



Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

- ✓ Apply Bayes' theorem.
- ✓ Use the law of total probability.
- ✓ Compute a posterior probability.
- ✓ Understand false positives with rare conditions.



Section A · Concept Check

• BEGINNER

4 × 1 = 4

- If $P(A)=0.05$, $P(B|A)=0.7$, $P(B)=0.15$, then $P(A|B) =$:
☐ A. 0.233 ☐ B. 0.7 ☐ C. 0.05 ☐ D. 0.35
- Disease 3%, true-positive 85%, false-positive 10%. $P(\text{positive test}) =$:
☐ A. 0.1225 ☐ B. 0.85 ☐ C. 0.03 ☐ D. 0.1
- Using that, $P(\text{has disease} | \text{tests positive}) =$:
☐ A. 0.208 ☐ B. 0.85 ☐ C. 0.03 ☐ D. 0.5
- Bayes shows accurate tests can produce many ___ when a condition is rare:
☐ A. true positives ☐ B. false positives
☐ C. errors ☐ D. negatives



Section B · Problem Solving

• INTERMEDIATE

2 + 3 × 3 = 11

- Bayes' theorem: $P(A|B) = [P(B|A) \times P(A)] /$ _____
- For $P(A)=0.05$, $P(B|A)=0.7$, $P(B)=0.15$, $P(A|B) =$ _____
- If $P(A)=0.05$, $P(B|A)=0.7$, $P(B)=0.15$, find $P(A|B)$.

- Disease 3%, true-positive 85%, false-positive 10%. Find $P(\text{positive test})$.

- Using the previous result, find $P(\text{has disease} | \text{tests positive})$.



Section C · Challenge

• CHALLENGE

5

- Factory A makes 70% of parts at 1% defect; Factory B makes 30% at 4% defect. Find $P(\text{defective})$.

Reflection — the most useful thing I learned: _____

A ___/4 B ___/11 C ___/5 Total ___/20

Teacher's Signature _____

Parent's Signature _____

ANSWER KEY — FOLD OR CUT BEFORE HANDING OUT

1-A 2-A 3-A 4-B | 5 $P(B)$ 6 0.233 7 = 0.233 8 = 0.1225 9 = 0.208 | 10 = 0.019