Math-2

Lesson 8-9

Practice Calculating Probabilities

What is the probability of dealing a King out of a well-shuffled deck of 52 cards? $\frac{4}{53}$

Convert this probability into a percentage. $\frac{4}{53} = 0.08 * \frac{100\%}{1} = 8\%$

The probability of arriving on time is 55%. $55\% * \frac{1}{100\%} = 0.55$

Convert this to decimal form:

What is the probability of drawing a King followed by a Queen (without replacement)?

$$P(K\ and\ Q) = P(K) * P(K/Q) = \frac{4}{52} * \frac{4}{51}$$

Convert this probability into a percentage.

$$\frac{4}{52} * \frac{4}{51} = \frac{16}{2652} = 0.006 * \frac{100\%}{1} = 0.6\%$$

Convert this probability into a decimal.

A mom and pop pet store has 20 animals. 5 animals are reptiles, 7 are mammals, and 8 are birds. 3 of the reptiles are turtles and 2 are iguanas. 4 of the mammals are cats and 3 are dogs. 5 of the birds are cockatiels and 3 of them are macaws.

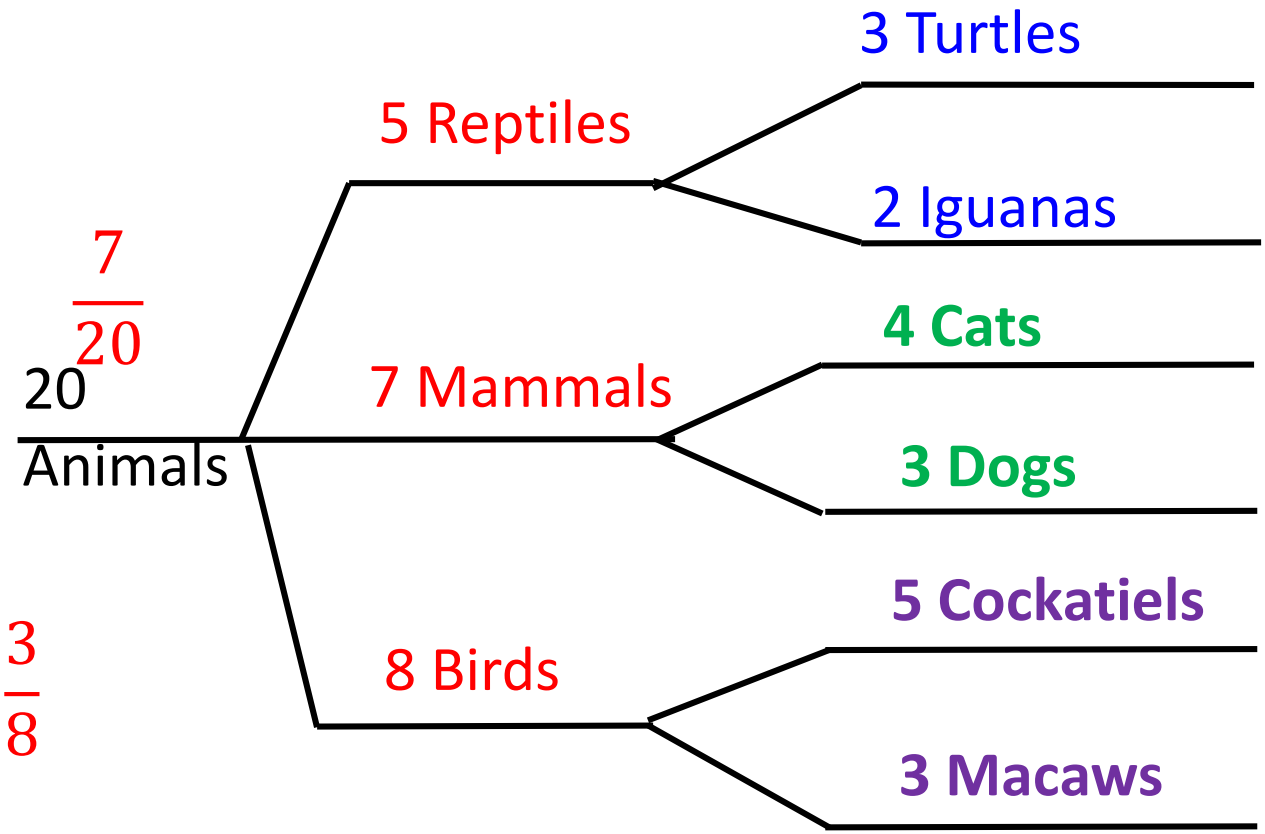
$P(Reptile) = ?$ $\frac{5}{20}$

$P(Turtle) = ?$ $\frac{3}{20}$

$P(Cat/Mammal) = ?$ $\frac{7}{20}$

$P(Bird) = ?$ $\frac{8}{20}$

$P(Macaw/bird) = ?$ $\frac{3}{8}$



Probability for the Sum of Two Fair Dice=?

