Systems of Equations with Various Function Families　　　Name _____ #_____

CP:	HN:
1) For the following function: $h(x) = \begin{cases} 2^x, & x < -3 \\ \frac{3}{x}, & x \geq -3 \end{cases}$ 　a) Evaluate $h(-4)$. 　b) Evaluate $h(1) + h(-3) - h(6)$.	1) For the following function: $$h(x) = \begin{cases} -x^2 + 2x, & x \leq -3 \\ 2\left(\frac{1}{2}\right)^x, & -3 < x < 4 \\ \dfrac{2x-5}{x-7}, & x \geq 4 \end{cases}$$ Evaluate $h(-3) + 2h(-1) - h(4)$.
CP: 2) For the following function: $$g(x) = \begin{cases} x^2 + 2, & x \leq -1 \\ 3^x, & -1 < x < 2 \\ 4x - 7, & x \geq 2 \end{cases}$$ 　Evaluate $g(-2) + g(0) - g(2)$.	HN: 2) For the following function: $$p(m) = \begin{cases} \sqrt{m+7}, & m < -2 \\ |4 - 3m|, & -2 \leq m \leq 3 \\ m^3 - 1, & m > 3 \end{cases}$$ Evaluate $4p\left(\frac{3}{2}\right) - p(4) + 6p(-3)$.
CP: 3) Find the solution(s) to the following system: $$\begin{cases} y = 3x^3 + 7x^2 - 3x \\ y = 2x - 3 \end{cases}$$ Substitute your ordered pair(s) into each equation to show this is the actual solution.	HN: 3) Find the solution to the system: $$\begin{cases} f(x) = |x + 3| \\ g(x) = -x^2 - 4x + 3 \end{cases}$$ Explain what this solution means in terms of the functions- not the graphs.
CP: 4) Find the solution to the system: $\begin{cases} f(x) = |x - 3| \\ g(x) = \frac{1}{2}x \end{cases}$ Find f(2). Is there a way you could find this value without additional work?	HN: 4) Let $f(x) = 14x^3 + 28x^2 - 46x$ and $g(x) = 2x + 7$. Find the solution(s) to the equation $\frac{1}{2}f(x) = g(x)$.

EVERYONE:

5) The UV index on a sunny day can be modeled by the function $f(x) = -0.15(x - 13)^2 + 7.6$, where x represents the time of day on a 24-hour clock and $f(x)$ represents the UV index. Between what hours was the UV index greater than 7?

EVERYONE:

6) The increasing enrollment at Northern High School can be modeled by the equation $N(t) = -t^2 + 25t + 600$, where t represents the number of years after 2010. The increasing enrollment at Southern High School can be modeled by the equation $E(t) = 24t + 570$. In what year will the enrollments at the two schools be equal?

CP:

7) Sheriff Marlowe is riding his horse, Buster, at his top speed of 10 m/s toward a bank in the Old West, and is 100 m away when a bank robber starts to accelerate away from the bank going the same direction as Sheriff Marlowe. The robber's distance, d, in meters, away from the bank after t seconds can be modeled by the equation $d = 0.2t^2$.

   a) Write a corresponding model for the position of Sheriff Marlowe as a function of time.

   b) Will Sheriff Marlowe catch the bank robber according to these models? If he does, find the time and position where this happens. If not, explain why not.

HN:

7) You have 36 yards of fencing to build an enclosure like the one in the diagram. Some of this fencing is to be used to build an internal divider as shown. If you would like to enclose 54 square yards, what are the dimensions of the enclosure? Write and solve a system of equations to answer this problem where x = length and y = width.