

**Probability**

- Page 1 : a. {HH, HT, TH, TT}; 4  
 b. {HHH, HHT, HTH, THH, HTT, TTH, THT, TTT}; 8  
 c. {R1,R2,R3,G1,G2,G3,B1} the numbers just help indicate the distinct outcomes.; 7  
 d. {RB, BR, BX XX} where X is not blue and not red. 4.  
 e. {(1,1) (1,2) (1,3) (1,4) (1,5) (1,6) (2,1) (2,2) (2,3) (2,4) (2,5) (2,6) (3,1) (3,2) (3,3) (3,4) (3,5) (3,6) (4,1) (4,2) (4,3) (4,4) (4,5) (4,6) (5,1) (5,2) (5,3) (5,4) (5,5) (5,6) (6,1) (6,2) (6,3) (6,4) (6,5) (6,6) }; 36  
 f. {(1,1) (1,2) (1,3) (1,4) (2,1) (2,2) (2,3) (2,4) (3,1) (3,2) (3,3) (3,4) (4,1) (4,2) (4,3) (4,4)} 16

page 3: 1a  $SS = \{1,2,3,4,5,6\}$ ,  $n(SS) = 6$   $E = \{5, 6\}$   $n(E) = 2$   $P(\text{result} > 4) = 2/6$  (or  $1/3$ , or  $33.333\%$ )  
 b.  $3/6$  c.  $3/6$  d.  $6/6$  e.  $2/6$  f.  $0/6$  g.  $2/6$  h.  $3/6$  i.  $0/6$

Page 4 : 2a  $60/360$  ( $1/6$ ); b.  $5/6$ ; c.  $2/6$  d.  $5/6$  e.  $0/6$  f. 1  
 3a.  $7/33$  b.  $12/33$  c.  $0/33$  d.  $7/33$  e.  $14/33$  f. 0 g.  $6/32$

page 5: 1a) {HT,TH,TT,HH},  $n(SS) = 4$ ; b) {H1, H2,H3,H4,H5,H6,T1,T2,T3,T4,T5,T6}  $n(ss) = 12$   
 2a)  $E = \{HT, TH\}$   $n(E) = 2$ ; b) {H2,H4,H6}  $n(E) = 3$   
 3a)  $P(\text{one head one tail}) = 1/2$ ; b)  $P(\text{one head and even number}) = 3/12 = 1/4$   
 4a)  $SS = \{HHH, HHT, HTH, THH, TTH, THT, HTT, TTT\}$   $n(SS) = 8$ ;  
 b)  $SS = \{0, 1, 2, 3, 4, 5, \dots\}$   $n(SS) = \infty$  (infinity); c) see page 6 ex1 for full solution.

page 6: 1a  $5/36$  b  $21/36$  c  $1/2$  d  $0/36$  e  $2/36$  f  $21/36$

page 7: 1a  $6/12 = 1/2$  b  $3/12 = 1/4$  c  $9/12 = 3/4$  d  $0/12$  e  $2/12 = 1/6$  f  $3/12 = 1/4$

page 8: 2b  $P(H \& Y) = 1/6$ ; b.  $P(T \& G) = 1/6$ ; c.  $P(H \& B \text{ or } H \& Y) = 2/6$

page 9. 1a  $4/9$  b.  $1/9$  c.  $8/9$

page 10 Exercise 1 : the tree diagram would look roughly as follows

This is a model through which probabilities are used to understand the sample space  
 $P(\text{win game 1}) = 4/5$   $P(\text{win game 2}) = 2/3$   
 $n(SS) = \text{product of denominators} = 5 \times 3 = 15$

$n(SS) = 15$   
 $P(\text{win both}) = 8/15$   $P(\text{lose both}) = 1/15$   $P(\text{win game 1 or win game 2}) = \frac{8 + 4 + 2}{15} = \frac{14}{15}$

page 11 Exercise 1 :

| Description of event E   | P(E)   | P(E <sup>c</sup> ). | Odds of E |
|--|--------|---------------------|-----------|
| a Heads in flip of one coin                                    | 1/2    | 1/2                 | 1:1       |
| b >3 in rolling one die  | 1/2    | 1/2                 | 1:1       |
| c Getting diabetes if one ever smoked daily (exercise 1 pg. 4) | 59/591 | 532/591             | 59:532    |
| d 7 or 11 in rolling of 2 dice                                 | 8/36   | 28/36               | 8:28      |
| e At least one head in flipping two coins                      | 3/4    | 1/4                 | 3:1       |

Or  
2:7

2 : a 4/9   b 4/5   c 3/4   d) 2/7   e) 2/4