$P(2)$

$$P(2) = \frac{1}{36}$$

$P(4) = ?$

$$P(4) = \frac{3}{36}$$

$P(9) = ?$

$$P(9) = \frac{4}{36}$$

$P(even\ number) = ?$

$$P(even) = \frac{18}{36}$$

$P(3\ or\ a\ 9) = ?$

$$P(even) = \frac{2}{36} + \frac{4}{36} = \frac{6}{36}$$

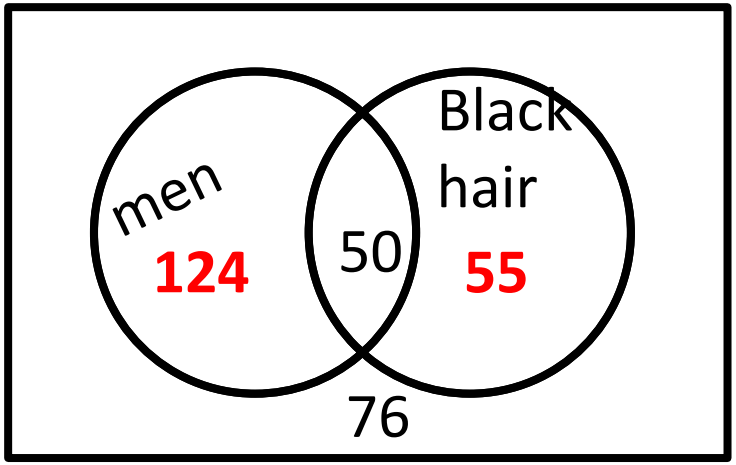
$P(7) = ? = \frac{6}{36}$

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Fill in the table

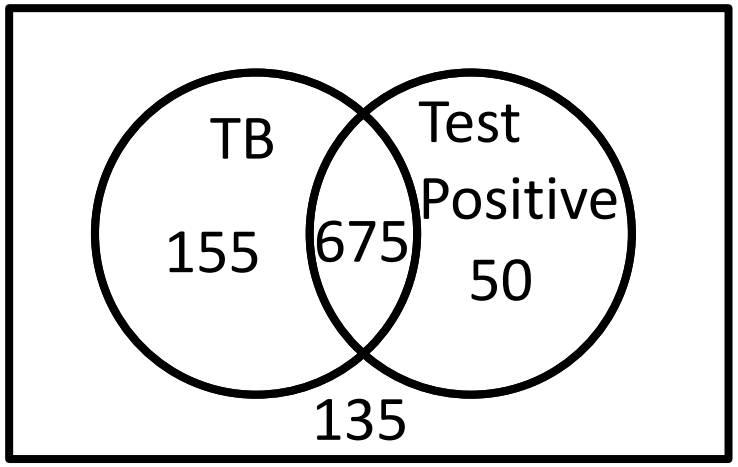
	Black hair	Other color hair	Totals
Men	50	124	174
Women	55	76	131
Totals	105	200	305

Build a Venn Diagram



Error in notes for VENN Diagram

Make a table from the Venn diagram



	Positive	Negative	Totals
Have TB	675	155	830
Not TB	50	135	185
Totals	725	290	1015

$P(A) = 7/23$

$P(A/B) = 4/11$

$P(B/A) = ?$ 4/7

$P(A/\overline{B}) = ?$ 3/12

$P(B) = ?$ 11/23

$P(A \cap B) = ?$ 4/23

$P(A \cap \overline{B}) = ?$ 3/23

$P(\overline{A} \cap B) = ?$ 7/23

$P(\overline{A} \cap \overline{B}) = ?$ 9/23

$P(\overline{A} \cup \overline{B}) = ?$ 19/23

$P(A \cup B) = ?$ 14/23

	B	Not B	Totals
A	4	3	7
Not A	7	9	16
Totals	11	12	23

$P(A) = 0.40$

$P(B) = 0.5$

$P(\bar{B}/\bar{A}) = 0.25$

What if it is a decimal probability?

Fill in the table as you go.

