

Assign 5b Challenge Probability

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Name: _____

Date: _____

Assignment 5b: Challenge Probability Questions

1. Seven seats are lined up in a row. Two people went to sit on the seats. What is the probability that they sit next to each other?



- always to choose 2 adjacent seats
- 7(2) ways to get 2 seats: $\frac{7 \times 6}{1 \times 2} = 21$

$$P(x) = \frac{6}{21} = \frac{2}{7}$$

$$\frac{2}{7} \times \frac{1}{6} + \frac{5}{7} \times \frac{2}{6}$$

$$\frac{2}{42} + \frac{10}{42} = \frac{12}{42} = \frac{2}{7}$$

2. A blue and red 20-sided dice are rolled. What is the probability that the number on the red die is greater than the blue die?

- $20 \times 20 = 400$
- # of ways to be equal: 20
- $400 - 20 = 380$
- half BLUE BLUE 190
- half RED BLUE 190

$$P(\text{RED} > \text{BLUE}) = \frac{190}{400} = \frac{19}{40}$$

3. Amy rolls a five sided die and Brad rolls a ten sided die. Amy wins if her number is greater than Brad's. What is the probability that Amy wins?

	1	2	3	4	5	6	7	8	9	10
A										
2	✓									
3	✓	✓								
4	✓	✓	✓							
5	✓	✓	✓	✓						

$$\frac{10}{50} = \frac{1}{5}$$

4. Four people (A, B, C, D) line up in a row at random. What is the probability that "A" and "B" are next to each other but "C" and "D" are not next to each other?

$$\begin{aligned} & AB _ _ X \\ & _ AB _ \textcircled{2} \\ & _ _ AB _ X \end{aligned} = \frac{2}{4!} = \frac{2}{24} = \frac{1}{12}$$

5. Alice picks an integer from 1 to 10 (inclusive) at random and Bob picks an integer from 11 to 20 (inclusive) at random. What is the probability that the product of Alice's number and Bob's number is a multiple of 3?

	11	12	13	14	15	16	17	18	19	20
1		/			/			/		
2		/			/			/		
3	/	/	/	/	/	/	/	/	/	/
4		/			/			/		
5		/			/			/		
6	/	/	/	/	/	/	/	/	/	/
7		/			/			/		
8		/			/			/		
9	/	/	/	/	/	/	/	/	/	/
10		/			/			/		

$30 + 21 = 51$ or $P(A) = \frac{3}{10}$ $P(B) = \frac{3}{10}$
 $P(A \cap B) = \frac{9}{100}$
 $P(X) = \frac{36}{100} + \frac{30}{100} - \frac{9}{100} = \frac{51}{100}$

6. Amy flips 4 coins, while Brad flips 5. What is the probability that Brad flips more heads than Amy?

	1	2	3	4	5
1		/	/	/	/
2			/	/	/
3				/	/
4					/

$P(x) = \frac{10}{20} = \frac{1}{2}$

You could ONLY do this if $P(\text{heads}) = P(\text{tails}) = \frac{1}{2}$.

7. Every day, a stock price goes up 1% with probability 0.5 and down 1% with probability 0.5. After 4 days, what is the probability that the stock price is greater than where it started?

++++	++--	
+++-	-+-	
++-+	+--+	
+ - + +	-+-+	5.
- + + +	---+	
<hr/>		
GAIN: (5)	SAME: (6)	LOSS: (5)

$P(\text{win}) = \frac{5}{16}$

8. 100 people are in a room and each person is to select an envelope. There are 100 envelopes and in one of the envelopes is a black card. Each person takes turn taking an envelope and they all open it together at once. Would it be better to select the envelope in the beginning or near the end?

• B/C NO ONE GAINS REVERSEHAND, IT'S ALL THE SAME PG.