ALGEBRA 1
PRACTICE TESTS
Based on
Next Generation Learning Standards

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Reference Sheet for Algebra I (NGLS)

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	$y - y_1 = m\left(x - x_1\right)$

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

ALGEBRA 1
Next Generation Learning Standards
Test 1
Part I

Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the space provided the numeral preceding the word or expression that best completes the statement or answers the question.

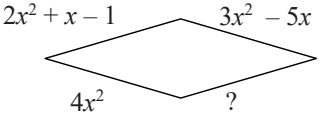
1. What are the values of x in the equation $x(x - 6) = 4(x + 6)$?
(1) $\{-6, 6\}$ (2) $\{-12, 2\}$ (3) $\{-2, 12\}$ (4) $\{-6, 0, 6\}$ 1 _____

2. Which of ordered pairs is *not* a function?
(1) $\{(0, 9),(9, 0),(1, 2),(3, 4)\}$ (3) $\{(2, 3),(3, 4),(4, 5),(5, 6)\}$
(2) $\{(0, 1),(-1, 0),(1, 2),(3, 2)\}$ (4) $\{(2, 3),(2, 4),(4, 5),(4, 6)\}$ 2 _____

3. If $f(x) = |3x - 4| + 2$, find $f(-10)$.
(1) 28 (2) 34 (3) 36 (4) 38 3 _____

4. What is the value of the 1st quartile in the data set below?
Scores on a math quiz: 65, 90, 100, 72, 88, 55, 73
(1) 65 (2) 73 (3) 90 (4) 55 4 _____

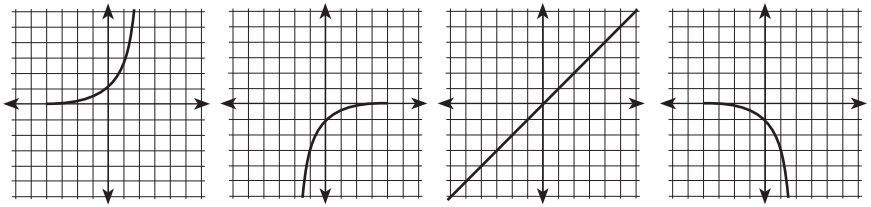
5. What is the length of the missing side of the quadrilateral shown if the perimeter is $5x^2 + 2x + 1$?



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

6. What is the product of $(x + 1)$ and $(2x^2 + 3x - 1)$?
(1) $2x^2 + 5x^2 - x - 1$ (3) $2x^3 + 3x^2 + 3x + 1$
(2) $2x^3 + 5x^2 + 2x - 1$ (4) $2x^3 + 3x^2 - 3x - 1$ 6 _____

7. Which graph is a correct representation of the function $f(x) = 3^x$?



(1) (2) (3) (4)
7 _____

8. The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. The radius, r, of the cone may be expressed as
(1) $\sqrt{\frac{3V}{\pi h}}$ (2) $\sqrt{\frac{V}{3\pi h}}$ (3) $3\sqrt{\frac{V}{\pi h}}$ (4) $\frac{1}{3}\sqrt{\frac{V}{\pi h}}$
8 _____

ALGEBRA 1 - NGLS
Test 1

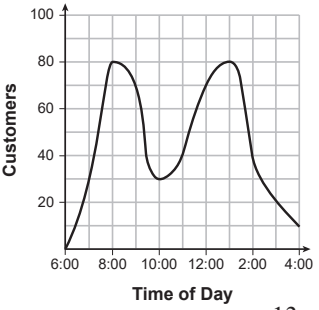
9. How can $b^2 + 9b + 14$ be re-written?
(1) $(b + 7)(b - 7)$ (3) $(b + 7)(b - 2)$
(2) $(b - 7)(b - 2)$ (4) $(b + 7)(b + 2)$ 9 _____

10. What is the sum of $3x\sqrt{5} + 2x\sqrt{5}$?
(1) $5x\sqrt{5}$ (2) $5x^2\sqrt{5}$ (3) $5x\sqrt{14}$ (4) $5x^2\sqrt{14}$ 10 _____