	B	Not B	Totals
A	5	35	40
Not A	45	x 15	60
Totals	50	50	100

$P(B/A) = ?$ 5/40 = 0.125

$P(A/\bar{B}) = ?$ 35/50 = 0.7

$P(B) = ?$ 50/100 = 0.5

$P(A \cap B) = ?$ 5/100 = 0.05

$P(A \cap \bar{B}) = ?$ 35/100 = 0.35

$P(\bar{A} \cap B) = ?$ 45/50 = 0.9

$P(\bar{A} \cap \bar{B}) = ?$ 15/100 = 0.15

$P(\bar{A} \cup \bar{B}) = ?$ (45+15+35)/100 = 0.95

$P(A \cup B) = ?$ (5+35+45)/100 = 0.85

$$P(\bar{B}/\bar{A}) = 0.25 = \frac{x}{60}$$

$$60 * 0.25 = \frac{x}{60} * 60$$

$$x = 15$$

Melany plans on running a race. There are a total of 8 contestants. If everyone has the same running ability, what is the probability that she will finish in first place?

$$P(event) = \frac{\#\ of\ ways\ for\ her\ to\ be\ in\ first\ place}{\#\ of\ ways\ 8\ runners\ to\ finish}$$

$$P(event) = \frac{{}_1^1P}{{}_8^8P} = \frac{1}{40320}$$

Writing Probability Statements

	Tails	No tails	Total
Mammals	5	4	9
Not mammals	7	3	10
Total	12	7	19

$$P(\text{mammal}) = \frac{?}{?} = \frac{9}{19}$$

$$P(\text{not a mammal}) = \frac{?}{?} = \frac{10}{19}$$

$$P(\text{tail / mammal}) = \frac{?}{?} = \frac{5}{9}$$

$$P(\text{no tail / not mammal}) = \frac{?}{?} = \frac{3}{10}$$

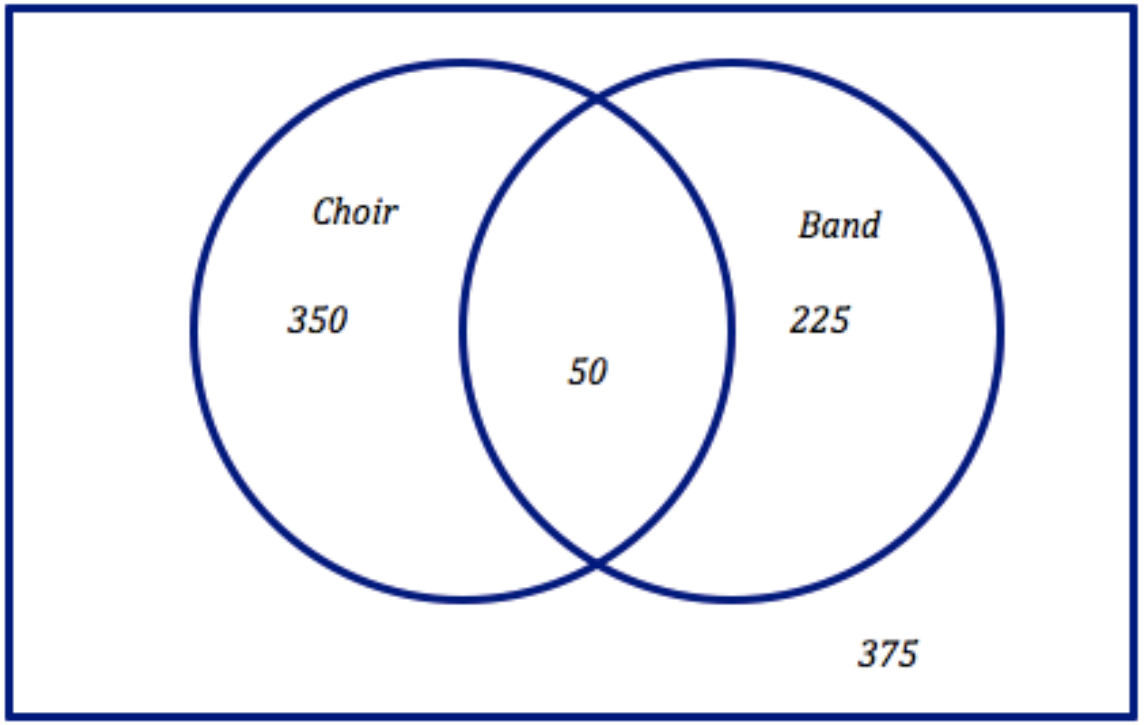
$$P(\text{ mammal / no tail}) = \frac{?}{?} = \frac{4}{7}$$

$$P(\text{ not mammal / tail}) = \frac{?}{?} = \frac{7}{12}$$

Your Turn

	Wins	Losses	Tie Games	Total
Steelers	7	8	1	16
49ers	10	6	0	16
Total	17	14	1	32

1. What is the probability that a game ends with the Steelers winning?
2. What is the probability that a game was won?
3. What is the probability that the 49ers played in a game?



