

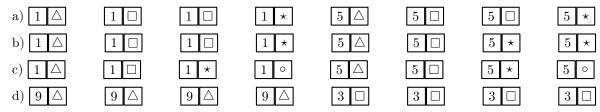
Warmup Exercises: Independence

Multiplication Rule:

- $P(A \text{ and } B) = P(A) P(B \mid A)$.
- If A and B are independent, then P(A and B) = P(A) P(B).

Events A and B are independent if and only if P(B|A) = P(B). This is true if and only if P(B|A) = P(B). In other words, knowing A doesn't change the chance of B; knowing B doesn't change the chance of A.

1. Sets of paper tickets are shown below. Each ticket has a number on the left and a shape on the right. For each set of tickets, Determine if number and shape are independent or dependent.



- 2. Referring to the polio vaccine trials, are the events A and B independent or dependent?
 - A = a randomly selected subject is from a high-income family
 - B = a randomly selected subject will get polio
 - A = a randomly selected subject is from a high-income family
 - B =the parents of the randomly selected subject will consent to their child getting the vaccine
 - A = a randomly selected subject will be diagnosed with polio
 - B =the medical examiner will know that the patient received the vaccine



Math 207 Introduction to Statistics

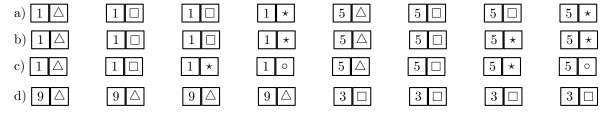
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- 3. Are the two events independent or dependent.
 - a) A = it will snow on 21 December $B = \text{the high temp on 21 December will be 31}^{\circ} \text{ F}$
 - b) A = it will snow on 21 DecemberB = 21 December will be a Saturday
 - c) A = it will snow on 21 DecemberB = the next coin flip will be tails
- 4. Are the two events independent or dependent.
 - a) $A = \text{first card drawn will be a } \heartsuit$ B = first card drawn will be a 10
 - b) A = first card drawn will be a face cardB = first card drawn will be a king
 - c) $A = \text{first card drawn will be a } \clubsuit$ $B = \text{second card drawn will be a } \clubsuit$
 - d) $A = \text{first card drawn will be a } \clubsuit$ $B = \text{second card drawn will be a } \diamondsuit$

Solutions: 1.a) independent; b) dependent; c) independent; d) dependent. 2. all are dependent. 3.a) dependent; b) independent; c) independent 4.a) independent; b) dependent; c) dependent; d) dependent

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