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

ALGEBRA I

Tuesday, August 19, 2025 — 8:30 to 11:30 a.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 Which expression is equivalent to $100x^2 - 16$?

(1) $(50x - 8)(50x + 8)$

(2) $(50x - 8)(50x - 8)$

(3) $(10x - 4)(10x + 4)$

(4) $(10x - 4)(10x - 4)$

2 Josie has \$2.30 in dimes and quarters. She has two more dimes than quarters. Which equation below can be used to determine x, the number of quarters she has?

(1) $0.35(2x + 2) = 2.30$

(2) $0.25(x + 2) + 0.10x = 2.30$

(3) $0.25x + 0.10(x + 2) = 2.30$

(4) $0.25x + 0.10(x - 2) = 2.30$

3 If $g(x) = -2x^2 + 16$, then $g(-3)$ equals

(1) -20

(2) -2

(3) 34

(4) 52

4 What are the zeros of $f(x) = x^2 - 8x - 20$?

(1) 10 and 2

(2) 10 and -2

(3) -10 and 2

(4) -10 and -2

Use this space for computations.

5 Which point lies on the graph of $y = 3x^2 - \frac{1}{4}x + 3$?

(1) $(-2, 15.5)$

(2) $(-1, 5.75)$

(3) $(1, 6.25)$

(4) $(2, 15.5)$

6 Given $f(x) = x^2$ and $g(x) = 8x - 15$ graphed on the same set of axes, which value(s) of x will make $f(x) = g(x)$?

(1) 3, only

(2) 9, only

(3) 3 and 5

(4) 9 and 25

7 Which trinomial is written in standard form and has a constant term of five?

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

(2) $2x^2 + 6x^4 + 5$

(3) $5x^4 - 3x^2 + 1$

(4) $4x^5 - 8x^2 + 5$

8 When solving $x^2 + 6x = -8$ for x, a student wrote $x^2 + 6x + 8 = 0$ as their first step. Which property justifies this step?

(1) associative property

(2) commutative property

(3) zero property of addition

(4) addition property of equality

Use this space for computations.

9 The tables below show the input and output values of four different functions.

x	f(x)
−2	6
−1	1
0	−2
1	−3
2	−2
3	1

x	g(x)
−4	3
−3	2
−2	1
−1	0
0	1
1	2

x	h(x)
−2	−1
−1	−2
0	−4
1	−8
2	−16
3	−32

x	j(x)
−3	−11
−2	−7
−1	−3
0	1
1	5
2	9

Which table represents a linear function?

(1) $f(x)$ (3) $h(x)$

(2) $g(x)$ (4) $j(x)$

10 What is the solution set to the equation $3x^2 = 24x$?

(1) {8} (3) {0, −8}

(2) {0, 8} (4) {0, 8, −8}

11 The table below shows the radioactivity level of a substance after the given time, t, in seconds.

Time (seconds)	Radioactivity Level
0	20
1	10
2	5
3	2.5
4	1.25

What is the average rate of change in radioactivity level over the interval $1 \leq t \leq 3$?

(1) 3.75 (3) 4.6875

(2) −3.75 (4) −4.6875

Use this space for computations.

12 Fred recorded the number of minutes he read each day, from Monday through Friday. His results are shown in the table.

Day	Number of Minutes Read
1	12
2	16
3	19
4	27
5	29

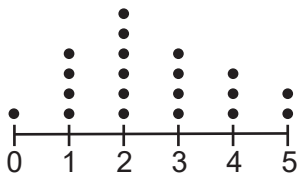
What is the correlation coefficient, to the *nearest thousandth*, and strength of the linear model of these data?

(1) 0.984 and strong
(2) 0.968 and strong
(3) 0.984 and weak
(4) 0.968 and weak

13 Given $f(x) = x^2$, which function will shift $f(x)$ to the left 3 units?

(1) $g(x) = x^2 + 3$
(2) $h(x) = x^2 - 3$
(3) $j(x) = (x - 3)^2$
(4) $k(x) = (x + 3)^2$

14 A class of 20 students was surveyed to determine the number of pets each student owned. The data are represented in the dot plot below.



