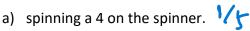
COMP2610/COMP6261 - Information Theory

Tutorial 1: Elementary Probability

Week 1, Semester 2, 2021

1. A spinner is divided into 5 equal sections, with sections labelled 1, 2, 3, 4 and 5. Compute the probability of:



- b) spinning an even number on the spinner. $\frac{1}{2}$
- c) Spinning a prime number on the spinner. 3/5



- 2. Let us assume that ACT number plates have three letters followed by three numbers (e.g., YOA077). What will be the probability that a randomly chosen number plate will have an ACT with the number ending in a 7 (ACT##7)? $\frac{1}{36} \times \frac{1}{36} \times \frac{1}{36} \times \frac{1}{36} = \frac{1}{36} = \frac{1}{1679616}$
- **3**. ACT Govt. plan to enforce speed limits during the morning rush hour on four different routes into the city. The traps on routes A, B, C, and D are operated 40%, 30%, 20%, and 30% of the time, respectively. Arya always speeds to work, and she has probability 0.2, 0.1, 0.5, and 0.2 of using those routes. Compute the probability of:
 - a) Arya getting a ticket on any one morning. 0.4x02+0.3x0./+0.2x0.5+0.3x0.2=0.27
 - b) Arya will go five mornings without the tickets. $(-0.7)^5 = 0.73 \stackrel{5}{\sim} 0.2073$
- 4. In an urn there are 5 blue, 3 red, and 2 yellow marbles. If you draw 3 marbles, what is the probability that less than 2 will be red if:

 Order 1. Order 2. Order
 - a) the marbles are drawn with replacement. 0.7 84 $0.7 \ \ell \sqrt{2} \ \sqrt{2$
- **5.** Nick will miss an important Cricket match while taking his Information theory exam, so he sets both his VCRs to record it. The first VCR has 70% chances to successfully record the match and the second VCR has 60% chances to successfully record the match. What is the probability that he gets home after the exam and finds? (Note: Here we assume that events A and B are independent, so with P(A) = 0.7 and P(B) = 0.6 and their set complements A^c and B^c occurring with probabilities 0.3 and 0.4 respectively).
 - a) No copies of the Cricket match? 0. 3xo. 4= 0. 12
 - b) One copy of the Cricket match? $0.7\times0.4+0.5\times0.6=0.28+0.18=0.46$
 - c) Two copies of the Cricket match? 0.7xo.6= 0.42.