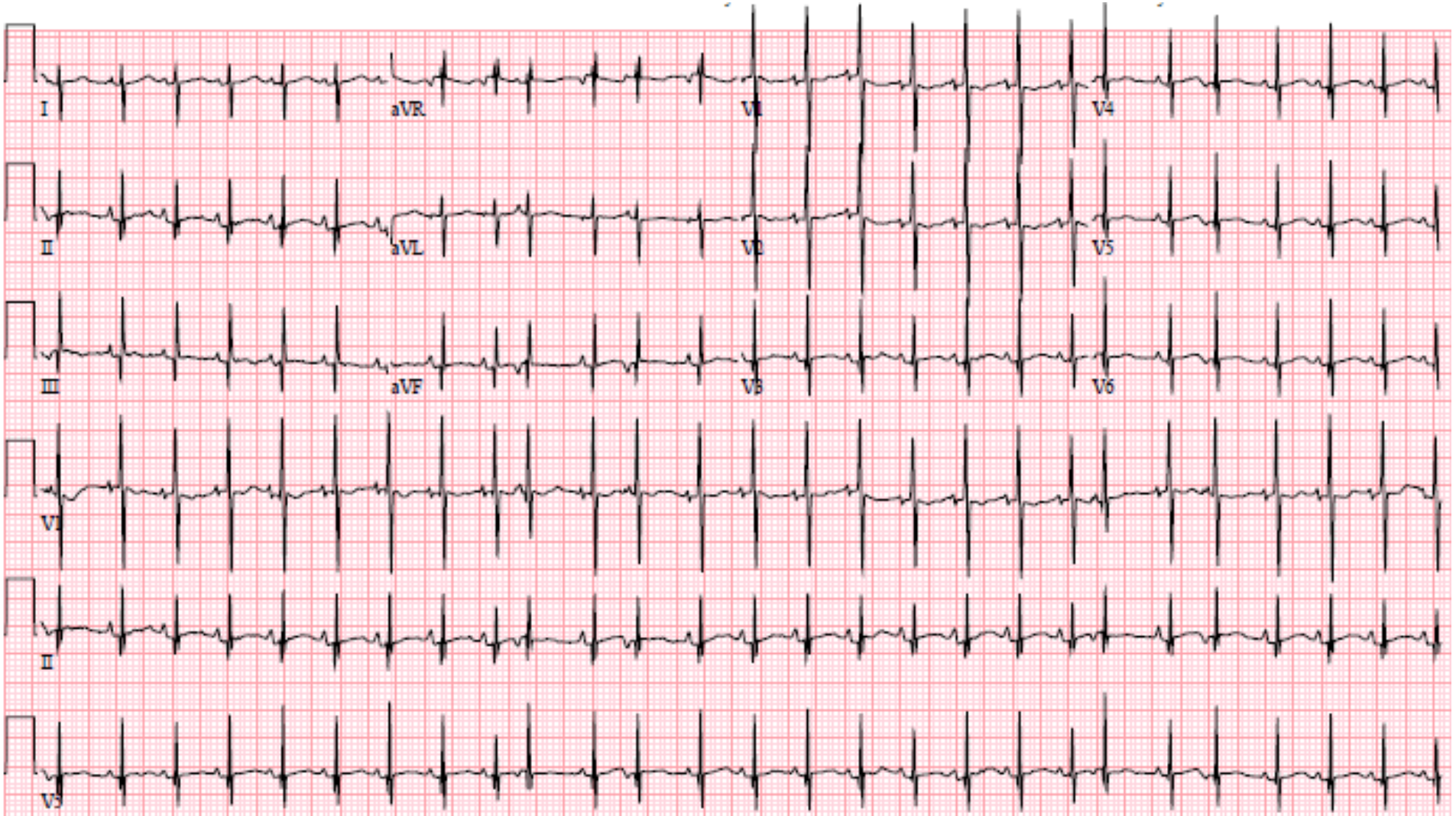
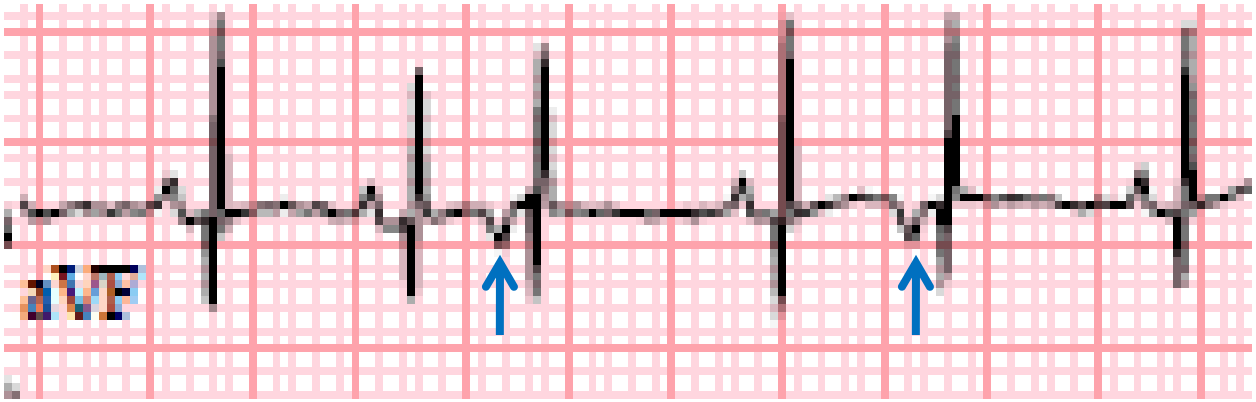
You are seeing a healthy 5 week old in your outpatient clinic for a routine well-child checkup. You note an irregular heart rate and obtain a 12-lead ECG, shown below. A "gunner" medical student working in the clinic tells you "This is obviously sinus arrhythmia. These patients frequently develop other more dangerous arrhythmias. " (for those who don't know the term "gunner" see http://en.wikipedia.org/wiki/Gunner under "Other")

1) What is the rate and QRS axis? (1 point)
2) "This is obviously sinus arrhythmia." True or false? How do you know? (1 point)
3) "These pateints frequently develop other more dangerous arrhythmias." True or false? (1 point)



1) The rate is slightly iregular, but close to 150bpm. The R-R interval varies a bit yielding instantaneous HR's between 140 and 160. Counting up all the QRS's and multiplying by 6 gives a HR around 160bpm. The QRS axis is rightward, about 120 degrees (down in I, up in aVF, equiphasic in aVR. This is normal for a 5 week old, by the way.

2) False. This is NOT sinus arrhythmia, which is simply an irregularity in the cadence of beats originating in the sinus node. Note that with each early beat (blue arrows), the P wave morphology is very different than the other P waves. These are premature atrial contractions (PAC's). The ones in this ECG are likely low in the atrium—they are negative in lead aVF, indicating that the atria are depolarizing from bottom to top (and the signal therefore goes AWAY from lead aVF, causing a negative deflection).



3. False. PAC's (and sinus arrhythmia for that matter) are entirely benign. PAC's are very common and generally speaking nothing to worry about, unless you were evaluating a child with a suspected arrhythmia or history of tachyarrhythmia. In these cases, the PAC's may represent a precursor to ectopic atrial tachycardia, an uncommon form of supraventricular tachycardia (SVT). As this kid is a healthy 5 week old, there is no cause for concern.