Number of Pets

Which statement about the data is correct?

(1) The mean and the median are the same.
(2) The median and the mode are the same.
(3) The mean and the mode are the same.
(4) The mean, median, and mode are all the same.

Use this space for computations.

15 The range of $f(x) = |x + 2| - 5$ is

(1) $y \geq -5$

(2) $y \geq 2$

(3) $x \geq -5$

(4) $x \geq 2$

16 Which equation is always correct?

(1) $a^3 \bullet a^x = a^{3x}$

(2) $(a^4)^x = a^{4+x}$

(3) $(ab)^x = a^x b^x$

(4) $a^x \bullet b^y = ab^{x+y}$

17 The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. The height, h, of the trapezoid may be expressed as

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

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

(3) $\frac{b_1 + b_2}{2A}$

(4) $\frac{1}{2}A - (b_1 + b_2)$

18 Three functions are given below.

$f(x) = -|x + 2| + 7$

$g(x) = (x - 3)^2 - 4$

x	h(x)
−4	5
−3	0
−2	−3
−1	−4
0	−3
1	0
2	5

Which functions have the same y-intercept?

(1) $f(x)$ and $g(x)$

(2) $g(x)$ and $h(x)$

(3) $f(x)$ and $h(x)$

(4) The functions all have different y-intercepts.

Use this space for computations.

19 The sum of $(x + 7)^2$ and $(x - 3)^2$ is

(1) $2x^2 + 58$

(2) $2x^4 + 58$

(3) $2x^2 + 8x + 58$

(4) $2x^4 + 8x^2 + 58$

20 The product of $2\sqrt{10}$ and $3\sqrt{2}$ is

(1) $12\sqrt{5}$

(2) $5\sqrt{20}$

(3) $24\sqrt{5}$

(4) $5\sqrt{12}$

21 When $6x^3 - 2x + 8$ is subtracted from $5x^3 + 3x - 4$, the result is

(1) $x^3 - 5x + 12$

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

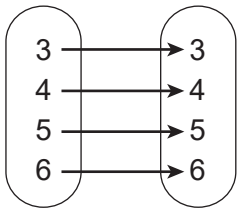
(3) $-x^3 + 5x - 12$

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

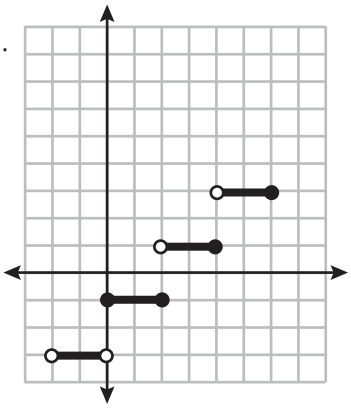
22 Three relations are shown below.

I. {(0,1), (1,2), (2,3), (3,4)}

II.



III.



Which relations represent a function?

(1) I and II, only

(2) I and III, only

(3) II and III, only

(4) I, II, and III

Use this space for computations.

23 The method of substitution was used to solve the system of equations below:

$$4x - 7y = 7$$
$$x - y = -1$$

Which equation is a correct first step when using this method?

(1) $x = y - 1$

(2) $y = x - 1$

(3) $3x - 6y = 8$

(4) $5x - 8y = 6$

24 In 2009, Usain Bolt, a sprinter from Jamaica, set the world record in the 100-meter dash with a time of 9.58 seconds. His approximate speed, in kilometers per hour, can be found using which conversion?

