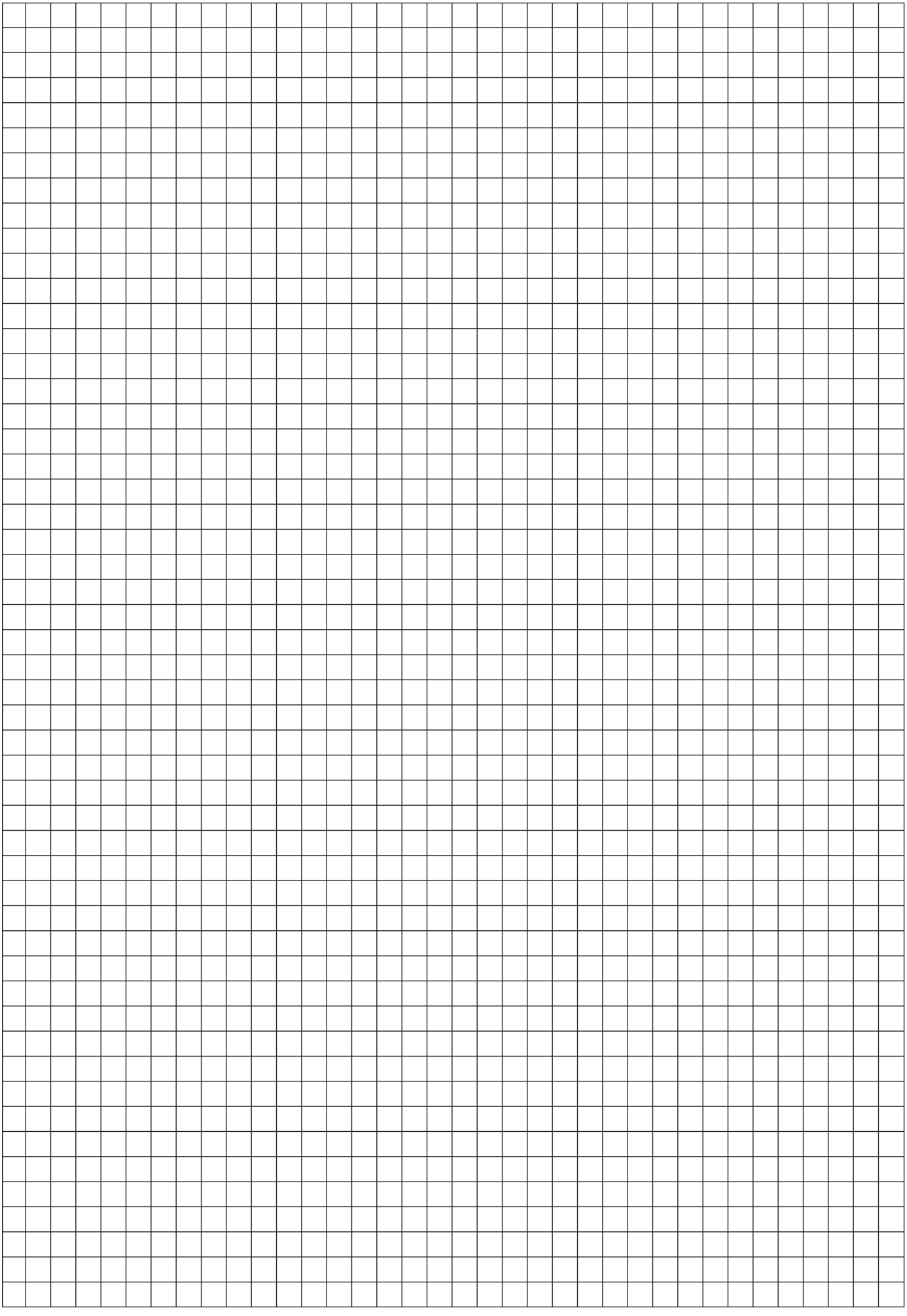

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Reference Sheet for Algebra I

Conversions

1 mile = 5280 feet
1 mile = 1760 yards
1 pound = 16 ounces
1 ton = 2000 pounds

Conversions Across Measurement Systems

1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 1.609 kilometers
1 kilometer = 0.6214 mile
1 pound = 0.454 kilogram
1 kilogram = 2.2 pounds

Quadratic Equation	$y = ax^2 + bx + c$
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Equation of the Axis of Symmetry	$x = -\frac{b}{2a}$
Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$
Linear Equation Slope Intercept	$y = mx + b$
Linear Equation Point Slope	$y - y_1 = m(x - x_1)$

Exponential Equation	$y = ab^x$
Annual Compound Interest	$A = P(1 + r)^n$
Arithmetic Sequence	$a_n = a_1 + d(n - 1)$
Geometric Sequence	$a_n = a_1 r^{n-1}$
Interquartile Range (IQR)	$IQR = Q_3 - Q_1$
Outlier	Lower Outlier Boundary = $Q_1 - 1.5(IQR)$
	Upper Outlier Boundary = $Q_3 + 1.5(IQR)$

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