8. How many students were surveyed?

9. What were the students asked?

10. What does the number 375 represent?
11. How many students are in both choir and band?
12. How many students are not in either choir or band?
13. What is the probability that a randomly selected student would be in band?

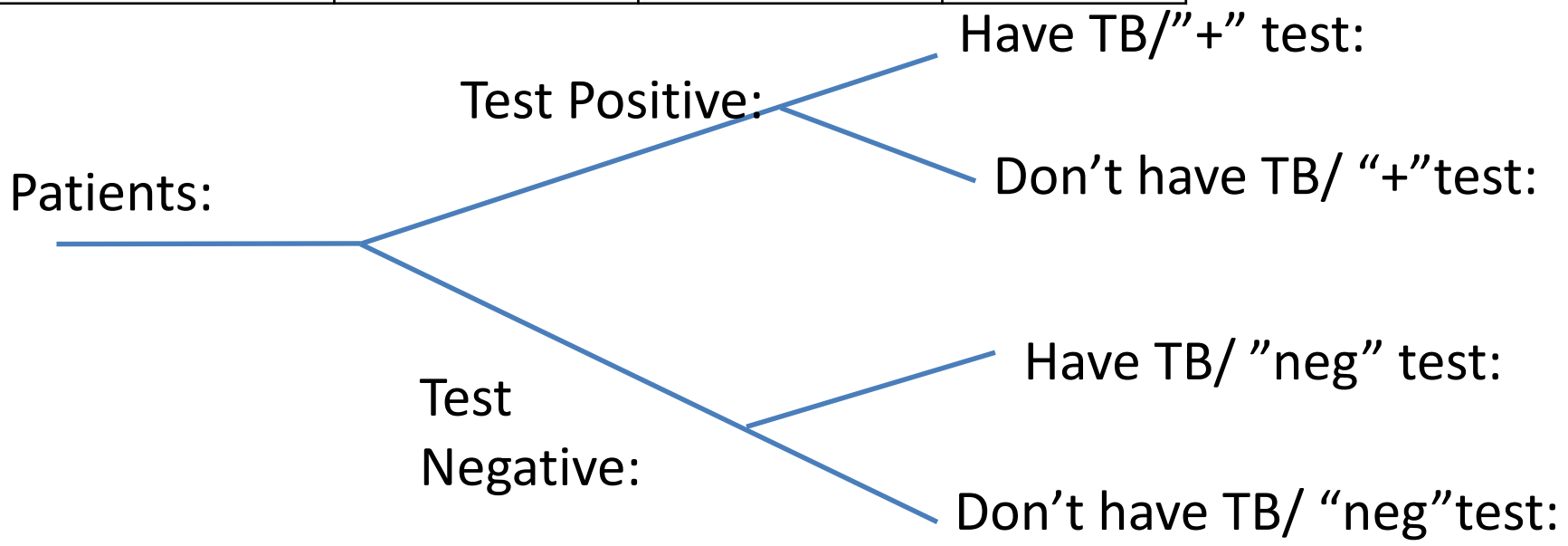
TB or Not TB?

Tuberculosis (TB) can be tested in a variety of ways, including a skin test.

If a person has tuberculosis antibodies, then they are considered to have TB.

Build a tree diagram and label it.

