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

ALGEBRA I

Wednesday, January 21, 2026 — 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.

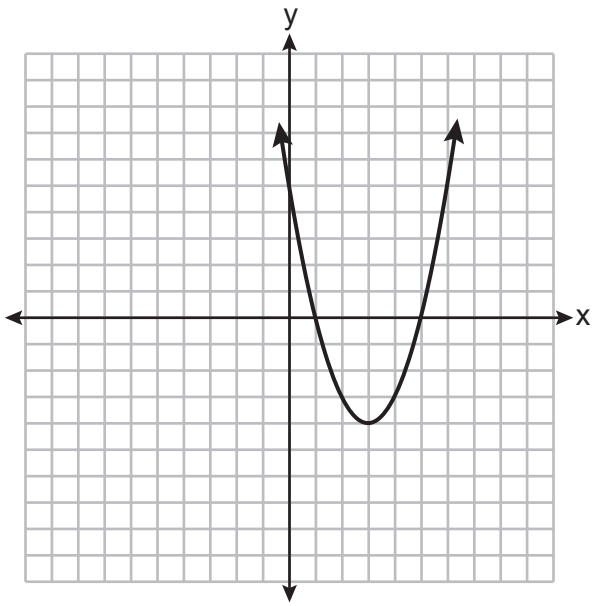
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

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 A parabola is graphed on the set of axes below.



What are the equation of the axis of symmetry and the coordinates of the vertex of this parabola?

(1) $x = 3$ and $(3, -4)$

(2) $y = 3$ and $(3, -4)$

(3) $x = -4$ and $(-4, 3)$

(4) $y = -4$ and $(-4, 3)$

2 The product of $\sqrt{25}$ and $\sqrt{2}$ will result in

(1) an irrational number

(2) a rational number

(3) a natural number

(4) an integer

Use this space for computations.

3 When $f(x) = |4x + 2|$ and $g(x) = 3x + 5$ are graphed on the same set of axes, for which value of x is $f(x) = g(x)$?

(1) 1
(2) 2
(3) 3
(4) 14

4 The expression $x^2 - 26x - 120$ is equivalent to

(1) $(x + 4)(x - 30)$
(2) $(x - 4)(x + 30)$
(3) $(x - 20)(x + 6)$
(4) $(x + 20)(x - 6)$

5 The expression $3 - 2\sqrt{5} + 6\sqrt{5}$ is equivalent to

(1) $7\sqrt{5}$
(2) $7\sqrt{10}$
(3) $3 + 4\sqrt{5}$
(4) $3 + 4\sqrt{10}$

6 Students were asked to write a polynomial given the following conditions:

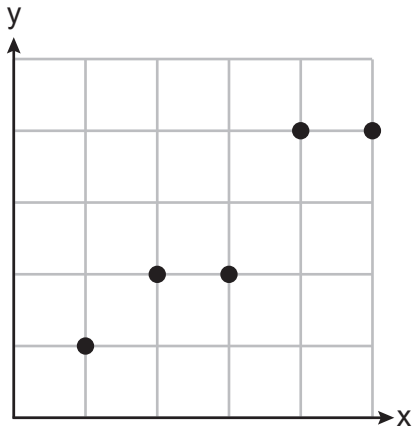
- the degree of the expression is 3
- the leading coefficient is 2
- the constant term is -6

Which expression satisfies all three conditions?

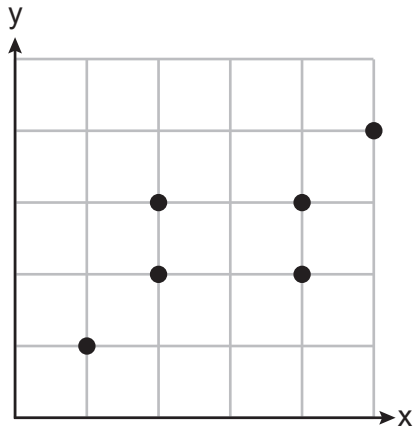
(1) $4x - 6 + 3x^2$
(2) $3x^2 - 6x + 4$
(3) $4 - 6x + 2x^3$
(4) $4x^2 + 2x^3 - 6$

Use this space for computations.

