Quiz 2 - MA331 I pledge my honor that I have abided by the Stevens Honors System - Aparajita Rana

Problem 1. Version Viewed → Outcomes: (1^{st}, 2^{nd}, 3^{rd})
Decision to Buy → Outcomes: (would buy, wouldn't buy)

Problem 2.

Version	Would Buy	Wouldn't Buy	Total People
1^{st}	25	40	65
2^{nd}	18	12	30
3^{rd}	54	31	85
Totals	97	83	180

Problem 3. Expected Values → $E = \frac{n_r(n_c)}{n}$

Version	Would Buy	Wouldn't Buy
1^{st}	35.02	29.97
2^{nd}	16.16	13.83
3^{rd}	45.80	39.19

Would Buy
$E_1 = \frac{65(97)}{180} = 35.02$
$E_2 = \frac{30(97)}{180} = 16.16$
$E_3 = \frac{85(97)}{180} = 45.80$

Wouldn't Buy
$E_1 = \frac{65(83)}{180} = 29.97$
$E_2 = \frac{30(83)}{180} = 13.83$
$E_3 = \frac{85(83)}{180} = 39.19$

Problem 4. $\chi^2 = \sum \frac{(O_i - E_i)^2}{E} =$

$\frac{(25-35.02)^2}{35.02} + \frac{(18-16.16)^2}{16.16} + \frac{(54-45.80)^2}{45.80} = 4.54445$ would buy
$2.8619 \quad 0.2095 \quad 1.46812$

$\frac{(40-29.97)^2}{29.97} + \frac{(12-13.83)^2}{13.83} + \frac{(31-39.19)^2}{39.19} = 5.31640$ wouldn't buy
$3.3567 \quad 0.24214 \quad 1.7115$

$4.5445 + 5.31640 = 9.8549$

$\boxed{9.8549}$

Problem 5. (i) H_0: $\mu_{1^{st}} = \mu_{2^{nd}} = \mu_{3^{rd}}$, all are equally likely to buy
H_A: $\mu_{1^{st}} \neq \mu_{2^{nd}} \neq \mu_{3^{rd}}$, a version makes users more likely to buy
(ii) Chi-Squared Distribution
Degree of Freedom: $(r-1)(c-1) = 2$

Problem 6: $1 - \text{pchisq}(9.8549, 2) \rightarrow \boxed{p = 0.007245}$

Problem 7: (alpha sig = 0.05) We see $0.007245 < 0.05$ so we reject the null hypothesis (H_0) that they were all equally likely to buy.

Problem 8: Based on our conclusion, different versions have different affects on whether someone buys or not.