11. Using the equation $y = ax^2 + bx + c$ to represent a parabola on a graph, which statement is true?
(1) If b is negative, the parabola opens downward.
(2) If a is negative, the parabola opens upward.
(3) If a is positive, the parabola opens upward.
(4) If c is negative, the parabola opens downward. 11 _____

12. If the function $h(x)$ represents the number of full hours that it takes a person to assemble x sets of tires in a factory, which would be an appropriate domain for the function?
(1) the set of real numbers (3) the set of integers
(2) the set of negative integers (4) the set of non-negative integers 12 _____

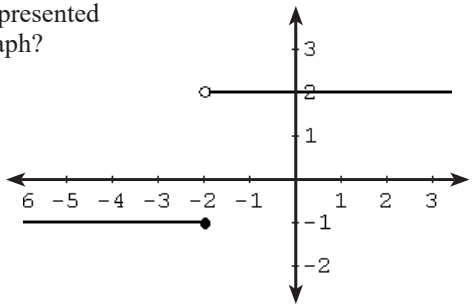
13. A café owner tracks the number of customers during business hours. The graph models the data. Based on the graph, the café owner saw a continual
(1) increase in customers from 6:00 to 11:00
(2) increase in customers from 12:00 to 3:00
(3) decrease in customers from 1:00 to 4:00
(4) decrease in customers from 11:00 to 2:00



13 _____

14. Which equation is represented by the accompanying graph?

(1) $y = \begin{cases} -1; x < -2 \\ 2; x > -2 \end{cases}$
(2) $y = \begin{cases} -1; x \leq -2 \\ 2; x > -2 \end{cases}$
(3) $y = \begin{cases} -1; x < -2 \\ 2; x \geq -2 \end{cases}$
(4) $y = \begin{cases} -1; x \leq -2 \\ 2; x \geq -2 \end{cases}$



14 _____

15. Seven less than twice a number is greater than 5 more than the same number. Which integer satisfies this inequality?
(1) 1 (2) 2 (3) 12 (4) 13 15 _____

16. A mouse population starts with 2,000 mice and grows at a rate of 5% per year. The number of mice after t years can be modeled by the equation, $P(t) = 2000(1.05)^t$. What is the average rate of change in the number of mice between the second year and the fifth year, rounded to the *nearest whole number*?

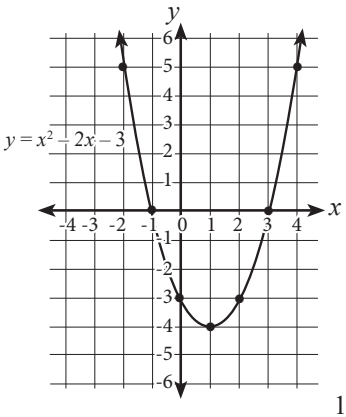
(1) 116 (2) 348 (3) 2205 (4) 2553 16 ____

17. What is the value of x in the equation $\frac{5(2x-4)}{3} + 9 = 14$?

(1) 1.9 (2) 3.5 (3) 5.3 (4) 8.9 17 ____

18. Which statement is true about the accompanying graph?

(1) It is decreasing when $-1 < x < 3$ and positive when $x > 1$.
(2) It is increasing when $x > 1$ and negative when $x < 0$.
(3) It is increasing when $x > 1$ and negative when $-1 < x < 3$.
(4) It is decreasing when $-1 < x < 3$ and positive when $x > 3$.



18 ____

19. The two-way table below represents the travel history of the seniors in the local Travel Club.

Travel Club History			
	Gender		Total
	Men	Women	
Aruba	14	19	33
Jamaica	17	18	35
Canada	32	22	54
Spain	4	11	15
Total	67	70	137

What is the percentage of the number of men and women that have traveled to Canada?

(1) 16% (2) 23% (3) 39% (4) 42% 19 ____

20. What is the equation of the line with a slope of $-\frac{1}{2}$ that passes through the point $(6, -6)$?

(1) $y = -\frac{1}{2}x - 3$ (2) $y = \frac{1}{2}x - 3$ (3) $y = -\frac{1}{2}x + 3$ (4) $y = -2x - 3$ 20 ____

ALGEBRA 1 - NGLS
Test 1

21. Alex makes ceramic bowls to sell at a monthly craft fair in a nearby city. Every month, she spends $50 on materials for the bowls from a local art store. At the fair, she sells each completed bowl for a total of $25 including tax. Which equation expresses Alex's profit as a function of the number of bowls that she sells in one month?