(1) $\frac{9.58 \text{ sec}}{100 \text{ m}} \bullet \frac{1000 \text{ m}}{1 \text{ km}} \bullet \frac{1 \text{ min}}{60 \text{ sec}} \bullet \frac{1 \text{ hr}}{60 \text{ min}}$

(2) $\frac{100 \text{ m}}{9.58 \text{ sec}} \bullet \frac{60 \text{ sec}}{1 \text{ min}} \bullet \frac{1000 \text{ m}}{1 \text{ km}} \bullet \frac{60 \text{ min}}{1 \text{ hr}}$

(3) $\frac{100 \text{ m}}{9.58 \text{ sec}} \bullet \frac{1 \text{ km}}{1000 \text{ m}} \bullet \frac{1 \text{ min}}{60 \text{ sec}} \bullet \frac{1 \text{ hr}}{60 \text{ min}}$

(4) $\frac{100 \text{ m}}{9.58 \text{ sec}} \bullet \frac{60 \text{ sec}}{1 \text{ min}} \bullet \frac{1 \text{ km}}{1000 \text{ m}} \bullet \frac{60 \text{ min}}{1 \text{ hr}}$

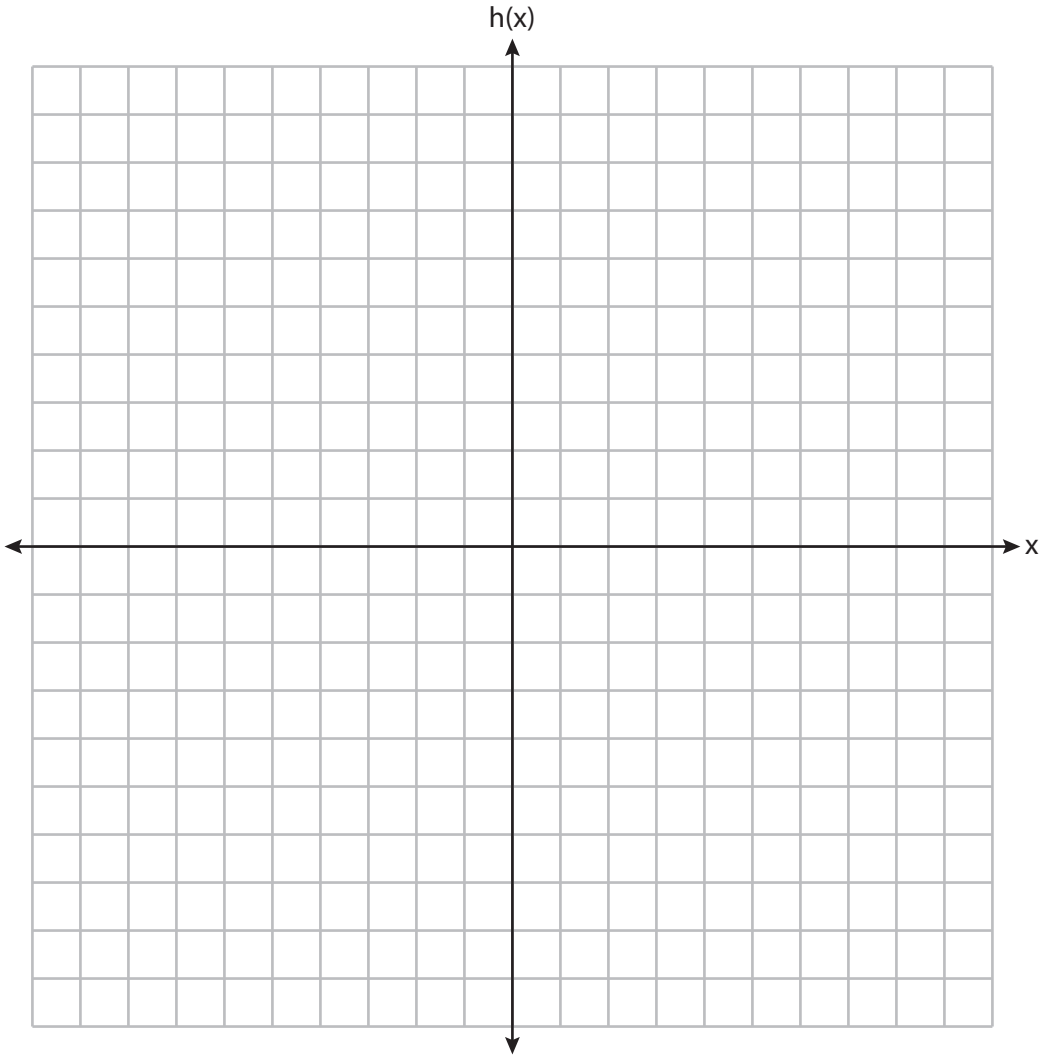
Part II

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 Solve the equation $\frac{1}{6}(4x + 12) = 9$ algebraically.