7 Which graph below represents a function?



(1)



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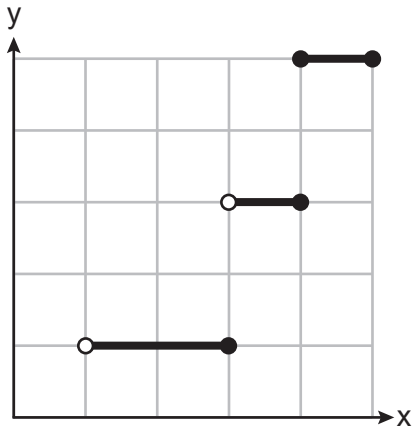

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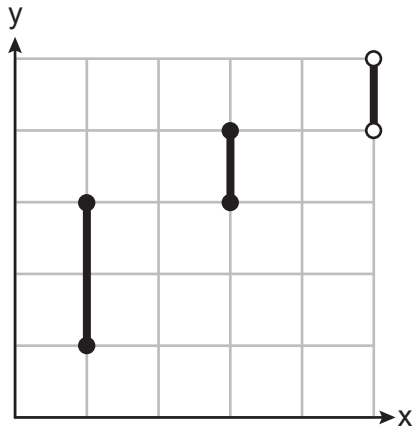


(4)

8 The following function models the value of a diamond ring, in dollars, t years after it is purchased:

$$v(t) = 500(1.08)^t$$

What was the original price of the ring, in dollars?

(1) \$108

(2) \$460

(3) \$500

(4) \$540

Use this space for computations.

9 The formula for the surface area of a cylinder can be expressed as $S = 2\pi r^2 + 2\pi rh$, where r is the radius and h is the height of the cylinder. What is the height, h, expressed in terms of S, π, and r?

(1) $h = \dfrac{S - 2\pi r^2}{2\pi r}$

(2) $h = S - r$

(3) $h = \dfrac{2\pi r^2 - S}{2\pi r}$

(4) $h = r - S$

10 When solving the following system of equations algebraically, Mason used the substitution method.

$$3x - y = 10$$
$$2x + 5y = 1$$

Which equation could he have used?

(1) $2(3x - 10) + 5x = 1$

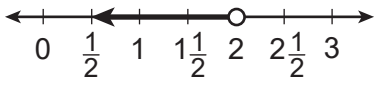
(2) $2(-3x + 10) + 5x = 1$

(3) $2x + 5(3x - 10) = 1$

(4) $2x + 5(-3x + 10) = 1$

11 Which graph represents the solution to the inequality $4 + 3x > 9 - 7x$?

(1)



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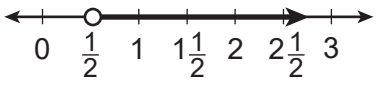

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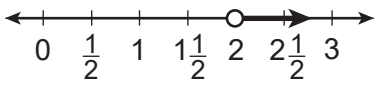

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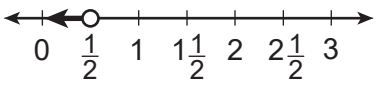


Use this space for computations.

12 When solving the equation $3(2x + 5) - 8 = 7x + 10$, the first step could be $3(2x + 5) = 7x + 18$. Which property justifies this step?

(1) addition property of equality

(2) commutative property of addition

(3) multiplication property of equality

(4) distributive property of multiplication over addition

13 Which table of values best models an exponential decay function?

x	f(x)
−2	7
−1	4
0	1
1	−2
2	−5
3	−8

(1)

m	f(m)
0	200
1	180
2	162
3	146
4	131
5	118

(2)

n	f(n)
0	200
0.5	210
1	220
1.5	231
2	242
2.5	254

(3)

p	f(p)
−3	−2
−2	−5
−1	−6
0	−5
1	−2
2	3

(4)

14 If $f(x) = \sqrt{x + 1} + 5$, then what is the value of $f(3)$?

(1) 9

(2) 7

(3) 3

(4) 10

15 Isabella wants to shift the graph of the function $f(x) = (x + 5)^2 - 2$ left 3 units. Which function represents the shifted graph?

(1) $g(x) = (x + 2)^2 - 2$

(2) $g(x) = (x + 8)^2 - 2$

(3) $g(x) = (x + 5)^2 - 5$

(4) $g(x) = (x + 5)^2 + 1$

Use this space for computations.

