Math 104 Spring 2026 – Exploration 11.2: Ice Cream Prices

Recall the ice cream shop which randomly determines the price of an ice cream cone by rolling a pair of six-sided dice. The price, in cents, will be the larger number followed by the smaller number. You enter the shop with two quarters. In addition, your friend offers to buy your ice cream if the price turns out to be an odd number.

Here's the sample space of 36 possible outcomes for the random process of rolling 2 six-sided dice:

(1, 1) 11¢	(1, 2) 21¢	(1, 3) 31¢	(1, 4) 41¢	(1, 5) 51¢	(1, 6) 61¢
(2, 1) 21¢	(2, 2) 22¢	(2, 3) 32¢	(2, 4) 42¢	(2, 5) 52¢	(2, 6) 62¢
(3, 1) 31¢	(3, 2) 32¢	(3, 3) 33¢	(3, 4) 43¢	(3, 5) 53¢	(3, 6) 63¢
(4, 1) 41¢	(4, 2) 42¢	(4, 3) 43¢	(4, 4) 44¢	(4, 5) 54¢	(4, 6) 64¢
(5, 1) 51¢	(5, 2) 52¢	(5, 3) 53¢	(5, 4) 54¢	(5, 5) 55¢	(5, 6) 65¢
(6, 1) 61¢	(6, 2) 62¢	(6, 3) 63¢	(6, 4) 64¢	(6, 5) 65¢	(6, 6) 66¢

1. Convert our sample space into a 2x2 table of counts. Write the appropriate count into each box of the following table.

	You can afford it	You can't afford it	Total
Your friend buys			
Your friend doesn't buy			
Total			

Let A represent the event that you can afford to buy the ice cream cone, and let B be the event that your friend buys the ice cream cone for you.

2. Fill in the following values: P(A)= [ ] P(B) = [ ]
3. What is the probability that *you* cannot afford the ice cream cone?

[ ]

Flip the page for more questions!

The **complement** of an event B, denoted B^C, means that event B does not occur. The probability of a complement is computed $P(B^C) = 1 - P(B)$.

4. Calculate: $P(B^C) =$ [ ] In your own words, describe what event is represented by B^C in the context of the ice cream shop.

[ ]

The **intersection** of events A and B, denoted $A \cap B$, means that A and B **both** occur.

5. Calculate: $P(A \cap B) =$ [ ] In your own words, describe what event is represented by $A \cap B$ in the context of the ice cream shop.

[ ]

The **union** of events A and B, denoted $A \cup B$, means that event A and/or event B occurs.

6. Calculate: $P(A \cup B) =$ [ ]
   In your own words, describe what event is represented by $A \cup B$ in the context of the ice cream shop.

[ ]

7. How much larger is $P(A) + P(B)$ than $P(A \cup B)$? [ ]
   Have you seen this value somewhere before? Explain.

[ ]

The **addition rule** for probability says $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

8. Under what circumstances would $P(A \cup B) = P(A) + P(B)$? In other words, what would have to be true about you being able to afford the ice cream and your friend buying you the ice cream in order for this equality to hold?

[ ]

Exit ticket (do): Complete the two questions on the Google form linked here