1. $\boxed{41}$
2. $\boxed{65}$
3. $\boxed{2}$
4. $\boxed{0 \text{ or } 6}$
5. The prime factors of 2009 are 7 and 41 (not 7 and 7 and 41). Their sum is $\boxed{48}$.
6. $2+3=5$. $2+5=7$. $2+11=13$. $2+17=19$. $2+29=31$. There are $\boxed{5}$.
7. Basically, we have two patterns of numbers which say what floor they are at after certain time intervals. Han is at 4 and Jason is at 3 after the first time interval; Han is at 8 and Jason is at 6 at the second time interval; Han is at 12 and Jason is at 9 at the third time interval. Continue this pattern. Han: 4, 8, 12, 16, 20, 24, 28, 32. Han gets to the 34th floor halfway during the 9th time interval. Now we look at Jason's pattern: 3, 6, 9, 12, 15, 18, 21, 24. During the first half of the 9th interval, Jason will be on the between the 25th and 26th floors. Their was a typo on this problem, so if you got it correct, please see the TA for credit. $\boxed{25.5}$
8. Square numbers with a factor of 11 in it have to be a multiple of 11^2. So N can be 11, 11×2^2, and 11×3^2. There are $\boxed{3}$ possibilities for N.
9. 12 factors: $\boxed{1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84}$
10. Prime factorize 1001: $7 \times 11 \times 13$. The youngest child will be 18 in 11 years, so their trip will be 11 years after 2009. $\boxed{2020}$