16 What are the zeros of $f(x) = x(x^2 - 36)$?

(1) 0, only

(2) 6, only

(3) 6 and -6, only

(4) 0, 6, and -6

17 The point $(x, -6)$ lies on the graph of a parabola whose equation is $y = -x^2 - x + 6$. The value of x can be

(1) -3 or 2

(2) -4 or 3

(3) 3, only

(4) -4, only

18 The two-way frequency table below is a summary of concession stand sales for a football game.

Concession Stand Sales

	Soda	Water	Coffee	Total
Hot Dogs	50	62	46	158
Pizza	120	58	4	182
No Food	30	20	10	60
Total	200	140	60	400

Of the people making a purchase at the concession stand, what is the relative frequency of them buying pizza and a water?

(1) 0.58

(2) 0.35

(3) 0.455

(4) 0.145

Use this space for computations.

19 When Theodore was driving in Canada, his speed was 104 kilometers per hour. Theodore was asked to convert his metric speed to a different rate, using the following conversion:

$$\frac{104 \text{ km}}{1 \text{ hr}} \bullet \frac{1 \text{ hr}}{60 \text{ min}} \bullet \frac{1 \text{ min}}{60 \text{ sec}} \bullet \frac{0.6214 \text{ mi}}{1 \text{ km}} \bullet \frac{5280 \text{ ft}}{1 \text{ mi}}$$

Assuming he did all the work correctly, what would the units be for Theodore's rate?

(1) feet per second
(2) feet per minute
(3) seconds per foot
(4) minutes per foot

20 Which expression is equivalent to $(-2x^2)^3$?

(1) $-2x^5$
(2) $-2x^6$
(3) $-8x^5$
(4) $-8x^6$

21 The table below shows the amount of a radioactive substance that remained for selected years.

Year	2000	2001	2005	2010	2014	2017	2019
Amount Remaining (grams)	750	450	219	85	25	12	8

To the *nearest tenth*, the average rate of change, in grams per year, from 2000 to 2014 is

(1) 39.1
(2) 51.8
(3) −39.1
(4) −51.8

Use this space for computations.

