9. [9 points] The ECG of a resting cockroach can be modeled by a periodic function $v = E(t)$, which gives the electrical activity of the cockroach's heart (in millivolts) at time t (in seconds). Each cycle is comprised of a large pulse lasting 0.8 seconds immediately followed by a smaller pulse lasting 0.4 seconds. During the large pulse the electrical activity of the heart rises from 0.1 millivolts to 0.4 millivolts and then falls to 0.1 millivolts again. During the smaller pulse the electrical activity rises from 0.1 millivolts to 0.2 millivolts and then falls to 0.1 millivolts again. The cycle immediately repeats.

a. [6 points] Find the amplitude, midline, and period of $E(t)$.

> *Solution:*
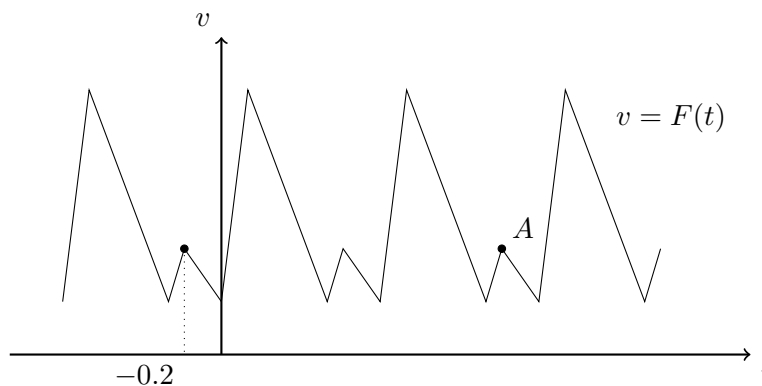> $$\frac{0.4 - 0.1}{2} = 0.15$$
> $$\frac{0.4 + 0.1}{2} = 0.25$$
> $$0.8 + 0.4 = 1.2$$

Amplitude: _____ 0.15 _____

Midline: _____ $v = 0.25$ _____

Period: _____ 1.2 _____

After some exercise, a cockroach's ECG can be modeled with the function $F(t) = E(\frac{4}{3}t)$. Part of the graph of $F(t)$ is shown below.

b. [3 points] Find the v- and t-coordinates of the point A.

> *Solution:*
> $$\text{Period} = 1.2 \cdot \frac{3}{4} = 0.9$$
> $$-0.2 + 0.9 \cdot 2 = 1.6$$

Coordinates of A: _____ $(1.6, 0.2)$ _____