# Solution to assignment 1

May 8, 2005

1.p.41

#6 (d) 3.625;
(e) 4;
(f) 4;
(g) 2.5.

#16 (a) 127.425; 127.5; 108,118.121.126.130.132.134.136 and 140.

2. p.80

#2 { HHH, HHT, HTH, THH, HTT, THT, TTH, TTT } ;
{ HHH, HHT, HTH, THH }.

#3 (a) { 7};
(b) { 1, 3, 4, 5, 7 };
(c) { 3, 5, 7};
(d) { 1, 3, 4, 5 };
(e) { 4, 6 };
(f) { 1, 4 }.

#5 (a) 16;
(b) (1,1,0,0),(1,1,1,0),(1,1,0,1),(1,1,1,1),(0,0,1,1),(0,1,1,1),(1,0,1,1);
(c) 4.

#6 (a) $E$;
(b) $FGF^c$;
(c) $E \cup F \cup G$;
(d) $EF \cup FG \cup EG$;
(e) $EFG$ ;
(f) $(E \cup F \cup G)^c$;
(g) $(EF \cup FG \cup EG)^c; (i) EFG^c \cup FGE^c \cup EGF^c$ ;
(j) $S$.

#12 $1 \geq P(E \cup F) = P(E) + P(F) - P(EF)$;

$1 \geq P(E) + P(F) - P(EF)$;
$P(EF) \geq P(E) + P(F) - 1$.

#13 (a) $P(E) = P(EF) + P(EF^c) - P((EF)(EF^c)) = P(EF) + P(EF^c)$.
Because $P((EF)(EF^c) = 0)$.
(b) $P(E \cup F) = P(E) + P(F) - P(EF)$;
$P(E \cup F) = 1 - P(E^c F^c)$;
$P(E) + P(F) - P(EF) = 1 - P(E^c F^c)$;
$P(E^c F^c) = 1 - P(E) - P(F) + P(EF)$.

#18 (a) 1/3;
(b) 1/3;
(c) 1/15.

#19. The probability of the union of events is less than the sum of probabilities, if events have nonempty intersections.

3. Three 1s, three 2s, two 3s and one 4.

4. No, using a finite number of cards, we cannot emulate the probability which is an irrational number.

5. $P(A) + P(B) + P(C) - P(AB) - P(BC) - P(CA) + P(ABC)$.

6. 85%.

7. At least one of the number of the dice is 6, this is a complement to the event that no outcome is 6, and the probability is 91/216.

8. 20/36 and 15/216. The last can be found by a direct counting.