26 Is the sum of $3\sqrt{2}$ and 5 rational or irrational? Explain your answer.

27 Graph $h(x) = |x - 2|$ over the domain $-4 \leq x \leq 4$.



28 A survey was given to 180 cell phone owners about the brand of phone they owned. The results showed that 59 adults owned Brand *B* and 32 teenagers owned Brand *A*. Of all the people surveyed, 40% owned Brand *A*. Complete the two-way frequency table below.

	Brand A	Brand B	Total
Adults			
Teenagers			
Total			

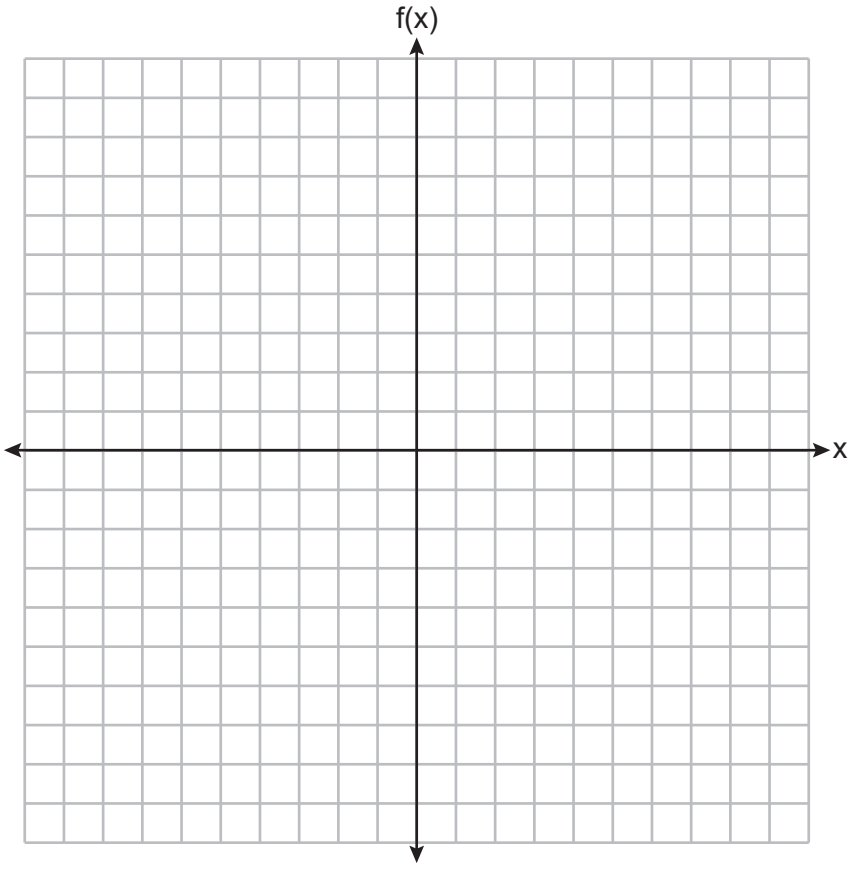
29 Determine the 8th term of a geometric sequence whose first term is 5 and whose common ratio is 3.

30 Using the method of completing the square, express $x^2 + 14x - 28 = 0$ in the form $(x - p)^2 = q$.

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 $f(x) = -\frac{1}{3}x^2 + 4$ on the set of axes below.



State the vertex of this function.

State the equation of the axis of symmetry of this function.

