

ALGEBRA 1

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) $p(x) = 25x - 50$ *↑ spent*
- 21 4

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

- (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 1

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 2

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 1

Part II

Answer all 8 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

slope
 $m = \frac{\Delta y}{\Delta x} = \frac{14}{1}$

\$14 / week

26. Factor completely, the expression: $\frac{2x^3 - 2x^2 - 12x}{2x}$

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



ALGEBRA 1

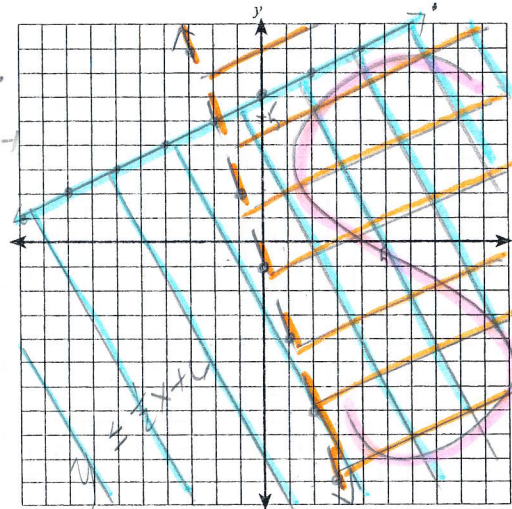
Test 1

27. Find one point that lies in the solution set of the following system of inequalities: [The use of the grid is optional.]

$y \leq \frac{1}{2}x + 6$ *m = 1/2 b = 6 solid ↓*
 $y > -3x - 1$ *m = -3 b = -1 dotted ↑*

Justify your answer

(5, 1) b/c it is in both solution set.



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

$2(x^2 + 2x - 8) = 0$
 $2 \neq 0 (x + 4)(x - 2) = 0$
 $x = -4$ $x = 2$

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

Let $x = \#$
 $16(x - 4) = 208$
 $16x - 64 = 208$
 $\quad +64 \quad +64$

 $16x = 272$
 $\quad \quad \quad 16$
 $x = 17$

30. 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.

$3x - 2 = -x - 6$ *(-1, -5)*
 $3(-1) - 2 = -(-1) - 6$
 $-3 - 2 = 1 - 6$
 $-5 = -5$ ✓

Test 1

31. Find $f(-2)$ for the function: $f(x) = \begin{cases} 3x^2 - 1, & x < 1 \\ x + 2, & x \geq 1 \end{cases} \rightarrow -2 < 1$

$$\begin{aligned} f(-2) &= 3(-2)^2 - 1 \\ &= 3(4) - 1 \\ &= 12 - 1 \\ f(-2) &= 11 \end{aligned}$$

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

Show your work.

vertex $(1, 7)$

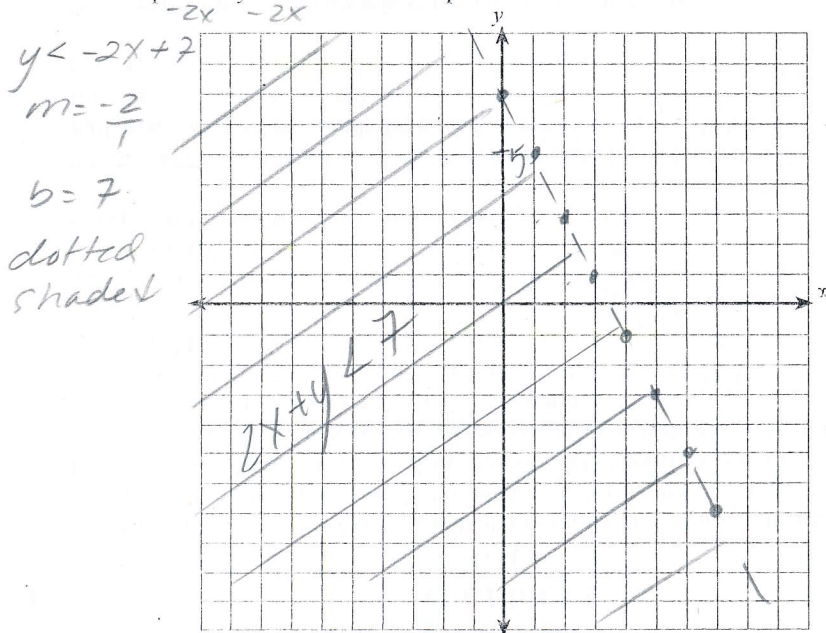
$$y = a(x-h)^2 + k$$

$$f(x) = (x-1)^2 + 7$$

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]

