Q 1

Friends ~~4~~

A B C D E F G

All ~~B~~ are

1 differ

2 differ

3 ~~All~~ differ

1 x 4

6 x 4

6 x 5 x 4

6 x 5 x 4 x 4

$4 + 6 \times 4 + 6 \times 5 \times 4 + 6 \times 5 \times 4 \times 4$

2) a) i) a ii) {1, 2, 3} iii) no

b) i) x ii) {a, b, c} iii) yes

c) i) z ii) {aa, bc, def} iii) yes

p(y|x) p(

$P(R) = P(R|Box1) + P(R|Box2)$

$\rightarrow$

$= P(box=1) = \frac{1}{2}$

$P(red/box=1) \quad \frac{3}{8}$

$P(A/B) = P$

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

3. $P(box=1/color=red) = \dfrac{P(box=1,\ color=red)}{P(color=red)}$

$P(box)$, $P(color)$ are independent

$\therefore$

$$= \frac{P(color=red/box=1) * P(box=1)}{P(color=red/box=1) * P(box=1) + P(color=red/box=2) * P(box=2)}$$

$$= \frac{\frac{3}{8} \times \frac{1}{2}}{\frac{3}{8} \times \frac{1}{2} + \frac{2}{7} \times \frac{1}{2}}$$

$$= \frac{21}{37}$$

(B) $P(A = a_1/B=b_1) = P(A=a_1/B=b_1) * P(A=a_1/B=b_1)$

4)

(i)

$$\sum_y p(x|y,z)\, p(y|z)$$

$$= \sum_y \frac{p(x,y,z)\, p(y|z)}{p(y,z)}$$

$$= \sum_y \frac{p(x,y,z)\, p(y,z)}{p(y,z)\, p(z)}$$

$$= \sum_y \frac{p(x,y,z)}{p(z)}$$

$$= \sum_y p(x|z)$$