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

(1) $x^2 - 5x + 9$

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

(3) $-x^2 + 5x - 9$

(4) $-x^2 - x - 1$

23 Which equation has the same solution as $x^2 - 6x = 24$?

(1) $(x - 3)^2 = 24$

(2) $(x - 6)^2 = 24$

(3) $(x - 3)^2 = 33$

(4) $(x - 6)^2 = 60$

24 In a sequence, the first term is -2 and the common ratio is -3. The fourth term in this sequence is

(1) -162

(2) -11

(3) 24

(4) 54

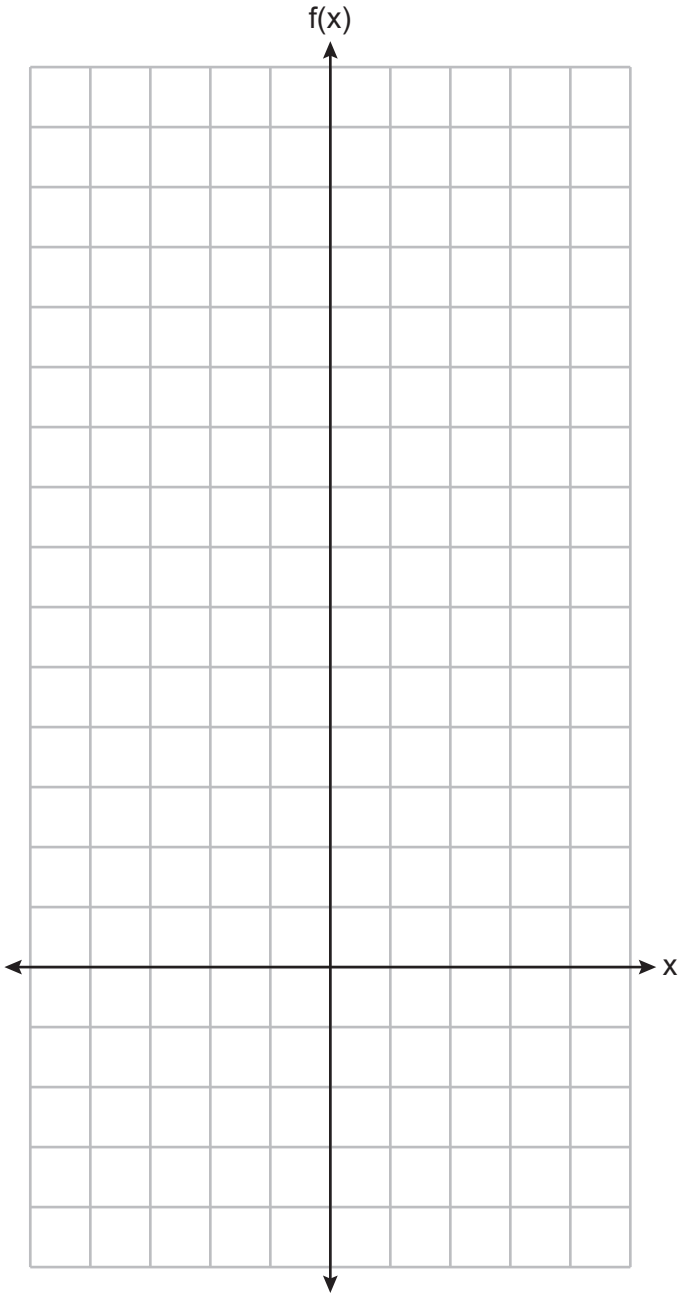
Part II

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 for x:

$$14x = 3(1 + 2x) - 4x$$

26 Graph $f(x) = 3(2)^x$ over the interval $-1 \leq x \leq 2$.



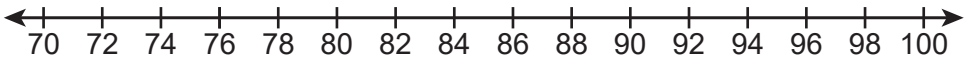
27 Determine the product of $(2x + 3)$ and $(-6x^2 + 5x - 1)$.

Express the product in standard form.

28 A student's test scores for the semester are listed below.

83, 87, 90, 94, 94, 93, 95, 70, 72, 83, 85, 88, 98

Construct a box plot for this data set, using the number line below.



Student Test Scores

29 Write an equation, in slope-intercept form, of a line that passes through the point (6, 3) and has a slope of $\frac{2}{3}$.

30 Abby has \$20 to spend at a community festival. She uses \$8.50 to purchase food coupons for popcorn, a hot dog, and a soda.

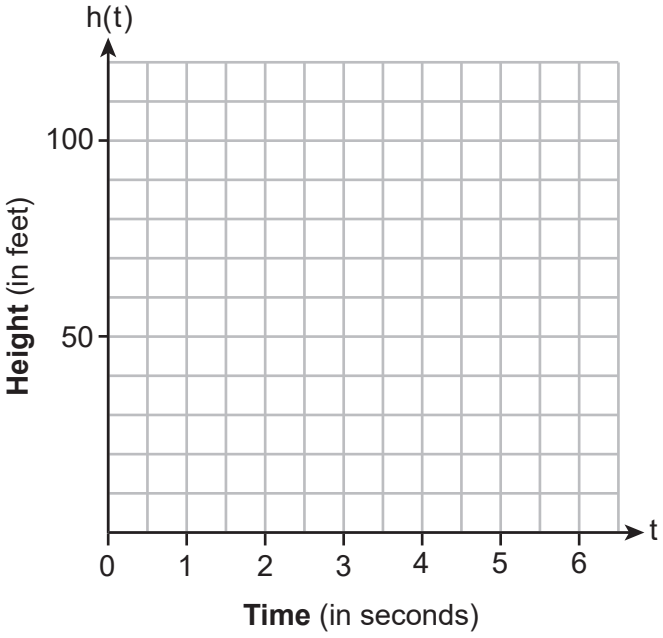
She can buy individual ride tickets for \$2.25 each. Determine algebraically the maximum number of ride tickets Abby can buy.

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 A rocket was launched from the ground into the air at an initial velocity of 80 feet per second. The path of the rocket can be modeled by $h(t) = -16t^2 + 80t$, where t represents the time after the rocket has been launched, and $h(t)$ represents the height of the rocket.

Sketch the function on the set of axes below.



State how many seconds it will take for the rocket to reach its maximum height.

State the maximum height, in feet, of the rocket.