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



Test 1

34. 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? 205
y-intercept is the initially weight

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

3 pounds

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

$$\frac{45}{3} = \frac{3m}{3} \quad m = \underline{15 \text{ months}}$$

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

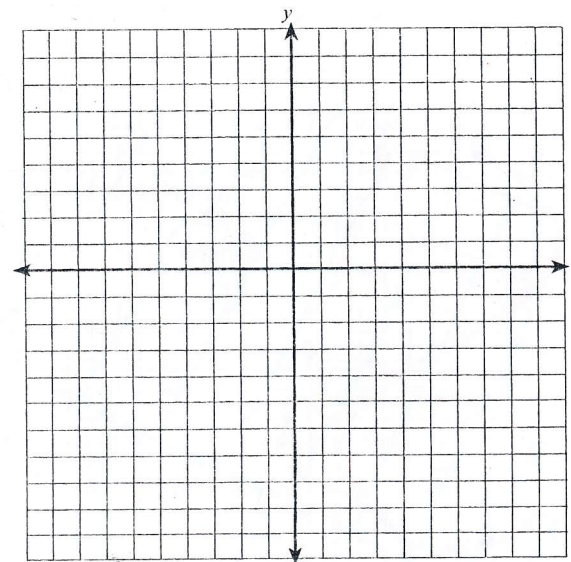
a) After how many years will she have 64 rabbits? *4 yrs*

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

$$y = 4(2)^x$$

initial

4 yr



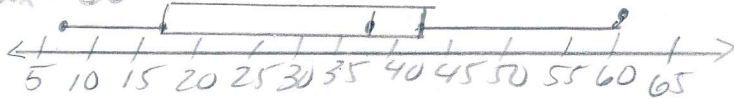
ALGEBRA 1

Test 1

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

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

min = 7
 $Q_1 = 17.5$
 mid = 38
 $Q_3 = 42.5$
 max = 60



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]

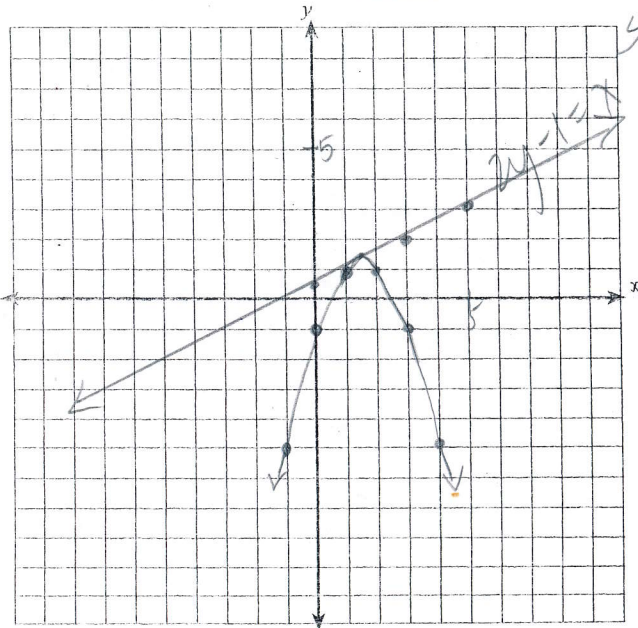
37. Graph the system of equations:

State the solution to the system.

$$y = -x^2 + 3x - 1$$

$$2y - y = x \rightarrow \frac{2y}{2} = \frac{x+1}{2} \rightarrow y = \frac{x+1}{2}$$

x	y
-1	-5
0	-1
1	1
1.5	1.25
2	1
3	-1
4	-5



$$y = \frac{x+1}{2}$$

x	y
0	0.5
1	1
1.5	1.25
2	1.5
3	2
4	2.5
5	3

$(1.5, 1.25)$ & $(1, 1)$