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.

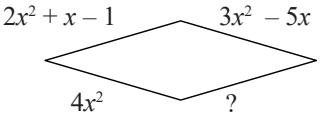
1. What are the values of x in the equation $x(x - 6) = 4(x + 6)$?
(1) $\{-6, 6\}$ (2) $\{-12, 2\}$ (3) $\{-2, 12\}$ (4) $\{-6, 0, 6\}$ 1 _____

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 _____

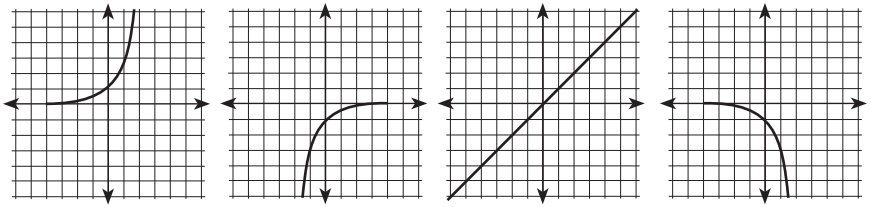
5. What is the length of the missing side of the quadrilateral shown if the perimeter is $5x^2 + 2x + 1$?



(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. A sequence has an initial value of 10 and each term is twice the previous term. Which function models this sequence?
(1) $a(n) = 10(2)^n$ (3) $a(n) = 10 + 2n$
(2) $a(n) = 10(2)^{n-1}$ (4) $a(n) = 10 + 2(n - 1)$ 8 _____

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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 he 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. Given the length of three sides of a triangle, which is a right triangle?
(1) 10, 26, 24 (2) 20, 12, 18 (3) 30, 15, 26 (4) 40, 50, 80 13 _____

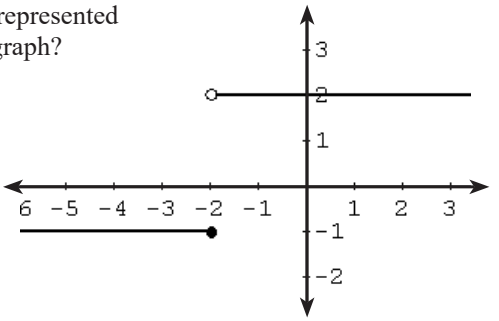
14. Which equation is represented by the accompanying graph?

(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. 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 15 _____

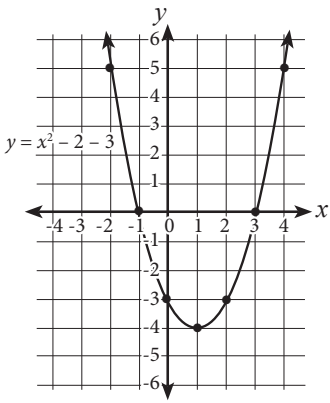
16. Seven less than the product of twice a number is greater than 5 more than the same number. Which integer satisfies this inequality?
(1) 1 (2) 2 (3) 12 (4) 13 16 _____

17. A sequence is defined recursively by $f(1) = 16$ and $f(n) = f(n-1) + 2n$. Find $f(4)$.

(1) 32 (2) 30 (3) 28 (4) 34 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 approximate marginal relative frequency 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 ____

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 ____

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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 turning point 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. Find the average rate of change of the function shown to the right that represents the amount of money in a savings account in Lender's Bank?

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

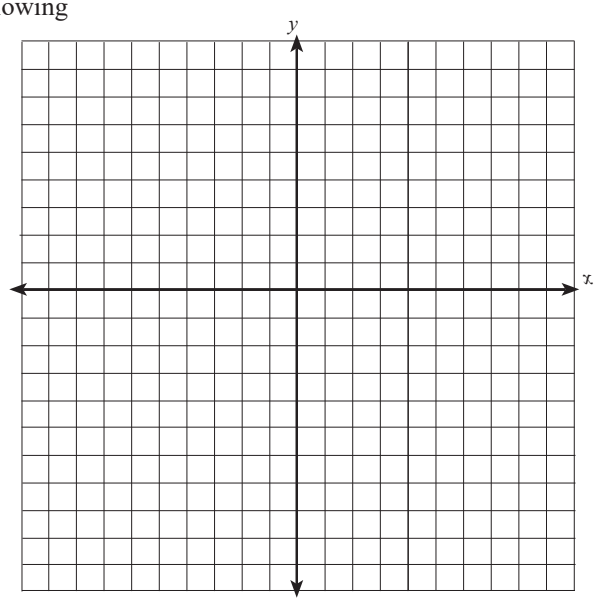
26. Find one point that lies in the solution set of the following system of inequalities:

$$y \leq \frac{1}{2}x + 6$$

$$y > -3x - 1$$

Justify your answer

[The use of the grid is optional.]



