

ALGEBRA 1

June 2017

Part II

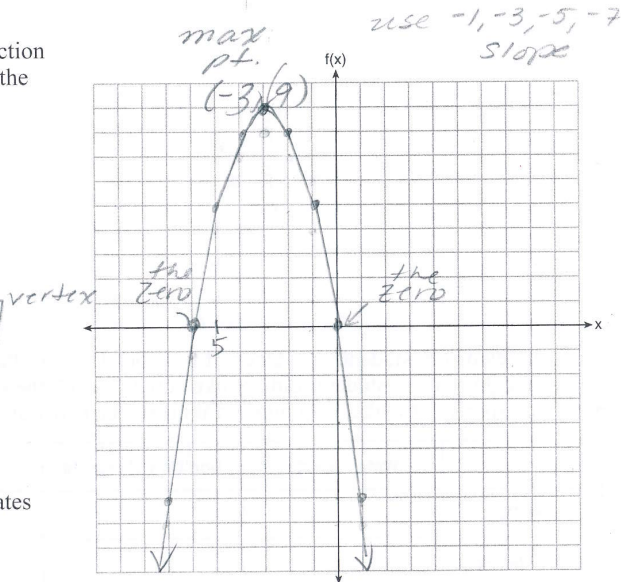
Answer all 8 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily 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 boundary lines, which should be done in pencil. [16]

25. Express in simplest form:  $(3x^2 + 4x - 8) - (-2x^2 + 4x + 2)$

$$\begin{array}{r} 3x^2 + 4x - 8 \\ + 2x^2 - 4x - 2 \\ \hline 5x^2 - 10 \end{array}$$

26. Graph the function  $f(x) = -x^2 - 6x$  on the set of axes.

x	y
-6	0
-5	5
-4	8
-3	9
-2	8
-1	5
0	0



State the coordinates of the vertex of the graph.

$$x = \frac{-b}{2a} = \frac{-(-6)}{2(-1)} = \frac{6}{-2} = -3$$

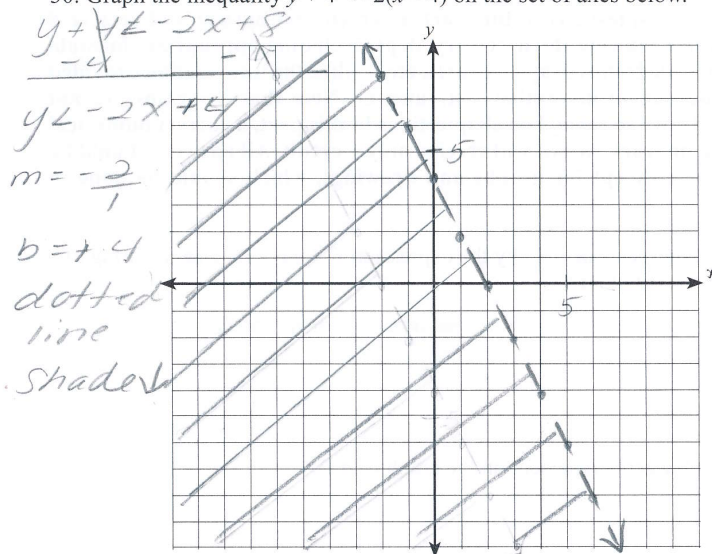
$$f(-3) = -(-3)^2 - 6(-3) = -9 + 18 = 9$$

$$f(-3) = 9$$

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30. Graph the inequality  $y + 4 < -2(x - 4)$  on the set of axes below.



31. If  $f(x) = x^2$  and  $g(x) = x$ , determine the value(s) of  $x$  that satisfy the equation  $f(x) = g(x)$ .

$$f(x) = g(x)$$

$$x^2 = x \text{ set } = 0$$

Factor out get  $\rightarrow x^2 - x = 0$

$$x(x-1) = 0$$

$x = 0$   $x = 1$

32. Describe the effect that each transformation below has on the function  $f(x) = |x|$ , where  $a > 0$ .

$g(x) = |x - a|$  - the graph will move to the right "a" units

*inside*

$h(x) = |x| - a$  - the graph will move down "a" units.

*down*

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## 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]

37. Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

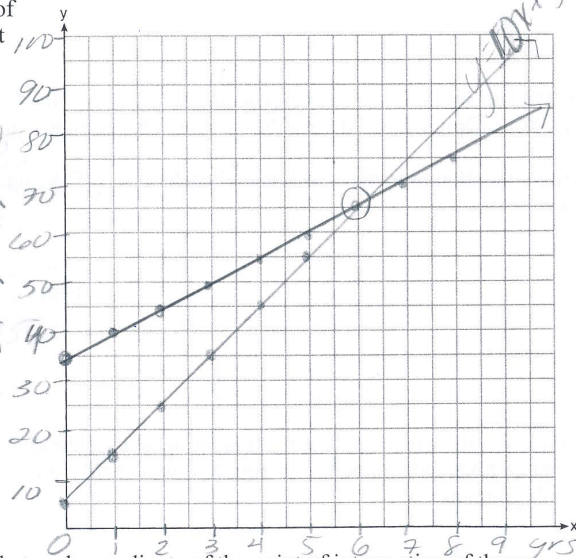
Write a system of equations to model this situation, where  $x$  represents the number of years since 2010.

$$y = 10x + 5$$

$$y = 5x + 35$$

Graph this system of equations on the set of axes.

$x$	$y_1$	$y_2$
0	5	35
1	15	40
2	25	45
3	35	50
4	45	55
5	55	60
6	65	65
7	75	70



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

(6, 65)  
yr people

In 6 yrs, 65 people are members of the chorus & swim team.