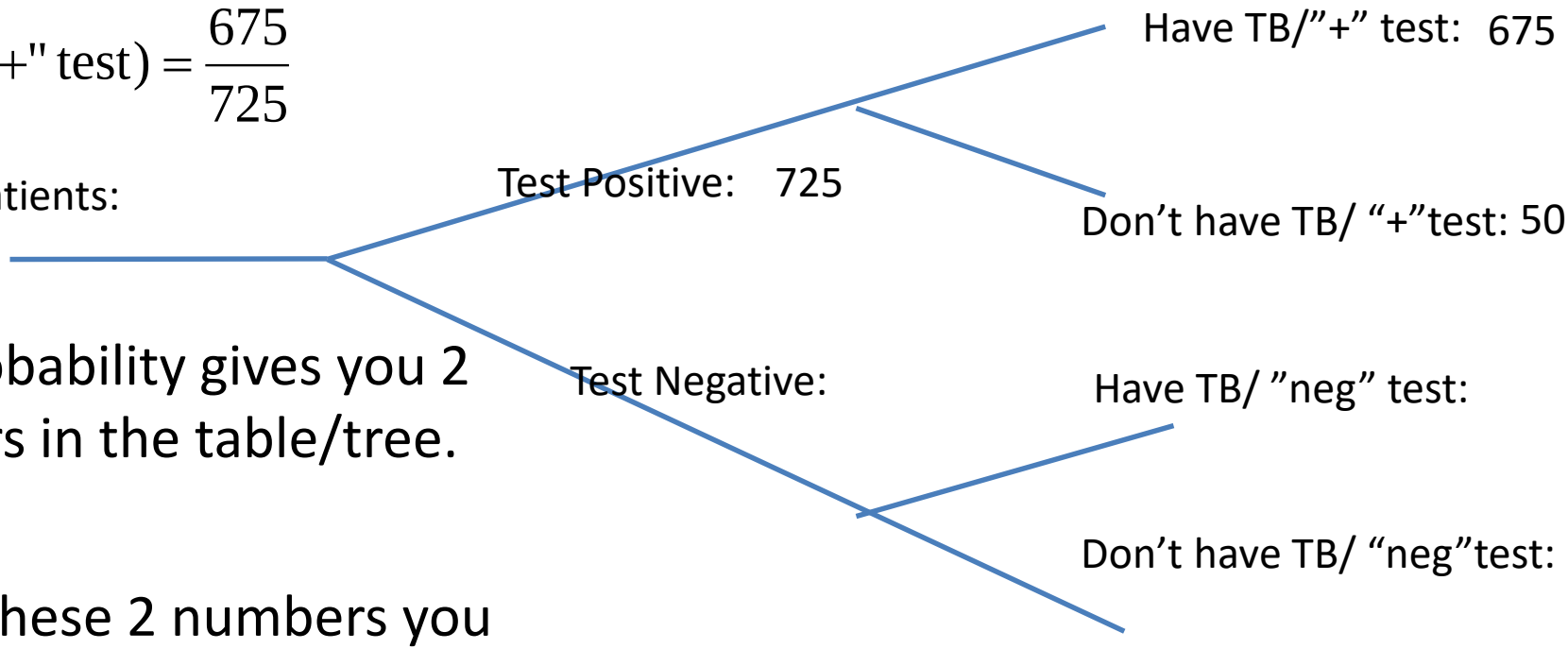
	Test Positive	Test Negative	Total
Have TB			
Don't have TB			
Total			



From the probability given, fill in the table and the tree.

	Test Positive	Test Negative	Total
Have TB	675		
Don't have TB	725 – 675 = 50		
Total	725		

$$P(\text{TB/"+" test}) = \frac{675}{725}$$



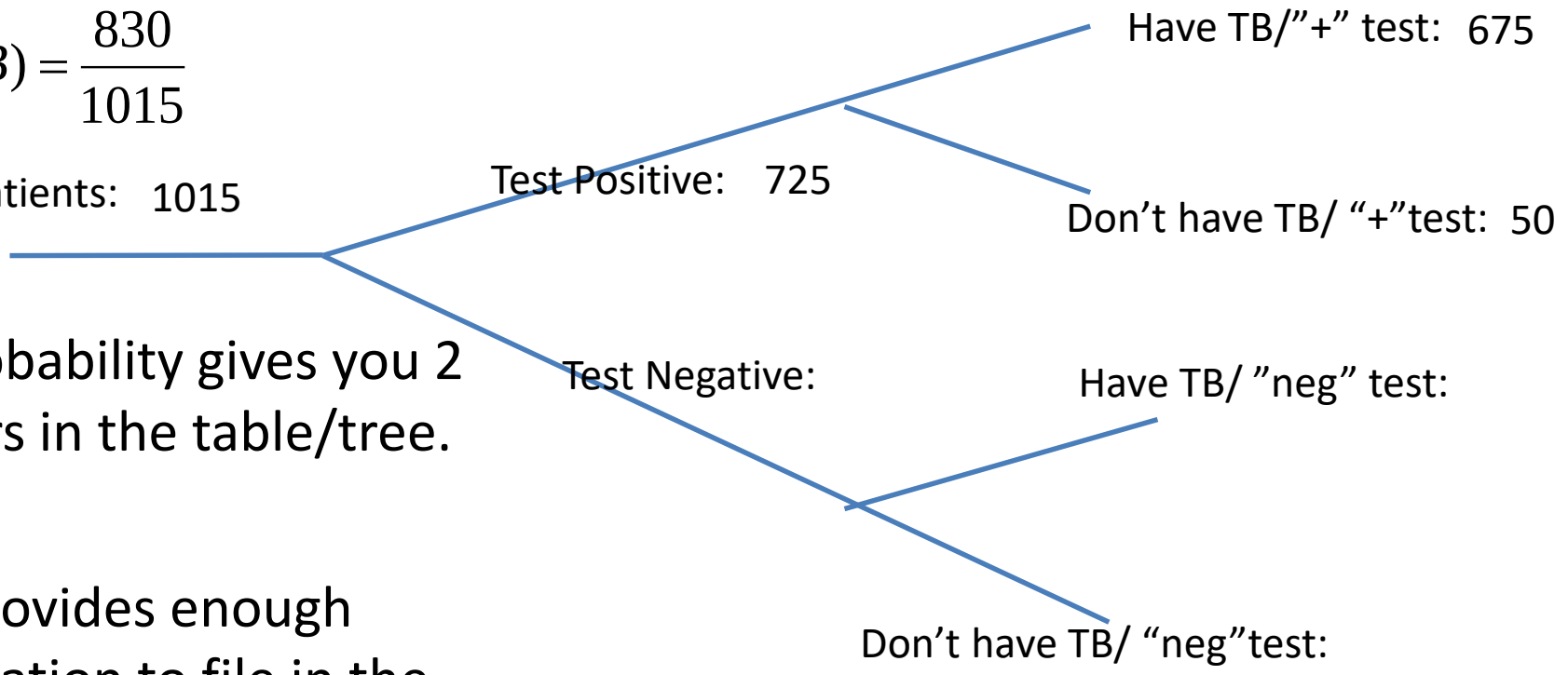
This probability gives you 2 numbers in the table/tree.

