7. [15 points] In each of the following problems, give a *formula* for a function whose domain is all real numbers, with *all* of the indicated properties. If there is no such function, then write "NO SUCH FUNCTION EXISTS". You do not need to show your work.

   a. [6 points] A sinusoidal function $P(t)$ with the following three properties:
     (i.) The period of the graph of $P(t)$ is 7.
     (ii.) The graph of $P(t)$ attains a maximum value at the point $(1, 20)$.
     (iii.) The graph of $P(t)$ attains a minimum value at the point $(-2.5, -6)$.

$$P(t) = \underline{\hspace{5cm}}$$

   b. [3 points] A function $h(x)$ with the following two properties:
     (i.) $h(x)$ is concave down for all x
     (ii.) $h(x) > 0$ for all x.

$$h(x) = \underline{\hspace{5cm}}$$

   c. [3 points] A function $j(x)$ with the following two properties:
     (i.) $j(x)$ is decreasing for all x.
     (ii.) $j(x)$ is concave up for all x.

$$j(x) = \underline{\hspace{5cm}}$$

   d. [3 points] A *rational* function $\ell(x)$ with the following two properties:
     (i.) $\ell(0) = 2$.
     (ii.) The line $y = 2$ is a horizontal asymptote to the graph of $\ell(x)$.

$$\ell(x) = \underline{\hspace{5cm}}$$