The mean height is \( D = 18 \).

The amplitude is \( A = (26 - 18) = 8 \).

The sketch shows the wave going from its lowest point to its highest point, so that must be half a period. Therefore the period is \( B = 2(0.6) = 1.2 \).

And, from the sketch, we see that a valid phase shift could be \( C = 0.3 \).

So

\[
y = 8 \sin \left( \frac{\pi}{1.2} (x - 0.3) \right) + 18
\]

(b) Graph from Calculator on the domain \( 0 \leq x \leq 2.4 \):
(c) Let's use a graph that shows the full 10 seconds and see how many times it crosses the horizontal line $y = 22$:

From the graph, we can see that there are 16 or 17 times when the weight will be 22 inches off the ground, depending on whether there is a solution at the far right of the interval. Let's see if there really is: If we plug $x=10$ into the function, we get

$$y = 8 \sin \left( \frac{2\pi}{1.2} (10-0.3) \right) + 18 = 22.$$ 

So $x=10$ does give a solution.

Therefore, there are 17 times when the height of the weight is exactly 22 inches above the ground.
(b) \[ d(t) = \sqrt{(x(t) - 2)^2 + (y(t) - 2)^2} \]
\[ = \sqrt{(t + t - 2)^2 + (t^2 - 2)^2} \]
\[ = \sqrt{(t - 1)^2 + (t^2 - 2)^2} \]
\[ = \sqrt{t^2 - 2t + 1 + t^4 - 4t^2 + 4} \]
\[ = \sqrt{t^4 - 3t^2 - 2t + 5} \]

(c) \[ f(t) = t^4 - 3t^2 - 2t + 5 \]

From the graph, the minimum value appears to occur at \( t \approx 1.3 \)
\[ h(t) = 40 - 4.9t^2 \]

\[ (a) \quad \frac{h(1.1) - h(1)}{0.1} = \frac{(40 - 4.9(1.1)^2) - (40 - 4.9(1)^2)}{0.1} \]

\[ = -10.29 \]

The average velocity is \(-10.29\) \text{ meters/second}.

\[ (b) \quad \frac{h(1.01) - h(1)}{0.01} = \frac{(40 - 4.9(1.01)^2) - (40 - 4.9(1)^2)}{0.01} \]

\[ = -9.849 \]

The average velocity is \(-9.849\) \text{ meters/second}.

\[ (c) \quad \frac{h(1 + \Delta t) - h(1)}{\Delta t} = \frac{(40 - 4.9(1 + \Delta t)^2) - (40 - 4.9(1)^2)}{\Delta t} \]

\[ = \frac{40 - 4.9 - 9.8\Delta t - 4.9\Delta t^2 - 40 + 4.9}{\Delta t} \]

\[ = \frac{-9.8\Delta t - 4.9\Delta t^2}{\Delta t} \]

\[ = -9.8 - 4.9\Delta t. \]

As \(\Delta t\) gets smaller, this approaches \(-9.8\) \text{ meters/second}. 