From these 2 numbers you can find a 3rd number.

From the probability given, fill in the table and the tree.

	Test Positive	Test Negative	Total
Have TB	675		830
Don't have TB	50		1015 – 830 = 185
Total	725		1015

$$P(\text{TB}) = \frac{830}{1015}$$



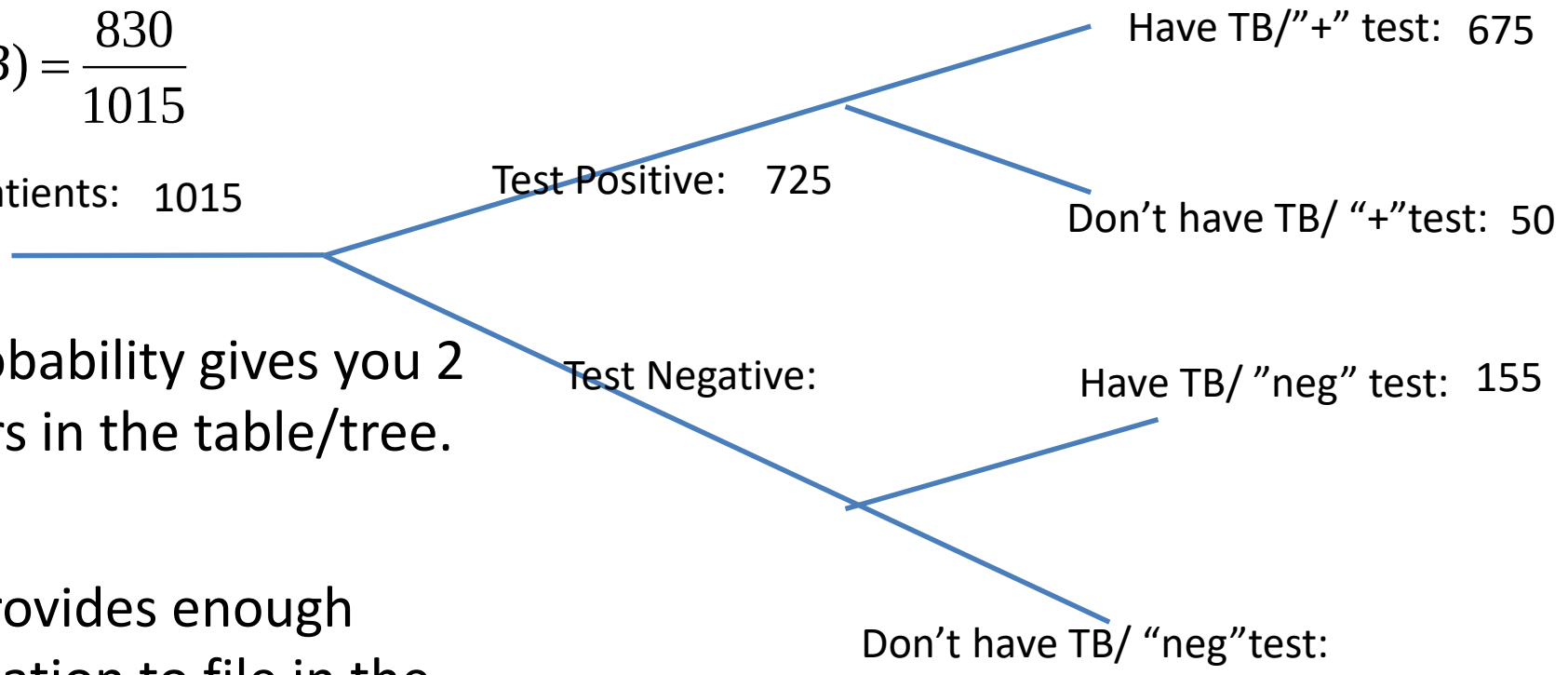
This probability gives you 2 numbers in the table/tree.

