



Amicable Arrangements

Three elves who work at Santa's factory are having a festive feast, and each one invites their best friend who works at the University of the North Pole. The three elves and their besties sit down at a round table. All of the possible seating arrangements of the six party-goers are equally likely.

(a) Show that the probability that each elf sits next to their bestie is $\frac{2}{15}$.

(b) Find the probability that exactly two of Santa's elves sit next to their best friends.

(c) Find the probability that no elf sits next to their best friend.

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Here are some further questions which might help you think about the problem:

- (1) If the first elf seats in a "fixed" seat, in how many ways can the other 5 people be seated?
- (2) If each elf sits next to their bestie, in how many different places can the first elf's bestie sit?
- (3) How many different people can sit on the other side of the first elf if the first elf's bestie is on the other side?
- (4) If the first elf does not sit next to their bestie, in how many seats can their bestie sit?
- (5) In which of these positions is it possible for the other two elves to sit next to their besties?

You might like to use the templates on the next page to try out your thinking.



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