Piecewise Practice

1) Your favorite dog groomer charges according to your dog's weight. If your dog is 15 pounds and under, the groomer charges $35. If your dog is between 15 and 40 pounds, she charges $40. If your dog is over 40 pounds, she charges $40, plus an additional $2 for each pound.

(a) Write a piecewise function that describes what your dog groomer charges.
(b) Graph the function.
(c) What would the groomer charge if your cute dog weighs 60 pounds?

2) What value of ***a*** would make this piecewise function **continuous**?

$$f(x)=\begin{cases}3x^2+4 & \text{if } x<-2\\ 5x+a & \text{if } x\geq -2\end{cases}$$

Evaluate each piecewise function for $x = -3$ and $x = 4$.

3. $f(x)=\begin{cases}10 & \text{if } x<4\\ -1 & \text{if } x\geq 4\end{cases}$

4. $g(x)=\begin{cases}3x-1 & \text{if } x<0\\ 2x^2 & \text{if } 0\leq x<4\\ 1-x & \text{if } 4\leq x\end{cases}$

5. $h(x)=\begin{cases}2-x & \text{if } x<-2\\ 4x & \text{if } -2\leq x<3\\ 6-x & \text{if } 3\leq x\end{cases}$

6. $k(x)=\begin{cases}-12 & \text{if } x<1\\ 7x & \text{if } 1\leq x\leq 4\\ 2x-x^2 & \text{if } 4<x\end{cases}$

7) Graph the following piecewise functions:

a) $f(x)=\begin{cases}2x+6 & \text{if } -5<x<-3\\ -\frac{2}{3}x-1 & \text{if } -3\leq x<3\\ x-5 & \text{if } x\geq 3\end{cases}$

b) $f(x)=\begin{cases}\frac{1}{2}x+5 & \text{if } x\leq -2\\ -\frac{2}{3}x-2 & \text{if } -2<x<0\\ 4x-4 & \text{if } x\geq 0\end{cases}$

c) $f(x)=\begin{cases}x^2-2x+1 & \text{if } -1\leq x<2\\ \frac{1}{2}x+1 & \text{if } x\geq 2\end{cases}$

8) The rate of decay of a certain sub-atomic particle at a temperature of 0° C and lower is modeled by the equation $f(x)=x^2+4x$. At temperatures above 0° C its rate of decay is modeled by the equation $f(x)=-x^2+4x+2$. Please model the rate of decay with a piecewise function and graph below.