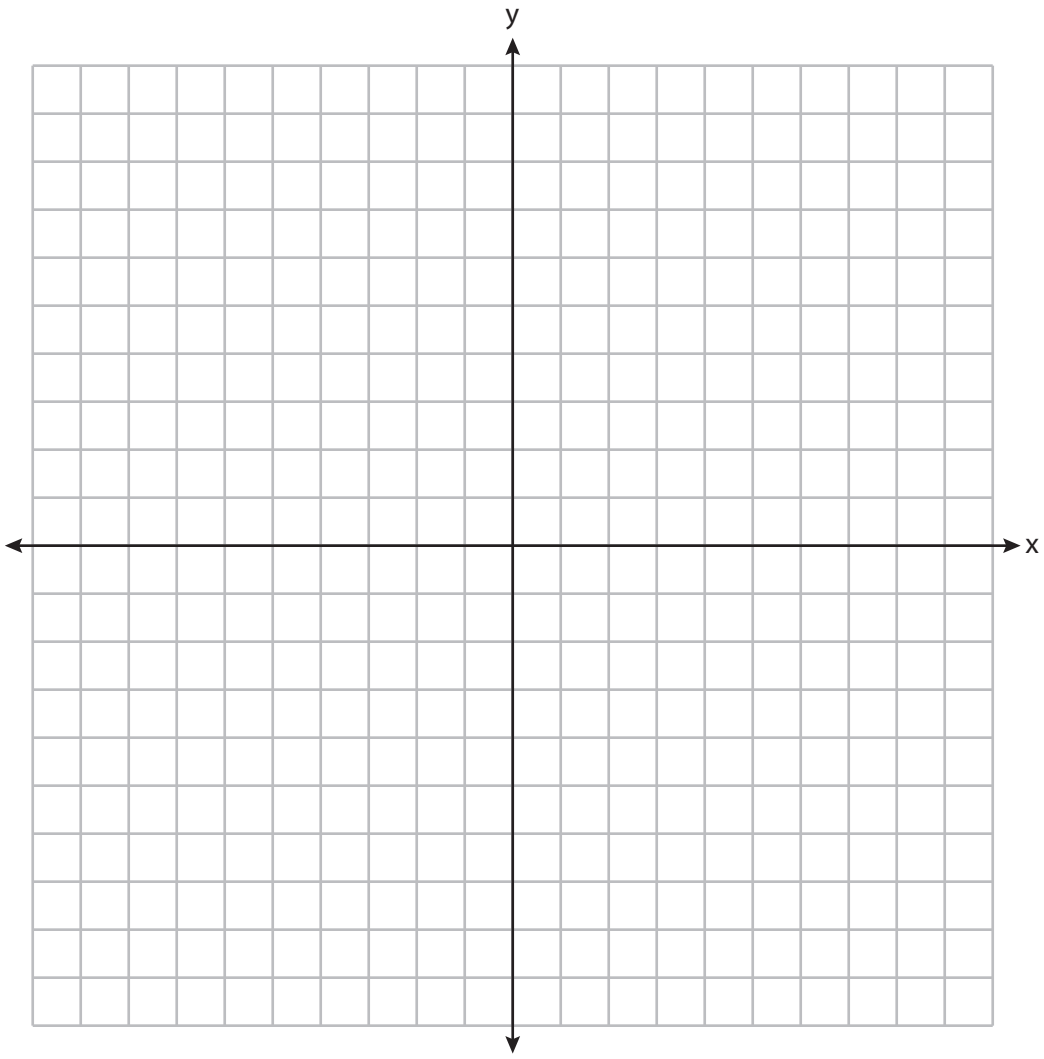
32 Vince wants to rent a canoe while he is on vacation. The canoe rental company charges \$18 for the first hour and \$7.50 for each additional hour, x. If Vince has \$78 to spend on renting a canoe, write an inequality in terms of x that models this situation.

Algebraically determine the maximum number of hours that Vince could rent a canoe.

33 Graph the following system of inequalities on the set of axes below.

$$y \geq -\frac{1}{2}x - 3$$

$$y - 2x < 5$$



State the coordinates of a point that is in the solution to this system. Justify your answer.

34 Using the quadratic formula, solve $x^2 - 6x + 3 = 0$.

Express the answer in simplest radical form.

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 Cameron sold hot dogs and sodas at a concession stand. He sold a total of 25 items for $45.00. A hot dog sold for $2.25 and a soda sold for $1.50. All prices include tax.

