Week 4 Tuesday

◆□▶ ◆□▶ ◆ 臣▶ ◆ 臣▶ ○ 臣 ○ の Q @

Turn to your neighbor and introduce yourself! Then work together and, using a Playfair cipher with key given by the grid below, decrypt: WZ LT OP WK SH ES VX PH.

С	W	F	Q	Y
G	I	Z	R	В
Н	М	K	L	U
V	A	D	E	N
0	Р	Х	Т	S

Frequency Analysis, Probability

▲□▶ ▲□▶ ▲ 三▶ ▲ 三▶ 三三 - のへぐ

1. A nickel, a dime, and a quarter are flipped simultaneously. Which of the following events is most likely?

- (A) The nickel lands hands.
- (B) Exactly one of the three coins lands heads.
- (C) Exactly two of the three coins lands heads.
- (D) At least one of the three coins lands heads.

2. Two fair six-sided dice are rolled simultaneously: one red and one blue. Let the random variable R represent the number on the red dice and B the number on the blue dice, so that R + B represents the sum of the numbers on the two dice. Which of the following is most accurate?

- (A) R and B are uniform, and so is R + B.
- (B) R and B are uniform, but R + B is not.
- (C) R and B are not uniform, but R + B is.
- (D) R and B are not uniform, and neither is R + B.

3. Amélie rolls a six-sided dice. If it's 3 or less, she loses \$9. If it's 5 or more, she wins \$18. Which of the following is most accurate?

- (A) Amélie is expected to lose money
- (B) Amélie is expected to break even
- (C) Amélie is expected to win money

4. In an imaginary country, 80% of the population is monolingual, 50% of the population likes hiking, and 40% of the population both is monolingual and likes hiking. If a resident of this country is chosen at random, is the event that this person is monolingual independent of the event that this person likes hiking?

- (A) Yes
- (B) No

5. Roughly 1% of people are allergic to cats. Allie thinks she might be too, so she takes an allergy test which has a 20% false negative rate and a 10% false positive rate. The test results come back saying that Allie is allergic to cats. What is the probability that Allie is *actually* allergic to cats?

▲□▶ ▲□▶ ▲□▶ ▲□▶ □ のQで

- (A) More than 75%
- (B) Between 50% and 75%
- (C) Between 25% and 50%
- (D) Less than 25%

6. There are 5 multiple choice questions on a math exam.

Each question comes with 4 options for an answer, and exactly one of the four options is correct. Sunny has not studied at all and decides to guess randomly on all of the questions. Which of the following events is most likely?

- (A) Sunny gets all of the questions right.
- (B) Sunny gets at least one question right.
- (C) Sunny gets exactly one question right.
- (D) Sunny only gets the fifth question right.

7. The alien residents of a distant planet have 1–4 eyes and either green or pink skin. Number of eyes is uniform and independent of skin color. A randomly chosen alien from this planet happens to be pink. What is the probability that this alien has 2 eyes?

▲□▶ ▲□▶ ▲□▶ ▲□▶ □ のQで

- (A) 25%
- (B) 50%
- (C) 75%
- (D) None of the above