32 Use the quadratic formula to solve $2x^2 - 4x - 3 = 0$, and express the answer in simplest radical form.

33 The table below shows the ages of drivers and the annual cost of their car insurance.

Age (x) (in years)	16	17	18	18	21	22	30
Annual Cost of Car Insurance (y) (in dollars)	1452	1332	1284	1320	1200	1188	600

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

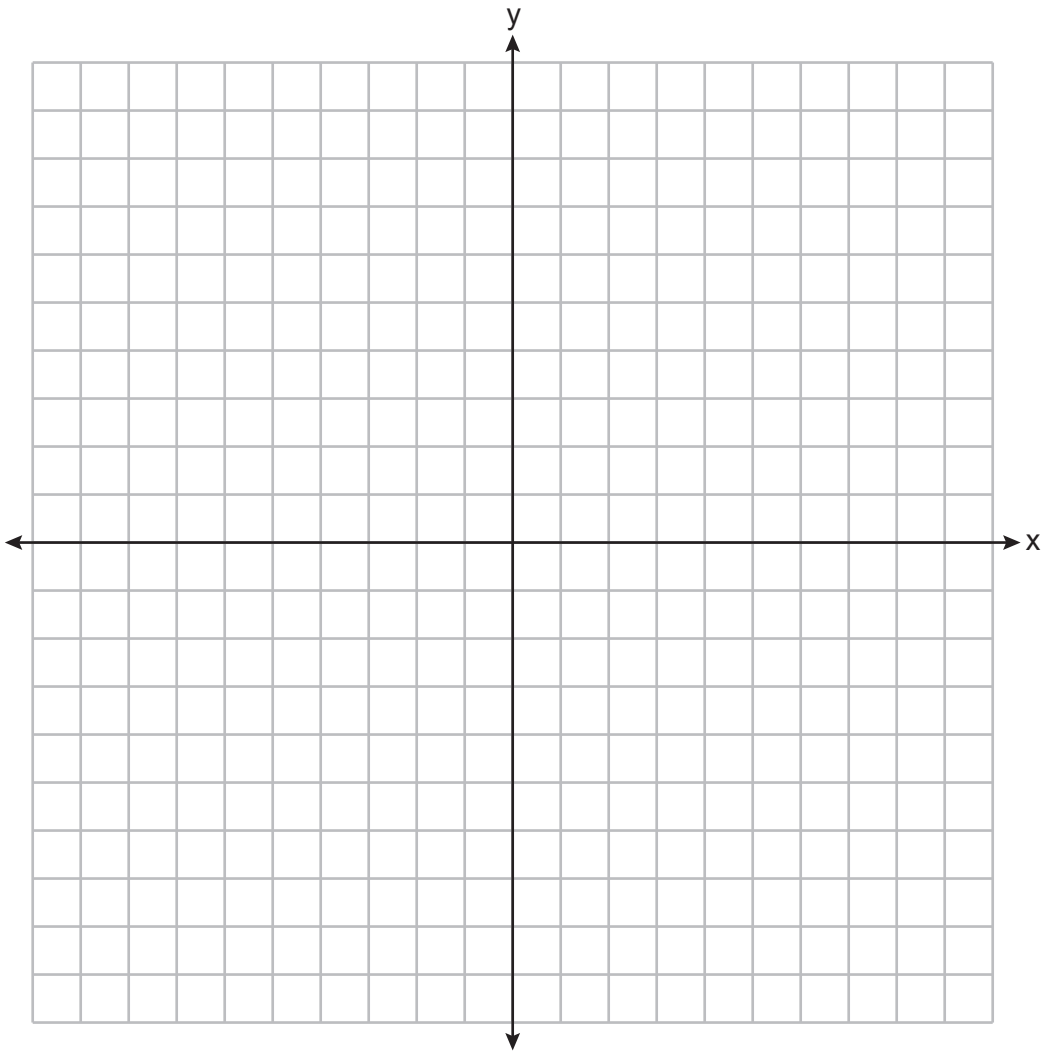
State the correlation coefficient of this line of best fit, to the *nearest hundredth*.

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

34 Solve the following system of inequalities graphically.

Label the solution set S.

$$2y \leq x + 6$$
$$2x + y > 3$$



Is the point (0, 3) in the solution set? Explain your answer.

