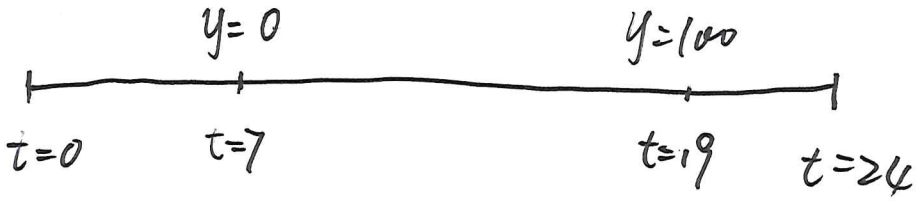
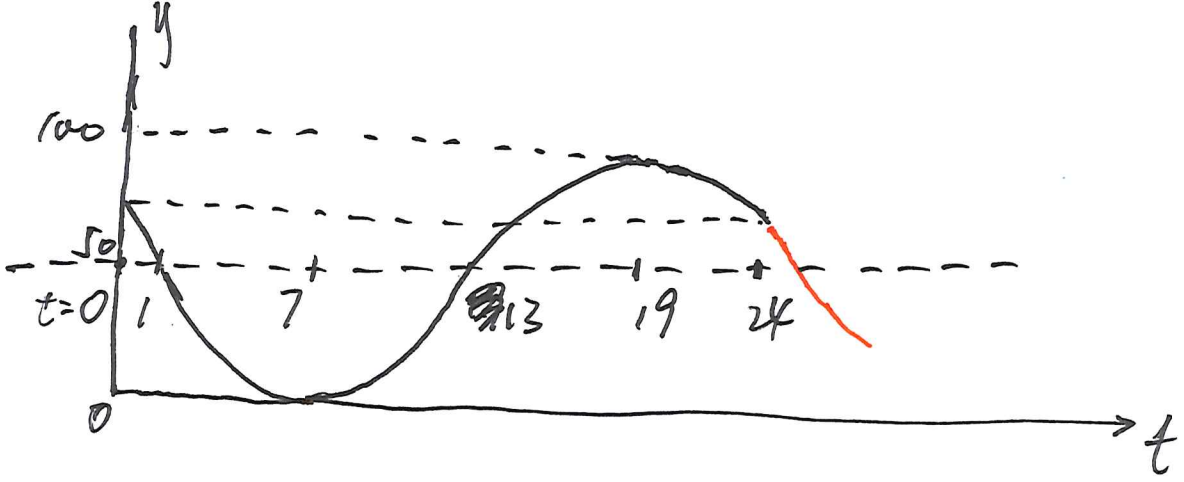
The level of a certain hormone in the bloodstream fluctuates between an undetectable concentration at t = 07:00 and 100 ng/ml at t = 19:00 hours. Approximate the cyclic variations in this hormone level with an appropriate trig function. Let t be the time in hours from 0:00 hrs through the day.



Amplitude: $A = \frac{100 - 0}{2} = 50$

↳ The function is offset by 50 upwards

Period: $T = 24 \quad \omega = \frac{2\pi}{T} = \frac{\pi}{12}$



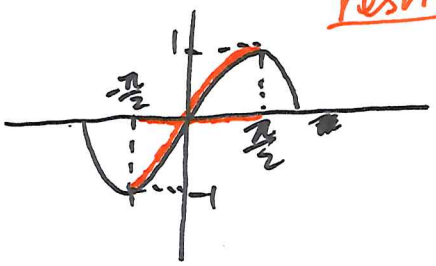
$$y(t) = 50 \sin\left(\frac{\pi}{12}(t-13)\right) + 50$$

$$= 50 \sin\left(\frac{\pi}{12}t - \frac{13\pi}{12}\right) + 50$$

Inverse trig functions

$y = \sin x \longrightarrow y = \arcsin x$

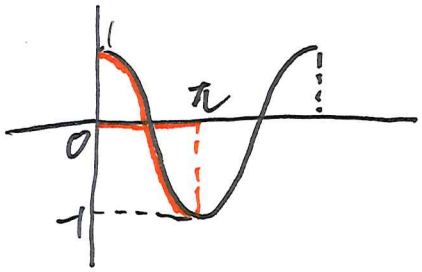
restricted



domain: $-1 \le x \le 1$

range: $-\frac{\pi}{2} \le y \le \frac{\pi}{2}$

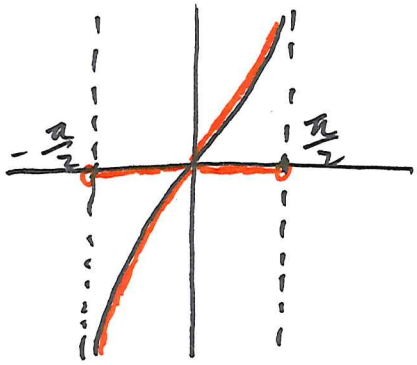
$y = \cos x \longrightarrow y = \arccos x$



domain: $-1 \le x \le 1$

range: $0 \le y \le \pi$

$y = \tan x \longrightarrow y = \arctan$



domain: $-\infty < x < \infty$

range: $-\frac{\pi}{2} < y < \frac{\pi}{2}$