# **Practice quiz on Probability Concepts**

### **TOTAL POINTS 9**

1. If x = "It is raining," what is  $\sim (\sim x)$ ?

1 / 1 point

- "It is raining"
- O "It is not raining"
- O "It is never raining"
- O "It is always raining"
  - ✓ Correct

The second negation cancels out the first one.

Similarly  $\sim (\sim (\sim x)) = \sim x$ 

2. If the statement "I am 25 years old" is assigned probability 0, what probability is assigned to 1/1 point the statement "I am not 25 years old"?

- $\bigcirc$  -1
- 1
- O Unknown
- $\bigcirc$  0
  - ✓ Correct

It is always the case that  $p(x) + p(\sim x) = 1$ .

3. If I assign to the statement x = "it will rain today" a probability of p(x) = 0.35, what probability must I assign to the statement "it will not rain today?"

1/1 point

- $\bigcirc$  .5
- .65
- $\bigcirc$  0
- O .35

$$p(x) + p(\sim x) = 1$$

| 4. | Is the following collection of statements a probability distribution?   | 1 / 1 point |
|----|---|-------------|
|    | 1. I own a Toyota pickup truck  |             |
|    | 2. I do not own a Toyota pickup truck   |             |
|    | 3. I own a non-Toyota pickup truck  |             |
|    | 4. I do not own a non-Toyota pickup truck   |             |
|    | No  |             |
|    | ○ Yes   |             |
|    | ✓ Correct The statements are not exclusive: 1 and 4 could both be true, 2 and 3 could both be true, 2 and 4 could both be true, and even (1) and (3) could both be true (if I owned more than one pickup truck).  |             |
| 5. | I don't know what it means to be "ingenuous." What probability would I assign to the statement, "I am ingenuous OR I am not ingenuous"?   | 1 / 1 point |
|    | O -1  |             |
|    | O .5  |             |
|    | <ul><li>● 1</li><li>○ 0</li></ul>   |             |
|    | $\checkmark$ Correct It is always the case, regardless of the content of the statement x, that $p(x 	ext{ or } \sim x) = 1$   |             |
| 6. | A friend of mine circumscribes a circle inside a square, so that the diameter of the circle and the edge of the square are the same length. He asks me to close my eyes and pick a point at random inside the square. He says the probability that my point will also be inside the circle is $\frac{\pi}{4}$ | 1 / 1 point |
|    | Is this correct?  |             |
|    | Yes   |             |
|    | ○ No  |             |
|    | ✓ Correct Probabilities can be any real number between 0 and 1. They do not need to be rational numbers – a numerator that is a transcendental number like Pi is acceptable.  |             |
|    | Note that the correct probability does not depend on the length r of the circle's radius. For a circle with any radius r to be circumscribed inside a square, the square  |             |

| 7. | The probability of drawing a straight flush (including a |
|----|--|
|    | Royal Flush) in a five-card poker hand is 0.0000153908   |

1/1 point

What is

the probability of **not** drawing a straight flush?

- .9999846092
- 0.9967253809
- 0.9999745688
- 0.9996582672

#### ✓ Correct

$$p(\sim x) = 1 - p(x)$$

8. What is the probability that a fair, six-sided die will come up with a prime number? (Recall that prime numbers are positive integers other than 1 that are divisible only by themselves and 1)

1 / 1 point

1 / 1 point

- $O_{\frac{2}{3}}$
- $O_{\frac{1}{6}}$
- $O_{\frac{1}{3}}$
- $\odot$   $\frac{1}{2}$

## ✓ Correct

The faces with 2, 3 and 5 satisfy the condition – which makes 3 relevant outcomes out of the "universe" of 6 outcomes =  $\frac{3}{6} = \frac{1}{2}$ 

9. The joint

probability p (the die will come up 5, the next card will be a heart) Is equal to the joint probability:

- $\bigcirc$  p (the die will **not** come up 5, the next card will **not** be a heart)
- p (the next card will be a heart, the die will **not** come up 5)
- p (the next card will be a heart, the die will come up 5)
- p (the next card will **not** come up 5, the next card will be a heart)

## ✓ Correct

In joint probabilities, the order does not change the probability: p(A,B)=p(B,A)