Tomato plants:

$$H_0: Tomato\ plants\ follow\ Mendel's\ Law\ of\ Inheritance\ (9:3:3:1)$$

$$H_a: H_0\ is\ not\ true\ (plants\ do\ not\ follow\ Mendel's\ Law)$$

Chi-squared test for given probabilities

data: plants
X-squared = 1.4687, df = 3, p-value = 0.6895

Assumptions:

1. Data are counts from categories
2. $E_i \geq 5$: 906.19 302.06 302.06 100.69
3. $Independence\ of\ subjects/units$ (assume it is met)

List test statistic, df, pvalue: $\chi^2 = 1.4687, \text{df} = 3, \text{pvalue} = 0.6895$

$pvlaue = 0.6895 \nleq \alpha(0.05) \therefore H_0$ cannot be rejected. Tomato plants follow Mendel's Law of Inheritance
Error?: A Type II error could have been made; we think the plants follow Mendel's Law but they don't

Gas stations:

	Pricing.Policy			
Condition	Aggressive	Neutral	Nonaggressive	
Substandard	24	15	17	56
Standard	52	73	80	205
Modern	58	86	36	180
	134	174	133	441

$$E_{r1c1} = \frac{56(134)}{441} = 17.02$$

Pearson's Chi-squared test

data: gas
X-squared = 22.476, df = 4, p-value = 0.0001611

$$H_0: pricing\ and\ condition\ of\ gas\ stations\ are\ independent$$

$$H_a: H_0\ is\ not\ true\ (there\ is\ a\ dependency\ between\ pricing\ and\ condition)$$

1. Independence of units (assume it is met)
2. Categories (yes)
3. $E_i \geq 5$➔ all are at least 5 (smallest one is 16. Something)

X-squared = 22.476, df = 4, p-value = 0.0001611

$pvalue = 0.0001611 \leq \alpha(0.05) \therefore H_0$ is rejected.

Since the null was rejected, there is a dependency (relationship, association) between station condition and pricing policy

Error: we rejected the null, we could have made a Type I error. We think there is a relationship between pricing and condition of gas stations when there is not