# Breakout Room Discussion of Session 1 Exercises

In each of your groups, you’ll be discussing the Session 1 exercise questions.

First, decide which roles each group member will fill:

## Roles:

**Moderator** - helps facilitate the conversation and encourages equitable participation

**Timekeeper** - keeps the group on track

**Note Taker** - takes record of the group’s discussion in this Google doc (see below).

**Active Participant** –engages and contributes to the discussion.

**Reporter** - presents the group’s solution to the whole class when we regroup.

## Before you begin to answer the exercise questions:

1. Introduce yourselves briefly.
2. Assign roles and record them below. Try to take a different role than last time.
3. Discuss the question(s) assigned to your group and note your answer.
4. Next, discuss other questions from Session 1. You won’t need to present these to the class but can use this time to compare answers to the other Session 1 questions.

## 

## Breakout Room (n=5 per room)

|  |  |
| --- | --- |
| **Breakout Room** | **Assigned Exercise Questions (see next page)** |
| **1** | **1 a, b, c, d** |
| **2** | **2 a, b, c, d, e** |
| **3** | **3 a, b, c, d** |
| **4** | **4** |
| **5** | **5** |
| **6** | **6** |
| **7** | **7** |
| **8** | **8** |
| **9** | **2 a, b, c, d, e** |
| **10** | **6** |
| **11** | **7** |
| **12** | **8** |

Roles:

* Moderator -
* Timekeeper -
* Note Taker -
* Reporter -
* Active Participant -

Question(s) discussed:

Solution to assigned question:

Any question you want the whole class to discuss/answer?

A different question discussed:

Notes:

**Session 1 Exercises**

1. Suppose you toss a single die

Consider the following events:

E1 = roll a 1

E2 = roll an even number

E3 = roll a 4, 5 or 6

E4 = roll a 3 or 5

1. What is Pr(E4)?
2. Are E2 and E3 mutually exclusive? E2 and E4?
3. Find a mutually exclusive, exhaustive collection of events. Do the probabilities add to 1?
4. What is Pr(E4c)?
5. Suppose we screen 10,000 people for a disease using a new screening test. Here are the results:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Disease Status | |  |
|  |  | Pos. | Neg. |  |
| Test Result | Pos. | 9 | 80 | 89 |
| Neg | 1 | 9910 | 9,911 |
|  |  | 10 | 9990 | 10,000 |

1. What is P(test positive)?
2. What is P(test positive and disease positive)?
3. What is P(test positive or disease positive)?
4. What is P(test positive | disease positive)?
5. What is P(disease positive | test positive)?
6. In a group of 30 symptomatic women attending a clinic, some had cervical infections with *Chlamydia trachomatis* (C) or *Neisseria gonorrhea* (G), and some were harboring both organisms and some had neither. Seven women had C only, 5 women had G only and 8 women had both (B).

a) What is the probability of chlamydia (C)?

b) What is the probability of gonorrhea (G)?

c) What is the probability of gonorrhea (G) or chlamydia (C)?

d) Are gonorrhea and chlamydia mutually exclusive?

1. A certain operation has a survival rate of 70%. If this operation is performed independently on three different patients, what is the probability all three operations will fail?
2. If allelle A has frequency 3/4 and allelle a has frequency 1/4 , what are the prevalances of the 3 genotypes AA, Aa and aa in the population (assuming random mating)?
3. Suppose an influenza epidemic strikes a city. In two child families the older child has influenza 10% of the time (event A), the younger child has influenza 10% of the time (event B) and both children have influenza 2% of the time .
   1. Are the events A and B independent?
   2. What is the probability that the older child has influenza if we know the younger child has influenza?
4. The following table gives the probability of a low birthweight (<2500g) baby for different gestational ages. What is the overall probability of having a LBW infant in this population?

|  |  |  |
| --- | --- | --- |
| Length of Gestation | Proportion born at this gestational age | Prob. LBW at this gestational age |
| < 20 weeks | .0004 | .540 |
| 20 – 27 weeks | .0059 | .813 |
| 28 – 36 weeks | .0855 | .379 |
| > 36 weeks | .9082 | .035 |

1. An investigator wants to determine the characteristics of a screening test for bacterial vaginosis (BV). The investigator obtains screening results on 250 women and finds 50 who screen positive and 200 who screen negative. The “gold standard” (i.e. true measure of disease status) is a gram stain test but this test is more expensive to do. Therefore, the investigator decides to do gram stains on all 50 women who screened positive and a random sample of 50 of the women who screened negative. The following results are obtained:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Gram stain | |  |
|  |  | + | - |  |
| Screening test | + | 44 | 6 | 50 |
| - | 3 | 47 | 50 |
|  |  | 47 | 53 |  |

1. Estimate the sensitivity and specificity of the screening test.
2. Estimate the positive predictive value of the screening test.

(Hint: Fix the table – or use Bayes rule – so it mimics the results you would get if all 250 women were tested by the gold standard)