(1) $p(x) = 50x + 25$ (3) $p(x) = 25x$
(2) $p(x) = 15x + 25$ (4) $p(x) = 25x - 50$ 21 ____

22. Which expression is equivalent to $x^4 - y^4$?

(1) $(x^2 - y^2)(x^2 + y^2)$ (3) $(2x^2)^2 - (2y^2)^2$
(2) $(x^2 - y^2)(x^2 - y^2)$ (4) $(x^2y^2) - (x^2y^2)$ 22 ____

23. A bottle rocket that was made in science class had a trajectory path that followed the quadratic equation $y = -x^2 + 4x + 6$. What is the vertex of the rocket's path?

(1) (1, 5) (2) (2, 10) (3) (–2, –10) (4) (1, –5) 23 ____

24. What is the solution to this system of linear equations:

$y - x = 4$ and $y + 2x = 1$?

(1) (–1, 3) (2) (0, 4) (3) (1, –1) (4) (–3, 3) 24 ____

Part II

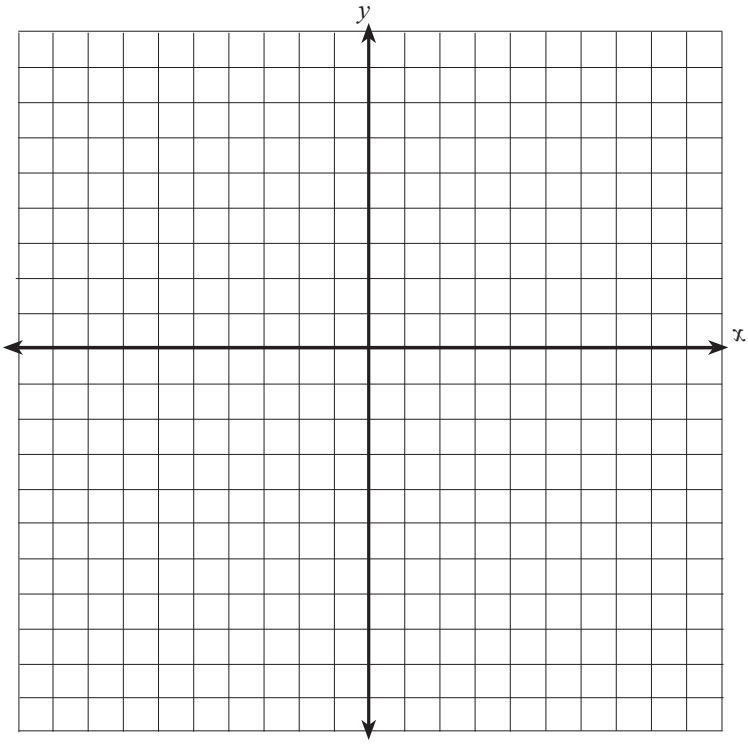
Answer all 6 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in the space provided. [16]

25. The function shown to the right represents the amount of money in a savings account in Lender's Bank.

Find the average rate of change of the domain for week 2 through week 5.

Week	Balance
1	$128
2	$142
3	$156
4	$170
5	$184

26. Graph $2x + y < 7$ and state one point in the solution set.



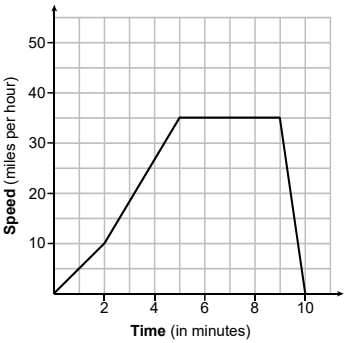
27. Solve for x: $2x^2 + 4x - 16 = 0$

ALGEBRA 1 - NGLS
January 2025

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. [16]

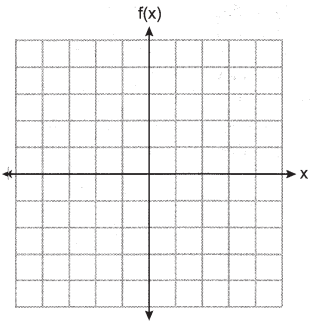
25. The accompanying graph models Sally's drive to the store.