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 Acme Athletics purchases shoes from a supply company. In January the store bought 30 pairs of running shoes and 10 pairs of basketball shoes for $3700. In March they bought 15 pairs of running shoes and 20 pairs of basketball shoes for $3575. The supply company kept their prices constant.

If x represents the cost of one pair of running shoes and y represents the cost of one pair of basketball shoes, write a system of equations that models this situation.

Jacob says that a pair of running shoes costs the store $80 each, and a pair of basketball shoes costs the store $130 each. Is he correct? Justify your answer.

Question 35 is continued on the next page.

Question 35 continued

Solve your system of equations algebraically to find the exact cost, in dollars, of one pair of running shoes and the exact cost, in dollars, of one pair of basketball shoes.

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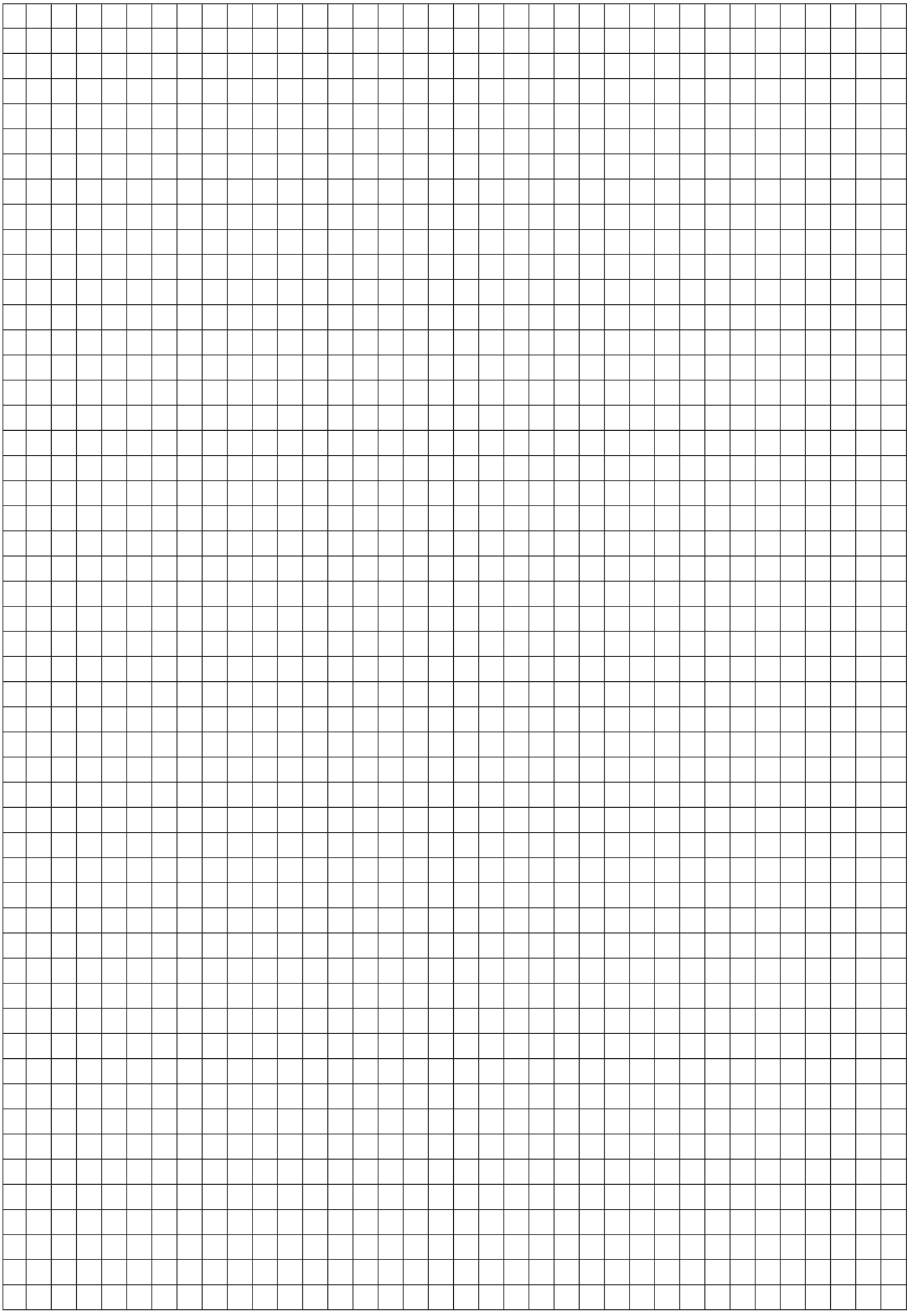

