

Print **all** group member's names here. Circle the name of the group member who turns this in.

For questions 1-3, refer to the Fourth Probability Worksheet to find verbal descriptions of each of the medical probability terms.

1. A group of scientists is developing a screening test to detect a disease. In a trial with 300 participants, we know that 80 of them have the disease. The scientists report their test had a false positive rate of 2.27% and a false negative rate of 10%. Recreate the data from the trial. When needed, round to the nearest whole number.

|                         | Positive test | Negative test | <i>total</i> |
|-------------------------|---------------|---------------|--------------|
| Have the disease        |               |               |              |
| Do not have the disease |               |               |              |
| <i>total</i>            |               |               |              |

2. Use the filled-in table above to find the following. **Express each of these as a conditional probability**, and give the answer as a fraction (no need to reduce):
  - (a) the **sensitivity**
  - (b) The **specificity**
  - (c) The **PPV** (positive predictive value):
  - (d) The **NPV** (Negative predictive value):
3. Are the events "the test was positive" and "the patient has the disease" independent or dependent? Show correct computations and notation to justify.

For question 4, we are choosing a number at random from the interval  $[14, 89]$ . Assume every real number in the interval is equally likely to be chosen. For each problem below, draw the appropriate number line, simplify the interval if possible, and give the probability as a fraction (no need to reduce).

4. What is the probability we select a number in the following intervals?

a.  $[19, 39]$

b.  $[19, 39] \cap [22, 45]$

c.  $[19, 39] \cup [22, 45]$

d.  $[19, 39] \cap [22, 35]$

e.  $[19, 39] \cap [45, 65]$

f.  $[19, 39] \cup [45, 65]$

g.  $[19, 39]$ , given that it is in  $[15, 50]$

h.  $[19, 39]$ , given that it is in  $[25, 50]$