Linear and Quadratic Systems

Name: _____

Solve each system of equations.

1) $\begin{cases} 3x - y = 7 \\ y + 4 = 2(x + 5)^2 \end{cases}$

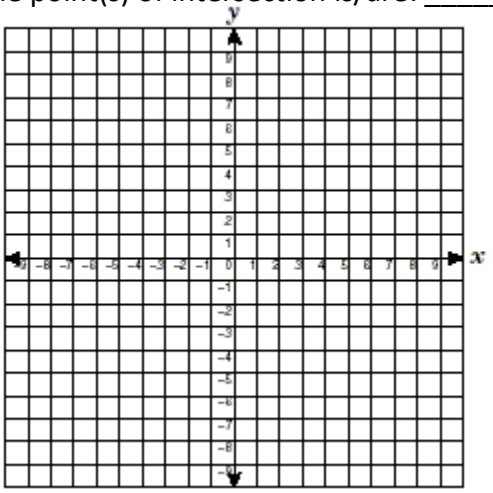
2) $\begin{cases} 6x + y = -16 \\ y + 7 = x^2 \end{cases}$

3) $\begin{cases} y = x^2 + 2x + 7 \\ y - 7 = x \end{cases}$

4) $\begin{cases} y - 3 = x^2 - 2x + 1 \\ 2x + y = 5 \end{cases}$

5) The height of a baseball that is thrown from the top of a house is given by $h(t) = -5t^2 + 20t + 15$. A paintball is shot at the baseball. The trajectory of the paintball is given by the equation $p(t) = 3t + 3$. Will the paintball hit the baseball? If so, when?

6) The graphs of $y = x^2 + 2$ and $y = 4x - 2$ have _____ point(s) of intersection as graphed below. The point(s) of intersection is/are: _____.



7) The revenue for a company producing electronic components is given by $y = -20x^2 - 50x + 200$, where x is the price in dollars of each component. The cost for the production is given by $y = 60x - 10$. Determine the price that will allow the production to break even (i.e. when revenue and cost are the same).

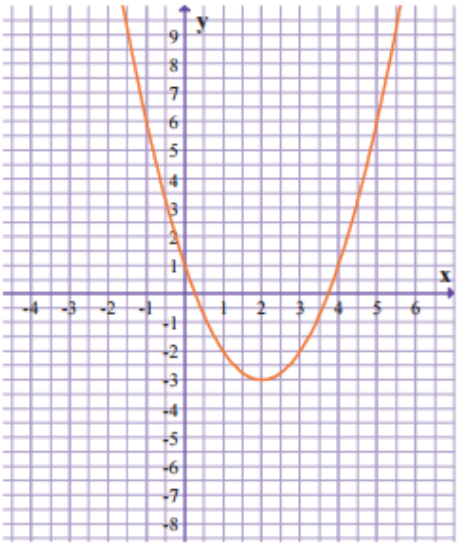
8) A pelican flying in the air over water drops a crab from a height of 30 feet. The distance the crab is from the water as it falls can be represented by the function $h(t) = -16t^2 + 30$, where t is time in seconds. To catch the crab as it falls, a gull flies along a path represented by the function $g(t) = -15t + 40$. Can the gull catch the crab before the crab hits the water?

9) The revenue for a production by a theater group is $y = -50t^2 + 300t$, where t is the ticket price in dollars. The cost for the production is $y = 600 - 50t$. Determine the ticket price that will allow the production to break even.

10) The graph of $y = (x - 2)^2 - 3$ is shown to the right.

a) Draw lines with slope of -4 that intersect the parabola at i) one point, ii) two points, and iii) no points.

b) Write equations for the lines in part a.



c) How are all lines with slope -4 that do not intersect the parabola related?