P1

Problem 1: (a) Number of accident happen in the west = P(accident happens in the west) * total number of work force = P(the work force is in the west factory) * P(there is an accident) * total number of work force = 1306/1979 * 59/1979 *1979 = 38.9. So the number of accident happened in the west factory is around 39.

```
dat = expand.grid(factory=c("East", "West"), accident=c("No", "Yes"))
dat$y = c(645,1275, 28,31)
tab = matrix(dat$y, nrow=2,
  dimnames=list(factory=c("East", "West"), accident=c("No", "Yes")))

#(b)
chisq.test(tab)$expected
```

```
##         accident
## factory        No      Yes
##    East  652.9358 20.06417
##    West 1267.0642 38.93583
```

(c) Let 1 represent the west factory or accident and 2 represent the east factory or no accident. m11 = pi_1+ * pi_+1 * 1979 m12 = pi_1+ * pi_+2 * 1979 m21 = pi_2+ * pi_+1 * 1979 m22 = pi_2+ * pi_+2 * 1979 To generalize, m_ij = pi_i+ * pi_+j * n.

(d) log(m11) = log(pi_1+)+ log(pi_+1)+log(1979) log(m12) = log(pi_1+)+ log(pi_+2) + log(1979) log(m21) = log(pi_2+)+ log(pi_+1) +log(1979) log(m22) = log(pi_2+)+ log(pi_+2) +log(1979) In terms of generalized form, log(m_ij) = log(pi_i+) + log(pi_+j) + log(n)

(e) log(pi_ij) = log(pi_+i) + log(pi_+j)