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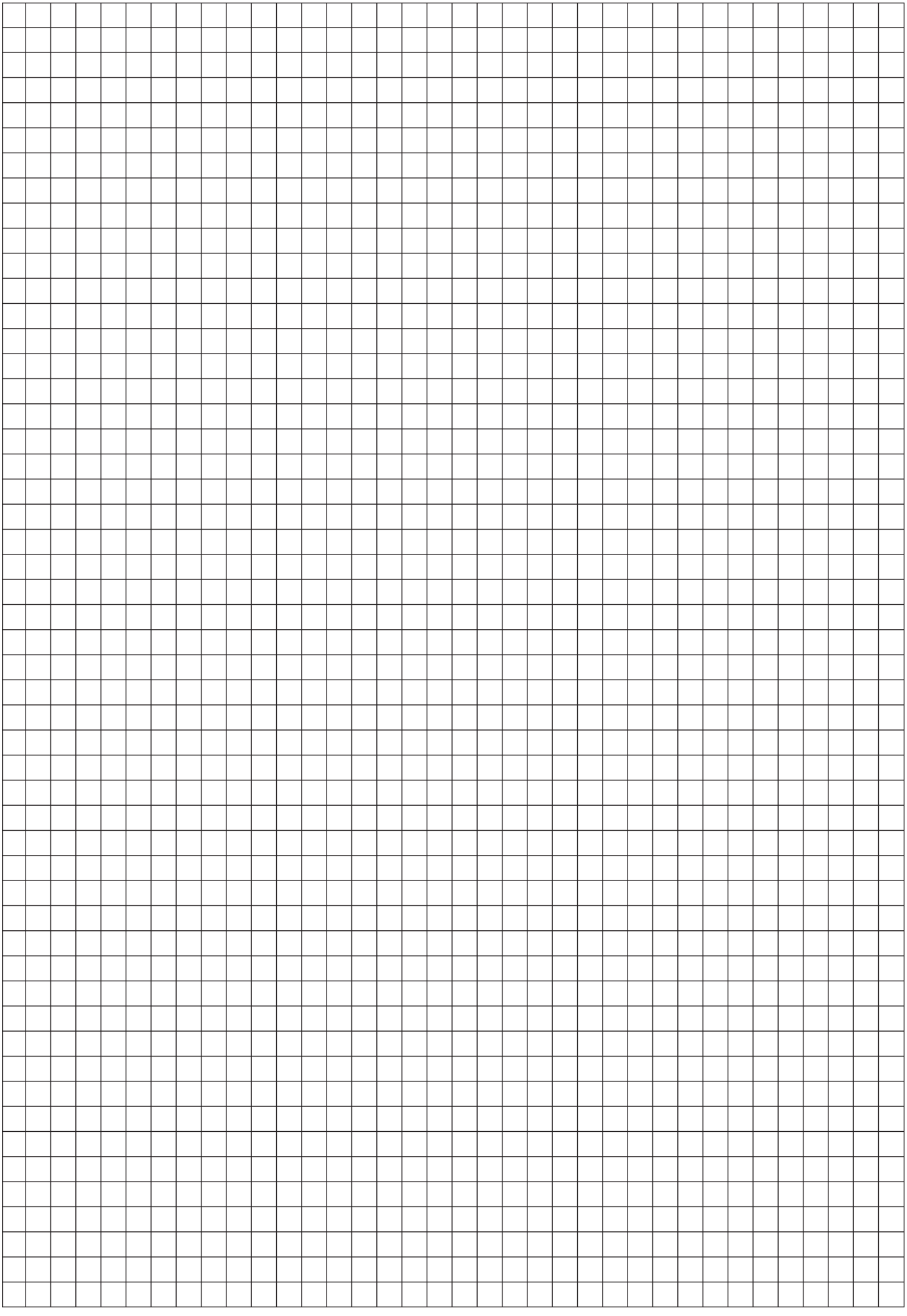

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Reference Sheet for Algebra I

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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