GOB: Have A35 out for me to check. For each of the two problems below: a) write the null and alternative hypothesis then b) name the appropriate test to use.

Example 1: Does your zodiac sign determine mathematical ability? Below are the zodiac signs of the 173 students in Ms. Korsunsky's Calculus BC class.

Sign	Aries	Taurus	Gemini	Cancer	Leo	Virgo	Libra	Scorpio	Sagittarius	Capricorn	Aquarius	Pisces
Births	14	18	11	16	12	11	13	10	12	18	17	21

a) H_0: Distribution of births = uniform over zodiac signs ($p_1 = p_2 = \ldots = p_{12}$)

H_A: Distribution of births ≠ uniform over zodiac signs ($p_1 \neq p_2 \neq \ldots \neq p_{12}$)

b) Test to use if A/C are met: Goodness-of-Fit χ^2 test [df = 11]

Example 2: In the problem described in Example 3 below, is St. Johnswort more effective than a Placebo in treating depression?

a) H_0: $p_P - p_J = 0$ The rate of recurrence is the same for both treatments.

H_A: $p_P - p_J > 0$ The rate of recurrence is greater for those taking the placebo.

b) Test to use if A/C are met: Two-proportion z-test

Example 3: Medical researchers enlisted ~~108~~[90] subjects for an experiment comparing treatments for depression. The subjects were randomly divided into three groups and given pills to take for a period of three months. Unknown to them, one group received a placebo, the second group the "natural" remedy St. Johnswort, and the third group the prescription drug Paxil. After six months psychologists and physicians (who did not know which treatment each person had received) evaluated the subjects to see if their depression had returned. Evaluate the effectiveness of the three treatment options.

	Treatment			
Diagnosis	Placebo	St.J	Paxil	Total
Depression returned	24	22	14	
No sign of depression	6	8	16	
Total				

a) H_0: The rate of recurrence is = for all three treatments. $p_P = p_J = p_x$

H_A: The rate of recurrence is ≠ for all three treatments. $p_P \neq p_J \neq p_x$

b) Test to use if A/C are met: Homogeneity χ^2 test [df =]

A0 Data are counts.
C0 (Are they?)
A1 Individuals/data in each group independent.
C1 SRSs and *n* < 10% populations
OR random allocation.
A2 Groups large enough
C2 All expected counts ≥ 5.

Because the P-value is so low we reject the null hypothesis. There is strong evidence that the test treatments are not all equally effective in preventing the recurrence of depression.