State an interval when Sally is traveling at a constant speed.

Explain your reasoning.

26. Graph the function $f(x) = x^2 + 4x + 3$.



State the equation of the axis of symmetry of $f(x)$.

27. The function $f(x)$ is shown in the table below.

x	0	3	2	6	1	5	4	m
f(x)	6	2	7	5	8	4	3	9

State an appropriate value for m in the table, so that $f(x)$ remains a function.

Explain your reasoning.

28. Solve $x^2 + 8x = 33$ for x by completing the square.

29. If $f(x) = \frac{-3x-5}{2}$, algebraically determine the value of x when $f(x) = -22$.

30. Rationalize the denominator of the fraction below. Express the solution in simplest form.

$$\frac{4}{\sqrt{2}}$$

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. Alex had \$1.70 in nickels and dimes on his desk. There were 25 coins in all.

Write a system of equations that could be used to determine both the number of nickels, n, and the number of dimes, d, that Alex had.

Use your system of equations to algebraically determine both the number of nickels and the number of dimes that he had.

ALGEBRA 1 - NGLS
January 2025

32. The table below shows the average heart rate, x, and Calories burned, y, for seven men on an Olympic rowing team during a one-hour workout class.

Average Heart Rate (x)	135	147	150	144	146	153	143
Calories Burned (y)	725	812	866	761	825	863	737

Write the linear regression equation that models these data, rounding all values to the *nearest tenth*.

State the correlation coefficient, rounded to the *nearest tenth*.

State what the correlation coefficient suggests about the linear fit of these data.

33. Using the quadratic formula, solve $x^2 + 4x - 3 = 0$.
Express your solution in simplest radical form.

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

$$y = x^2 - 7x + 12$$
$$y = 2x - 6$$

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]

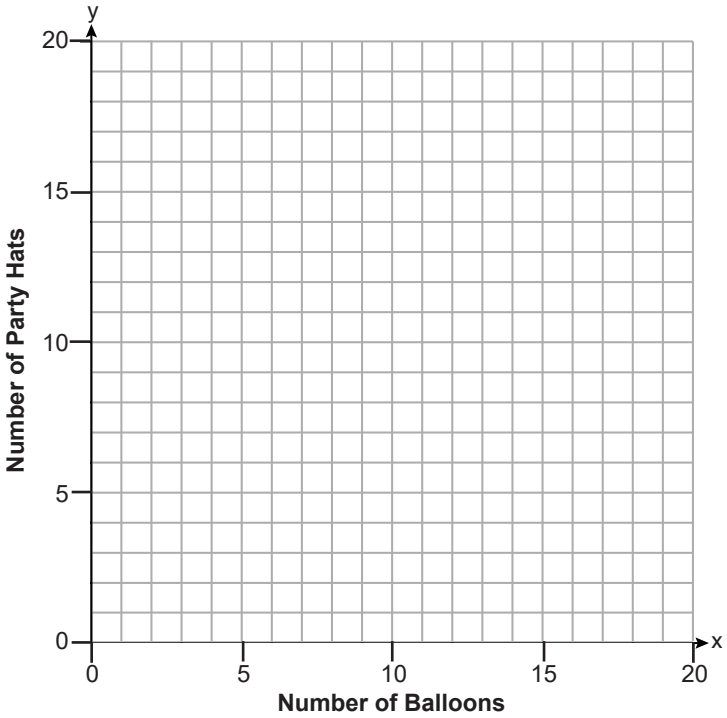
35. Anna plans to spend \$30 on balloons and party hats for her daughter's birthday party. Including tax, balloons cost \$2 each and party hats cost \$1.50 each. The number of party hats Anna needs is twice as many as the number of balloons.

If x represents the number of balloons and y represents the number of party hats, write a system of equations that can be used to represent this situation.

Question 35 is continued on the next page.

Question 35 continued:

Graph your system of equations on the set of axes below.



State the coordinates of the point of intersection of your lines.

Explain what each coordinate means in the context of the problem.