This provides enough information to file in the rest of the table/tree.

From the probability given, fill in the table and the tree.

	Test Positive	Test Negative	Total
Have TB	675	830 – 675 = 155	830
Don't have TB	50		185
Total	725		1015

$$P(TB) = \frac{830}{1015}$$



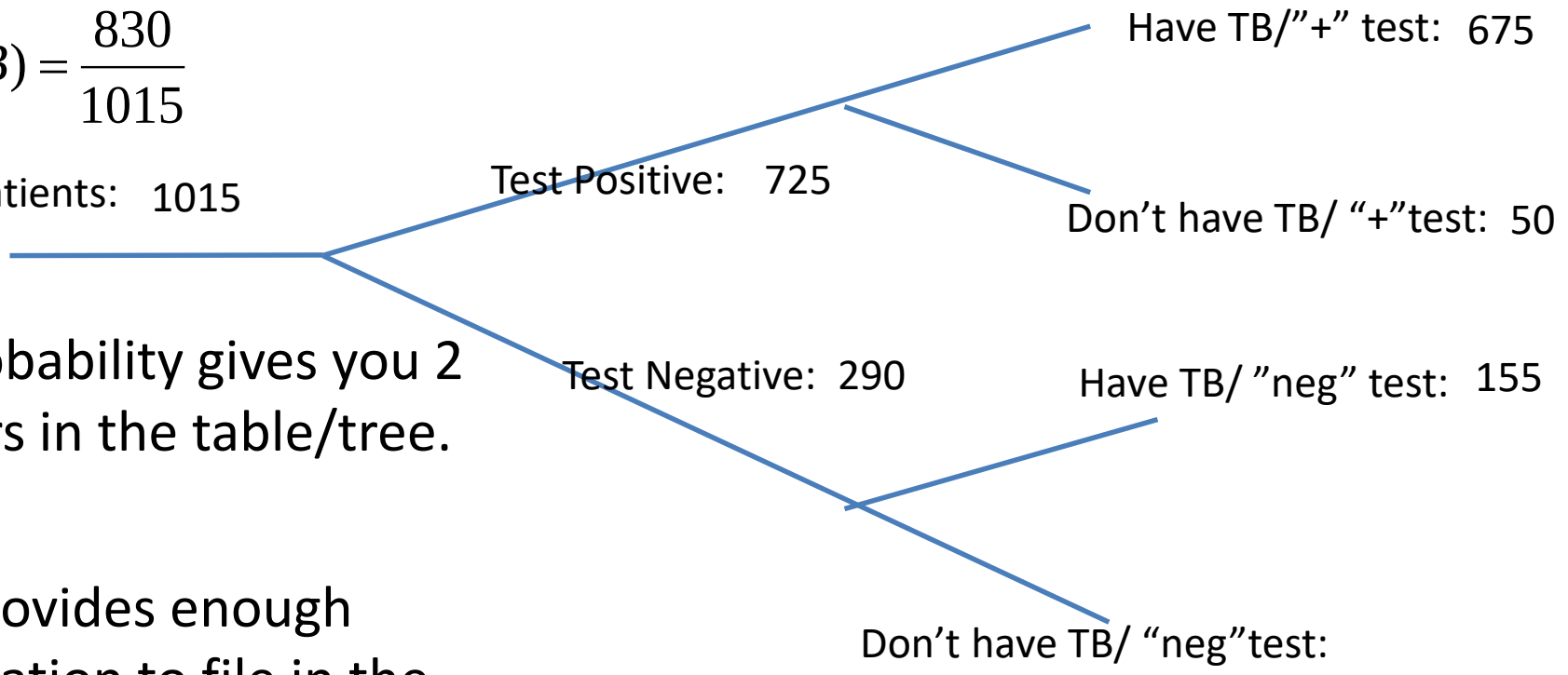
This probability gives you 2 numbers in the table/tree.

