1.1:

$P(\text{Jerry}) = 12/100$ $P(\text{Susan}) = 22/100$ $P(\text{Jerry} \cap \text{Susan}) = 8/100$

a. P(Jerry at bank | Susan was at bank) = P(Jerry ∩ Susan)/P(Susan at bank)
   P(Jerry ∩ Susan) = 8/100
   P(Susan at bank) = 22/100
   P(Jerry at bank | Susan was at bank) = P(Jerry ∩ Susan)/P(Susan at bank) = 8/22 = 0.367

b. **P(Only Jerry At Bank) = P(Jerry) = 12/100 = 0.12**

c. P(Both at bank | Atleast one at bank) = P(Both ∩ Atleast one at bank)/P(Atleast one)
   P(Atleast one at bank) = 1 - P(No one at bank)
   P(No one at bank) = (100-(12+8+22))/100
   = (100-42)/100
   = 58/100
   P(Atleast one at bank) = 1 - P(No one at bank) = 1 - (58/100)
   = 42/100

   P(Both at bank | Atleast one at bank) = 8/42 0.190

1.2:

P(Harold ∩ Sharon) = P(Harold Getting B) + P(Sharon Getting B) -
P(Harold Getting B U Sharon Getting B)
= 80/100 + 90/100 - 91/100
= 79/100

a. P(Only Harold Will Get B) = P(Harold Getting B) - P(Harold ∩ Saron)
   = 80/100 - 79/100
   = 1/100 = **0.01**

b. P(Only Sharon Will get B) = P(Sharon Getting B) - P(Harold ∩ Saron)
   = 90/100 - 79/100
   = 11/100 = **0.11**

c. P(No One Getting B) = 1 - P(Atleast one)
   = 1 - 91/100
   = 9/100 = **0.09**

1.3:

P(Jerry) = 20/100
P(Susan) = 30/100
P(Jerry ∩ Susan) = 8/100 = 0.08
P(Jerry) * P(Susan) = 0.06
P(Jerry ∩ Susan) is not equal to P(Jerry) * P(Susan)
Hence, they are not independent.

1.4:

1. “The sum is 6 And “The second die shows 5” **are not independent** as there is a chance of getting a combination of (1, 5).

2. “The sum is 7” And “The first die shows 5” **are not independent** as there is a chance of getting a combination of (5, 2).

1.5:

P(Choosing TX) = 60/100
P(Choosing NJ) = 10/100
P(Choosing AK) = 30/100
P(Finding Oil | In TX) = 30/100
P(Finding Oil | In AK) = 20/100
P(Finding Oil | In NJ) = 10/100

a. P(Finding Oil) = P(Finding Oil | In TX) + P(Finding Oil | In AK) + P(Finding Oil | In NJ)
= 0.3+0.2+0.1
= **0.6**

b. P(Choosing TX | Finding Oil) = (P(Choosing TX)*P(Finding Oil | In TX))

(P(Choosing AK)*P(Finding Oil | In TX) +
P(Choosing NJ)*P(Finding Oil | In NJ) +
P(Choosing AK)*P(Finding Oil | In AK))
= 0.6*0.3 / (0.6*0.3 + 0.1*0.1 + 0.3*0.2)
= 0.18/0.25
= **0.72**

1.6:

a. P(Did not survive) = 1490/2201 = **0.676**

b. P(Was In First Class) = 325/2201 = **0.147**

c. P(Staying in first | Survived) = P(First ∩ Survived) / P(Survived)
P(Survived) = 711/2201
P(First ∩ Survived) = 203/2201
P(Staying in first | Survived) = P(First ∩ Survived) / P(Survived) = 203/711 = **0.285**

d. P(Survival) = 711/2201 = 0.32
P(First Class) = 325/2201 = 0.14
P(Survival ∩ First Class) = 203/2201 = 0.09
P(Survival) * P(First Class) = 0.04
P(Survival ∩ First Class) not equal to P(Survival) * P(First Class)
Hence they are not independent.

e. P(First class child | Survived) = P(First class child ∩ Survived)/P(Survived)
P(Survived) = 711/2201
P(First class child ∩ Survived) = 6/2201
P(First class child | Survived) = P(First class child ∩ Survived)/P(Survived) = 6/711 = **0.0084**

f. P(Adult | Survived) = P(Adult ∩ Survived)/P(Survived)
P(Survived) = 711/2201
P(Adult ∩ Survived) = 197/2201
P(Adult | Survived) = P(Adult ∩ Survived)/P(Survived) = 197/711 = **0.277**

g. P(A ∩ B | C) = P(A|C) * P(B|C)
P(Age ∩ Staying In First Class | Survived) =
P(Age | Survived) * P(Staying In First Class | Survived)
P(Age ∩ Staying In First Class | Survived) = 203/2201
P(Age | Survived) = 711/2201
P(Staying In First Class | Survived) = 203/2201
P(Age | Survived) * P(Staying In First Class | Survived) not equal to P(Age ∩ Staying In First Class | Survived)
Hence not independent.