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

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28. The product of 16 and 4 less than a number is 208. Find the number.

29. MaryJo decided to solve the equation $3x - 2 = -x - 6$ by entering each of the expressions into her graphing calculator. To solve the equation as a system, she entered $y_1 = 3x - 2$ and $y_2 = -x - 6$. When she used the calculator to find the intersection, she found $x = -1$ and $y = -5$. Show the work to check to see if MaryJo found the correct solution for x to the linear equation.

30. Identify the turning point of the function $f(x) = x^2 - 2x + 8$ by writing its equation in vertex form.

Show your work.

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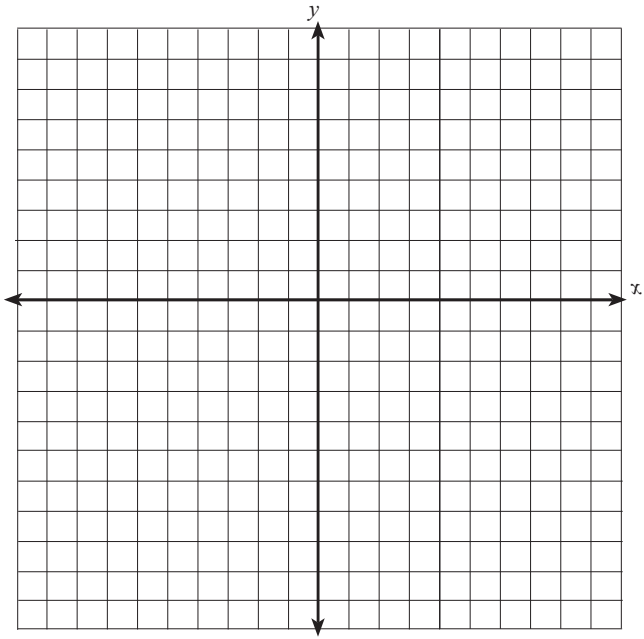
Part III

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



32. Jonathan has been on a diet since January 2013. So far, he has been losing weight at a steady rate. Based on monthly weigh-ins, his weight, w, can be modeled by the function $w = -3m + 205$ where m is the number of months after January 2013.

a) How much did Jonathan weigh at the start of the diet?

b) How much weight has Jonathan been losing each month?

c) How many months did it take Jonathan to lose 45 pounds?

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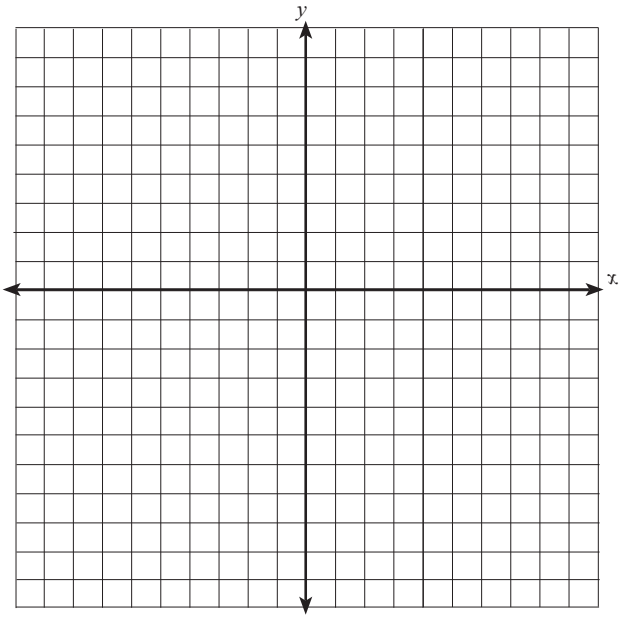
33. Yolanda owns 4 rabbits. She expects the number of rabbits to double every year.

a) After how many years will she have 64 rabbits?

b) Write an equation to model this situation. [The use of the grid is optional.]



34. Create a box plot for the ages of people listed below:

40, 25, 20, 15, 40, 40, 45, 60, 7, 10, 52, 34, 38

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Part IV

Answer one question in this part. The correct answer will receive 6 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 spaces provided. [6]

35. Graph the system of equations: $y = -x^2 + 3x - 1$
State the solution to the system. $2y - 1 = x$