1. Jerry goes to the bank = $P(A) = 0.2$
Susan goes to the bank = $P(B) = 0.3$
Together they are at the bank $P(A \cap B) = 0.08$
Jerry is not at Bank = $P(A') = 1 - 0.2 = 0.8$
Susan is not at Bank = $P(B') = 1 - 0.3 = 0.7$

	$P(B)$	$P(B')$
$P(A)$	0.08	0.12
$P(A')$	0.22	0.58

a) P(Jerry at Bank / Susan at Bank)

$$= \frac{P(A \cap B)}{P(B)} = \frac{0.08}{0.3} = 0.266 = 26.66\%$$

b) P(Jerry at Bank / Susan not at Bank)

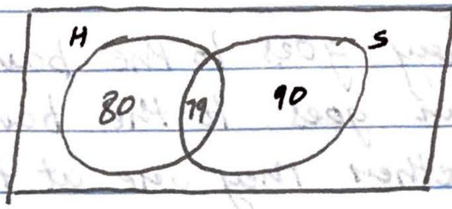
$$= \frac{P(A \cap B')}{P(B')} = \frac{0.12}{0.7} = 0.1714 = 17.14\%$$

(c) P(Both were there / At least one of them was there)

$$= P[(A \cap B) / (A \cup B)]$$

$$= \frac{P(A \cap B)}{(A \cup B)} = \frac{0.08}{0.42} = 0.1904 = 19.04\%$$

1.2



Harold's chances for getting B = $P(A) = 0.80$
Sharon's chances for getting B = $P(B) = 0.90$
Atleast one of them getting B = $P(A \cup B) = 0.91$
Both getting B = $P(A \cancel{\cup} \cap B) = 0.79$

a] P(only Harold gets B)

$= 0.80 - .79$

$= 0.1$

$= 1\%$

b) P(Only Sharon gets B)

$= 0.90 - 0.79$

$= 0.11$

$= 11\%$

(c) P(Both not getting B)

$= 1 - P(A \cup B)$

$= 1 - 0.91$

$= 0.09$

$= 9\%$

1.3

Jerry goes to the bank $= P(A) = 0.20$
Susan goes to the bank $= P(B) = 0.30$
Together at the Bank $= P(A \cap B) = 0.08$

For event to be Independant

$$\boxed{P(A/B) = \frac{P(A \cap B)}{P(B)} = P(A)}$$

i.e $\boxed{P(A \cap B) = P(A) . P(B)}$

In this case

$$0.08 \neq 0.20 \times 0.30$$
$$0.08 \neq 0.06$$

Therefore they are not Independant.

Q4 Two dices are rolled

a) $P(A)$ = Sum is 6

$P(S) = \underline{36}$

$P(A) = \dfrac{\{(1,5),(2,4),(3,3),(4,2),(5,1)\}}{P(S)}$

$P(A) = \boxed{\dfrac{5}{36}}$

$P(B) = \dfrac{\{(1,5)\ (2,5)\ (3,5)\ (4,5)\ (5,5)\ (6,5)\}}{P(S)}$

$P(B) = \dfrac{6}{36} = \boxed{1/6}$

$P(A \cap B) = \dfrac{\{1,5\}}{P(S)} = \boxed{\dfrac{1}{36}}$

$P(A) \times P(B) = P(A \cap B)$ For events to be independent

$\dfrac{5}{36} \times \dfrac{1}{6} \neq \dfrac{1}{36}$

$\therefore$ The events are not Independant.

b)

A: Sum is 7

B = The First die shows '5'

$P(S) = \underline{\underline{36}}$

$$P(A) = \frac{\{(1,6)\ (2,5)\ (3,4)\ (4,3)\ (5,2)\ (6,1)\}}{\cancel{P(S)} \quad P(S)}$$

$$P(A) = \frac{6}{36} = \boxed{1/6}$$

$$P(B) = \frac{\{(5,1)\ (5,2)\ (5,3)\ (5,4)\ (5,5)\ (5,6)\}}{P(S)}$$

$$= \frac{6}{36} = \boxed{1/6}$$

$$P(A \cap B) = \frac{\{5,2\}}{P(S)}$$

$$= \boxed{\frac{1}{36}}$$

$$P(A \cap B) = P(A) \times P(B)$$

$$\frac{1}{36} = \frac{1}{6} \times \frac{1}{6}$$

$\therefore$ The events are independent.

1.5

A = Drilling in TX
B = Drilling in AK
C = Drilling in NJ

$P(A) = 0.60$
$P(B) = 0.30$
$P(C) = 0.10$

$P(\text{oil in TX}) = 0.30$
$P(\text{oil in AK}) = 0.20$
$P(\text{oil in NJ}) = 0.1$

$P(\text{oil in TX} \cap A) : 0.18$
$P(\text{oil in AK} \cap B) = 0.06$
$P(\text{oil in NJ} \cap C) = 0.01$

1. $P(\text{finding oil}) = 0.18 + 0.06 + 0.01$
$= 0.25$
$= \underline{\underline{25\%}}$

2. $P(A \mid \text{found oil}) = \dfrac{P(A \cap \text{found oil})}{P(\text{oil found})}$

$= \dfrac{0.18}{0.25} = 0.72$

$= \underline{\underline{72\%}}$

"Including 'crew' in passengers"

1.6

1. $P(\text{Passenger did not survive}) = \frac{1490}{2201}$

$= 0.6769$

$= 67.69\%$

2. $P(\text{Passenger staying in } 2^{st} \text{ class})$

$= \frac{325}{2201}$

$= 0.1476$

$= 14.76\%$

3. $P(\text{First class} \mid \text{Passenger survived})$

$= \frac{203}{711}$

$= 0.2855$

$= 28.55\%$

4] $P(\text{survival}) = \frac{711}{2201} = 0.3230 = 32.30\%$

$P(\text{Firstclass}) = \frac{325}{2201} = 0.1476 = 14.76\%$

$P(\text{survival} \cap \text{First class}) = \frac{203}{2201} = 0.0922$

$= 9.22\%$

$P(\text{survival} \cap \text{first class}) \neq P(A) \cdot P(B)$

$9.22 \neq 32.30 \times 14.76$

They are not independent.

5. P(First class ∩ child | survived) $= \frac{6}{711}$

0.84%

6. P(Adult | survived)

$= \frac{654}{711}$

= 91.98%

7. P(F.C & survived) = 0.285
P(Adults & survived) = 0.919
P(Child & survived) = 0.08

① P(FC & survived) ∩ P(Adults & survived) = 0.277
②. P(FC & survived) ∩ P(Child & survived) = 0.008

P(Adult & survived) × P(FC & survived)
= 0.919 × 0.285
= 0.26 ≠ 0.277
They are not independant.

P(Child & survived) ∩ P(F.C & survived)
= 0.08 × 0.285 = 0.02
≠ ②.

Hence the events are not independant.