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	$y = ax^2 + bx + c$	Exponential Equation	$y = ab^x$	
Quadratic Formula	$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	Annual Compound Interest	$A = P(1+r)^n$	
Equation of the Axis of Symmetry	$x = -\dfrac{b}{2a}$	Arithmetic Sequence	$a_n = a_1 + d(n-1)$	
Slope	$m = \dfrac{y_2 - y_1}{x_2 - x_1}$	Geometric Sequence	$a_n = a_1 r^{n-1}$	
Linear Equation Slope Intercept	$y = mx + b$	Interquartile Range (IQR)	$IQR = Q_3 - Q_1$	
Linear Equation Point Slope	$y - y_1 = m\left(x - x_1\right)$	Outlier	Lower Outlier Boundary $= Q_1 - 1.5\left(IQR\right)$	Upper Outlier Boundary $= Q_3 + 1.5\left(IQR\right)$

ALGEBRA 1
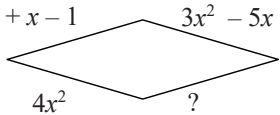## Next Generation Learning Standards
Test 1
Part I

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 $x(x-6) = 4(x+6)$?
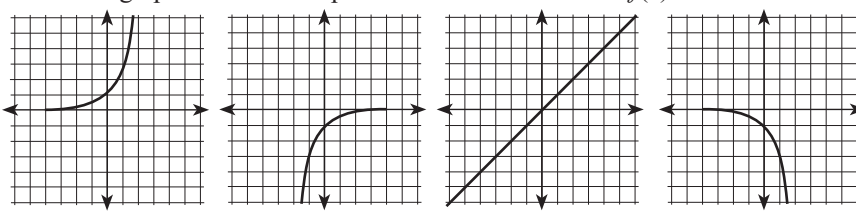(1) $\{-6, 6\}$ (2) $\{-12, 2\}$ (3) $\{-2, 12\}$ (4) $\{-6, 0, 6\}$ 1 _____

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 1$^{\text{st}}$ 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) $4x^2 + 8x - 4$

$2x^2 + x - 1$ $3x^2 - 5x$
$4x^2$?

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) $\sqrt{\dfrac{3V}{\pi h}}$ (2) $\sqrt{\dfrac{V}{3\pi h}}$ (3) $3\sqrt{\dfrac{V}{\pi h}}$ (4) $\dfrac{1}{3}\sqrt{\dfrac{V}{\pi h}}$

8 _____

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.
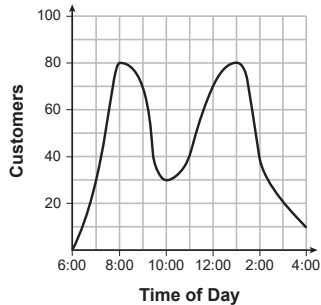Based on the graph, the café owner saw a continual
(1) increase in customers from 6:00 to 11:00
(2) increase in customers from 12:00 to 3:00
(3) decrease in customers from 1:00 to 4:00
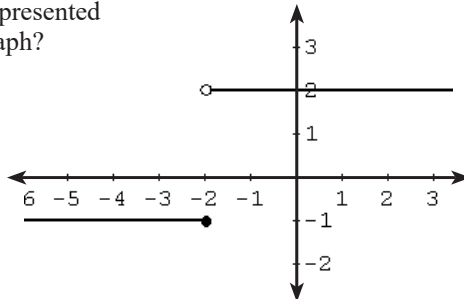(4) decrease in customers from 11:00 to 2:00

13 _____

14. Which equation is represented by the accompanying graph?
(1) $y = \begin{cases} -1; x < -2 \\ 2; x > -2 \end{cases}$

(2) $y = \begin{cases} -1; x \le -2 \\ 2; x > -2 \end{cases}$

(3) $y = \begin{cases} -1; x < -2 \\ 2; x \ge -2 \end{cases}$

(4) $y = \begin{cases} -1; x \le -2 \\ 2; x \ge -2 \end{cases}$

14_____

15. 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   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*?
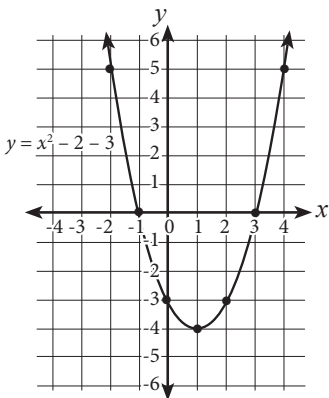
(1) 116   (2) 348   (3) 2205   (4) 2553   16 ____

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 $x > 3$.

$y = x^2 - 2 - 3$

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 ____

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:
$$y - x = 4 \text{ and } y + 2x = 1?$$

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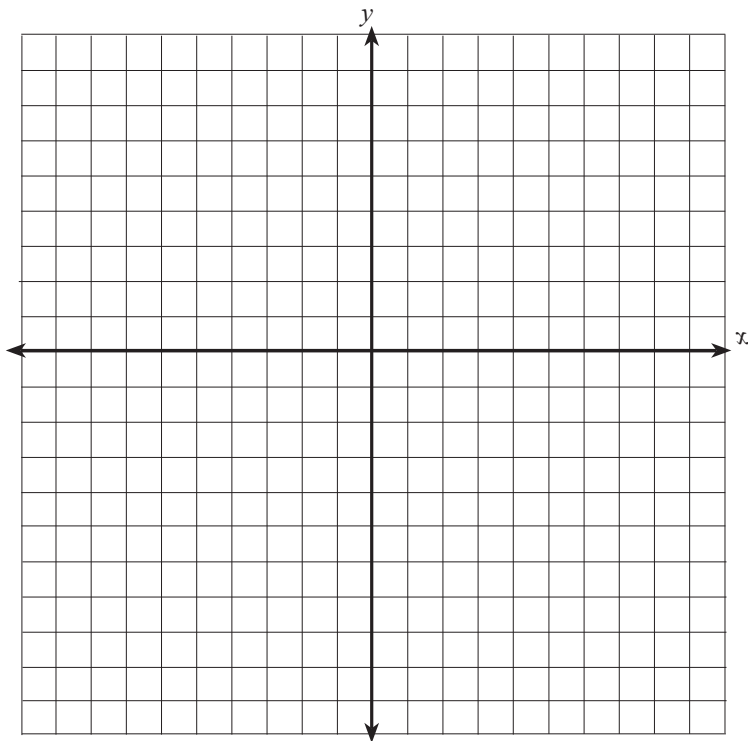
25. The function shown to the right represents the amount of money in a savings account in Lender's Bank.

