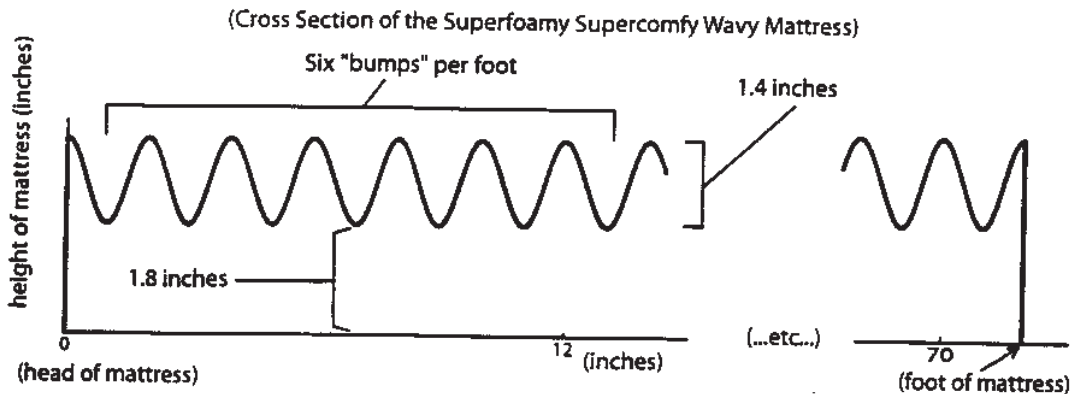


6. (13 pts) As part of your new job as Assistant Inventor at "All Things Foam" you have invented a product you call the "Superfoamy Supercomfy Wavy Mattress," and you have delivered the following specifications to Asha, the factory manager:



"I'm sorry," says Asha. "Regulations demand that all new product schematics be given also in formula form."

a) Satisfy the factory regulations by writing a formula for the height H of the mattress, as a function of the horizontal distance d from the head of the mattress.

We will use a cosine function to describe the "wavy profile". We have to adjust the frequency and amplitude to get a correct fit to the picture

We want 36 bumps altogether in 72 inches (or six feet), or one bump every two inches. $\cos\left(\frac{2\pi}{2}d\right)$.

will have one peak every 2 units (inches) in d .

The amplitude of the wave profile will be $\frac{1}{2} \times 1.4$ in.

= 0.7 inches, and the wave oscillates around height

1.8 in + 0.7 in = 2.5 in. Altogether, the profile is

b) What are the domain and range of your function? described by $h(x) = 2.5 + 0.7 \cos\left(\frac{2\pi}{2}d\right)$

The domain is $[0, 72]$ (in units of inches), and

the range is $[1.8, 3.2]$.