Homework 6

I pledge my honor that I have abided by the Stevens Honor Code – Chaparjita Pam

Problem 9.37:

a)

Stratum	# allowed	total
Small	51	57
Medium	12	17
Large	4	5

Totals: 67: allowed
12: not allowed
79: total samples

b) Small: 6/57 = 10.5%.
Medium: 5/17 = 29.4%.
Large: 1/5 = 20%.

c)

Strat	# allowed	# not allowed	total
small	51	6	57
med/large	16	6	22
total	67	12	79

We combine them because large's sample size of #'s not allowed is too small

d) H_0: no relationship between being allowed & claim size

e) Table:

~~Strat~~	allowed	not allowed
med/large	48.34	8.66
small	18.66	3.34

$\chi^2 = \sum \frac{(O-E)^2}{E} = 3.46$

→ degrees of freedom: 1
p-val: 0.063, $0.063 > 0.05$
so we accept the null hypo. there's no relationship.

9.38 ~ Population Estimates:

a) Small: $6/57 = 0.105 \times 3,342 = 350.91 \approx$ 351 Not Allowed
Medium: $5/17 = 0.294 \times 246 = 72.324 \approx$ 72 Not Allowed
Large: $1/5 = 0.20 \times 58 = 11.6 \approx$ 12 Not Allowed

b) Sample Error = $\sqrt{\frac{p(1-p)}{n}}$, 95% CI, $z = 1.96$

$SE_{small}: \sqrt{\frac{.105 \cdot 0.895}{57}} = 0.04060$
$SE_{medium}: \sqrt{\frac{0.294 \cdot 0.706}{17}} = 0.1104$
$SE_{large}: \sqrt{\frac{0.2 \cdot 0.8}{5}} = 0.179$

$ME_{Small}: 1.96 \times 0.0406 = 0.08$
$ME_{Medium} = 1.96 \times 0.1104 = 0.217$
$ME_{Large}: 1.96 \times 0.179 = 0.35$

9.50 ~ Goodness of Fit

group	Count	Prob	Expt. Count
$X \leq -0.6$	139	0.2743	137.15
$-0.6 < X \leq 0.1$	102	0.1859	92.95
$-0.1 < X \leq 0.1$	41	0.0796	39.8
$0.1 < X \leq 0.6$	78	0.1859	92.95
$X > 0.6$	140	0.2743	137.15

Degree Freedom: 4, $\chi^2 = 3.406$
p-val = 0.4923, this is > 0.05 = fail to reject null hypo so distribution is normal

9.51 ~ More Goodness of Fit

group	count	prob	Expt. Count
$X \leq -0.7$	112	0.242	121
$-0.7 < X \leq -0.2$	82	0.178	89.35
$-0.2 < X \leq 0.2$	77	0.158	79.3
$0.2 < X \leq 0.7$	111	0.178	89.85
$X > 0.7$	118	0.242	121

Degrees of Freedom: 4, $\chi^2 = 6.66$
p-val: 0.155, this is > 0.05 so we fail to reject the null hypo, distribution is normal.