If x represents the number of hot dogs sold and y represents the number of sodas sold, write a system of equations that models this situation.

Determine algebraically the number of hot dogs Cameron sold and the number of sodas he sold.

A customer has $20 to spend at the concession stand. Determine and state the maximum number of hot dogs he can purchase if he buys four sodas.

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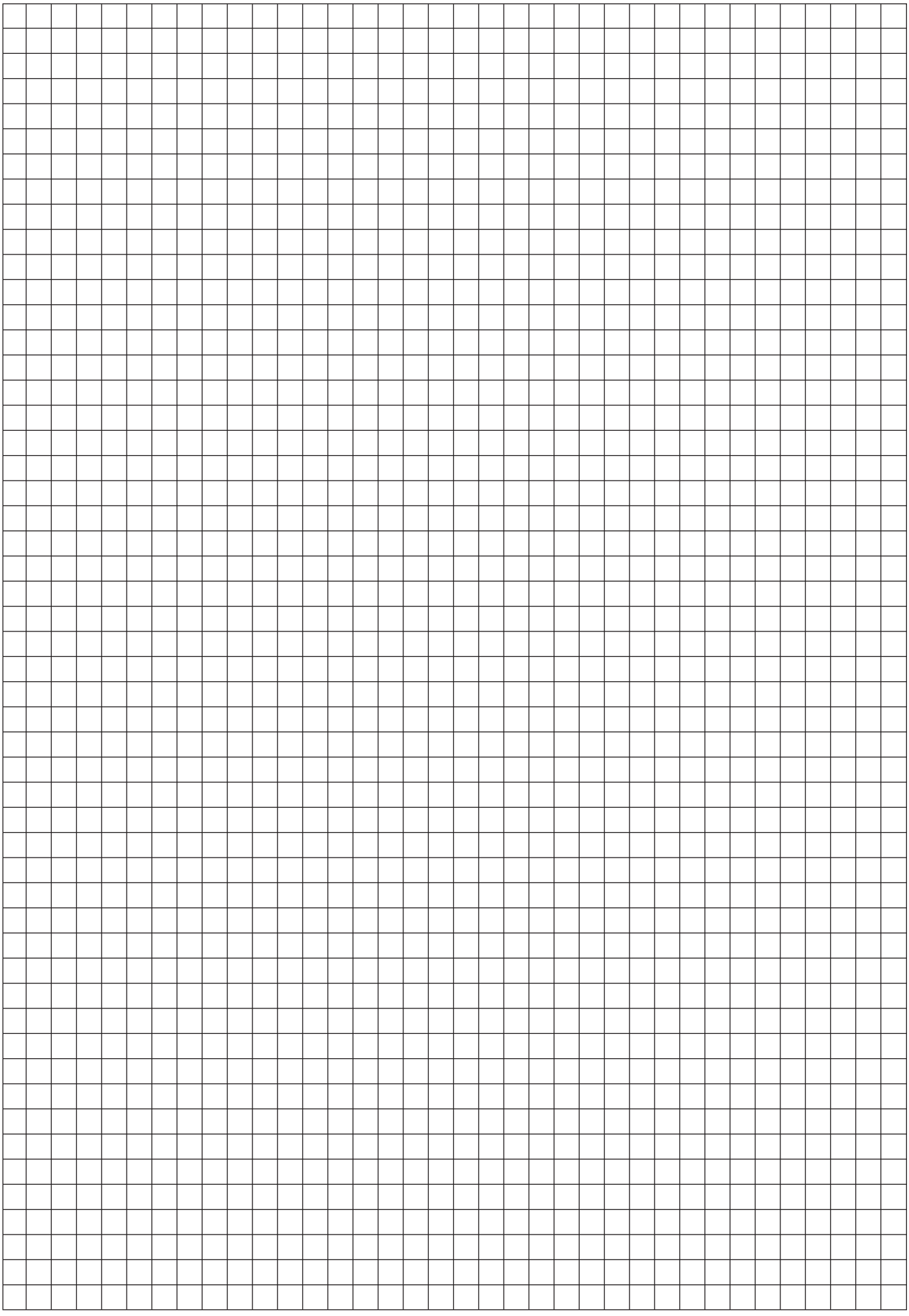