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: $2x^2 + 4x - 16 = 0$

28. Solve for x: $\frac{1}{2}x + 12 > 0.4x + 10$

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. A company produces x units of a product per month, where $C(x)$ represents the total cost and $R(x)$ represents the total revenue for the month. The functions are modeled by $C(x) = 300x + 250$ and $R(x) = -0.5x^2 + 800x - 100$. The profit is the difference between revenue and cost where $P(x) = R(x) - C(x)$. What is the total profit, $P(x)$, for the month?

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

$$y \geq x$$
$$y < -x - 2$$
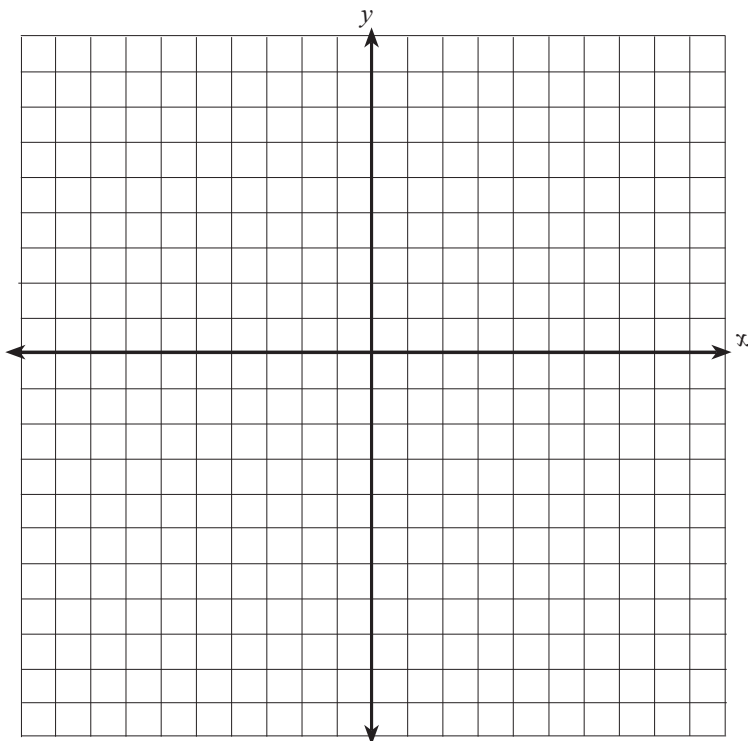
Justify your answer.

32. Jonathan has been on a diet since January. 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.

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

How much weight has Jonathan been losing each month?

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

33. The final exam in an Algebra class of 15 students. The grades are:

65, 70, 78, 80, 83, 85, 85, 85, 85, 85, 87, 87, 87, 90, 90
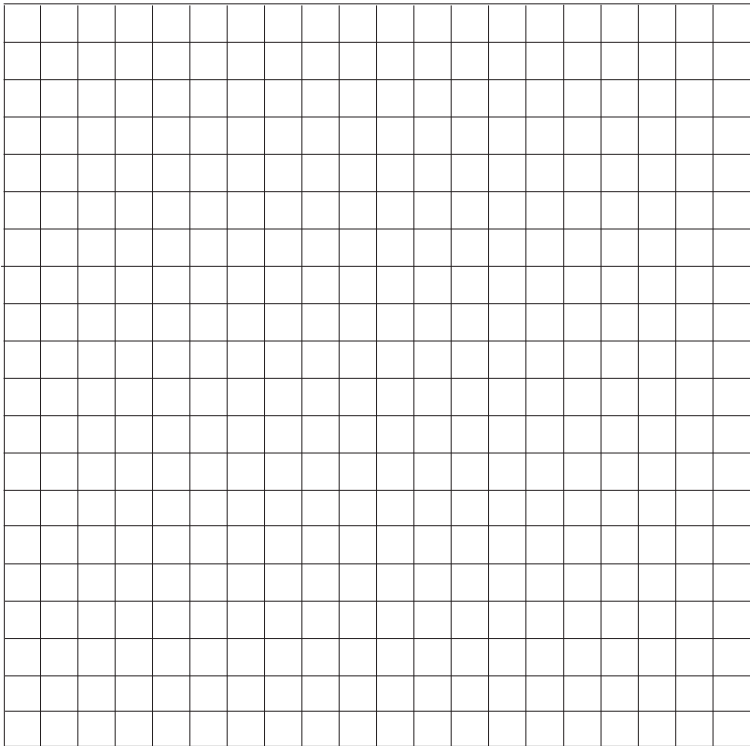
Create a dot plot for the final test scores.

What is the value of the lower and upper quartile?

What is the Interquartile Range (IQR) of the data?

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

Write an equation and graph to model this situation.

After how many years will she have 64 rabbits?

ALGEBRA 1 - NGLS
Test 1
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. Solve this system of equations graphically and check:
$$y = x + 4$$
$$y = -2x + 1$$