Solution to mid term exam 2013

1. We will say that if the peculiar velocity is small compared to the Hubble velocity if it is less than 10% of the Hubble velocity

$$v_{pec} < 0{,}1\, v_H$$
$$v_H > 10\, v_{pec}$$
$$H_0 d > 10\, v_{pec}$$
$$d > \frac{10\, v_{pec}}{H_0} = \frac{10 \cdot 300 \frac{km}{s}}{70 \frac{km}{s\,Mpc}} \approx 43\,Mpc$$

$$d > 50\,Mpc$$

(We use only the simple hubble velocity to get a rough estimate. ~~However, we could also do a more appropriate estimate as the distance we found here was very large~~ To do better we ~~could use~~ would have to know something about the dynamics of te universe. However, we know now that the universe is accelerating, meaning that H has been smaller in the past, meaning the compansating distance is larger and $d > 50\,Mpc$ rather than 43 Mpc is propably a safe estimate).

~~This is also an error~~