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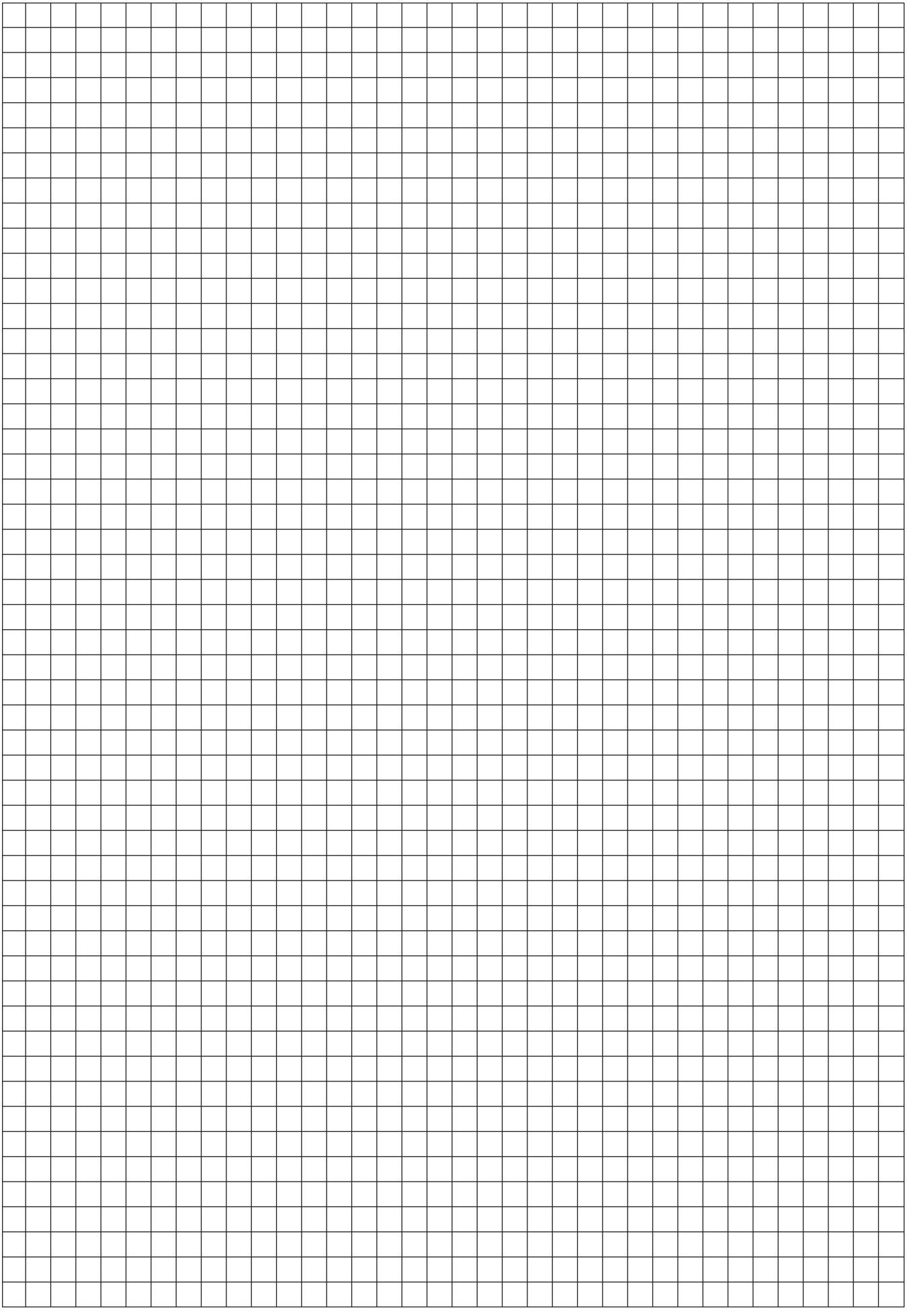

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Reference Sheet for Algebra I

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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