**Tutorial 1 Question 1**

* S = {HHH, HHT, HTT, HTH, THH, THT, TTH, TTT} ( 8 Sample Points)
* A = {HHH, HHT, HTT, HTH} (4 Sample Points)
* B = {HTT, HTH, TTH, TTT} (4 Sample Points)
* C ={HHT, THH} (2 Sample Points)

**Tutorial 1 Question 2**

Both girls : answer Probability is 1/3

Sample space reduces to

S\* = {gg, bg, gb}

·

Older Child Girl: answer Probability is 1/3

Sample space reduces to

S\*\* = {gg, gb}

**Tutorial 1 Question 3**

Part A

A = {2,4,6} Probability is ½

Part B

Tip : use complement rule (refer to question 1)

What is the probability of zero tails? 1/8

Answer: 1-(1/8) = 7/8

Part C

Twelve marbles, so probability is 3/12 =1/4

**Tutorial 1 Question 4**

P(M) = 0.30, P(CS) = 0.20, P(M and CS) = 0.10

Use the addition rule

P(M or CS) = P(M) + P(CS) – P(M and CS) = 0.30 + 0.20 – 0.10 = 0.40

(used Venn Diagrams in tutorials)

**Tutorial 1 Question 5**

· First one is not defective 9/13

· Second one is not defective 8/12

· Third one is not defective 7/ 11

Answer = (9/13) x (8/12) x (7/11) = 0.2937

**Tutorial 1 Question 6**

1. P(AC) = 2/3
2. P(A and B) = 1/3 x 1/5 = 1/15
3. P(only one) = P(A and BC) + P(AC and B)
   * 1. = ( 1/3 x 4/5) + (2/3 x 1/5)
     2. = 6/15
4. P(at least one) = P( A or B) = P(A) + P(B) – P(A and B)
   * 1. = 5/15 + 3/15 -1/15
     2. = 7/15

Another way

P(at least one) = P(only one) + P(both)

* + 1. = 6/15 + 1/15
    2. = 7/15

1. P(neither) = P(AC and BC) = 2/3 x 4/5 = 8/15

Another way (use complement rule)

P(neither) = 1 - P(at least one) = 6/15 + 1/15

* + 1. = 1 - 7/15
    2. = 8/15

**Tutorial 1 Question 7**

|  |  |  |
| --- | --- | --- |
| P(A) = 0.10 | P(Acc|A) = 0.55 | P(Acc and A) = P(Acc|A)P(A) = 0.055 |
| P(B) = 0.20 | P(Acc|B) = 0.60 | P(Acc and B) = P(Acc|B)P(B) = 0.120 |
| P(C) = 0.30 | P(Acc|C) = 0.95 | P(Acc and C) = P(Acc|C)P(C) = 0.285 |
| P(D) = 0.40 | P(Acc|D) = 0.75 | P(Acc and D) = P(Acc|D)P(D) = 0.300 |

P(Acc) = P(Acc and A) + P(Acc and B) + P(Acc and C) + P(Acc and D)

= 0.76

P(A|Acc) = P(Acc|A)P(A) / P(Acc) = 0.055/0.76 = **0.0723**

**Tutorial 1 Question 8**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Working | Defective |  |
| Supplier A | *900* | 100 | 1000 |
| Supplier B | *1830* | 170 | 2000 |
|  | *2730* | *270* | *3000* |

P(Working) = 2730/ 3000 = 0.91

P(Defective) = 270/3000 = 0.09

**Tutorial 1 Question 9**

Machine A works P(A) = 0.95

Machine B works P(B) = 0.98

P(A and B) = 0.95 x 0.98 = 0.931

P(AC and BC) = 0.05 x 0.02 = 0.0010

At least one working

1 - P( neither working ) = 0.9990

**Tutorial 1 Question 10**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Y = 0 | Y = 1 | Y = 2 | sum |
| X = 0 | 0.2 | 0.1 | 0.2 | 0.5 |
| X = 1 | 0.0 | 0.2 | 0.1 | 0.3 |
| X = 2 | 0.1 | 0.0 | 0.1 | 0.2 |
| sum | 0.3 | 0.3 | 0.4 |  |

E(X) = (0 x 0.5) + (1 x 0.3) + (2 x 0.2) = 0.7

E(Y) = (0 x 0.3) + (1 x 0.3) + (2 x 0.4) = 1.1