This provides enough information to file in the rest of the table/tree.

From the probability given, fill in the table and the tree.

	Test Positive	Test Negative	Total
Have TB	675	155	830
Don't have TB	50		185
Total	725	1015 – 725 = 290	1015

$$P(TB) = \frac{830}{1015}$$



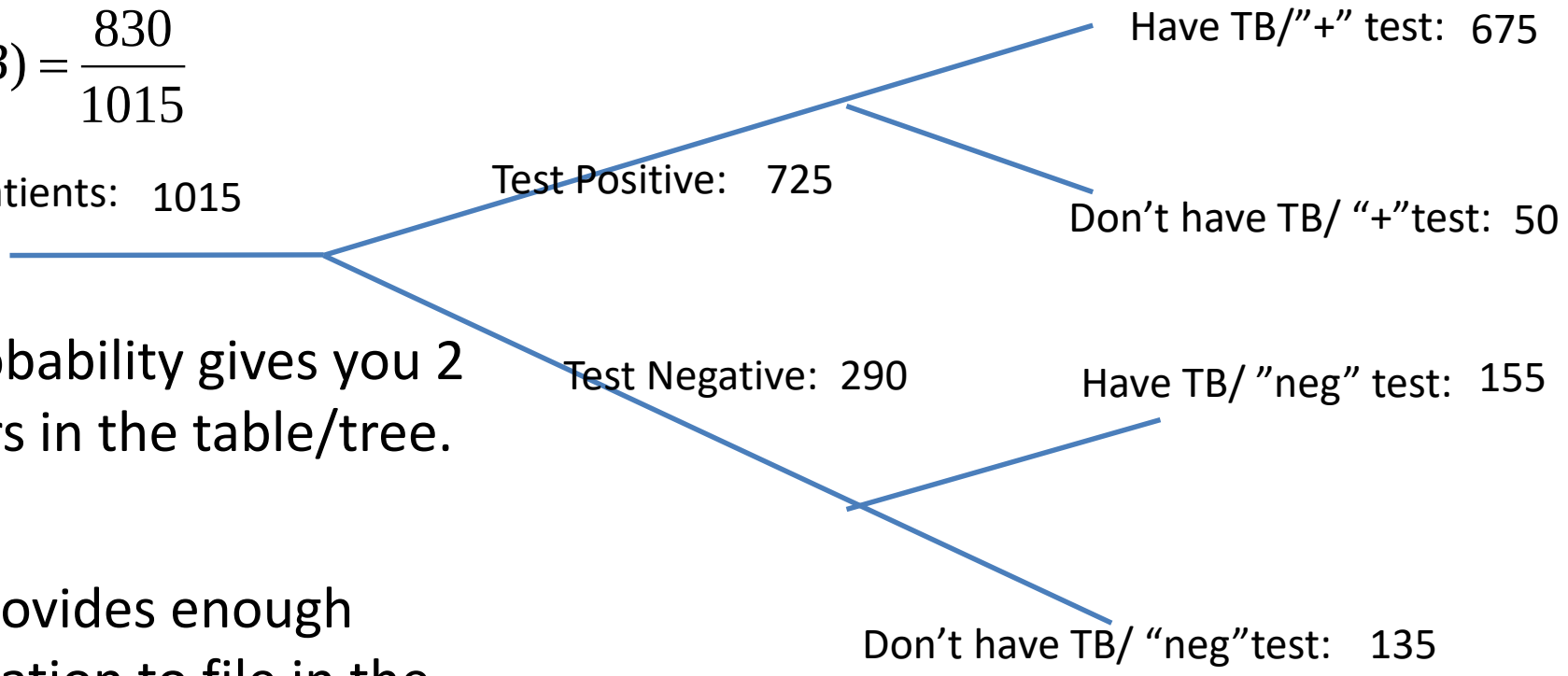
This probability gives you 2 numbers in the table/tree.

This provides enough information to file in the rest of the table/tree.

From the probability given, fill in the table and the tree.

	Test Positive	Test Negative	Total
Have TB	675	155	830
Don't have TB	50	290 – 155 = 135	185
Total	725	290	1015

$$P(TB) = \frac{830}{1015}$$



This probability gives you 2 numbers in the table/tree.

This provides enough information to file in the rest of the table/tree.

Below is a tree diagram representing data based on 1,000 people who have been given a skin test for tuberculosis.