5.6 Independent Events p. 354

Name ____________

Date ____________

Goal: Understand and solve problems that involve independent events.

EXPLORE…

The Fortin family has two children. Cam determines the probability that the family has two girls. Rushanna determines the probability that the family has two girls, given that the first child is girl. How are these probabilities similar, and how are they different?

Probabilities of Events A and B

General Case:

$P(A \cap B) =$

Note: Events A and B are independent if $P(B|A) = P(B)$

For independent events: $P(A \cap B) =$

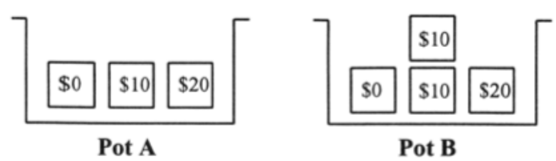
Example 1: A die is rolled 3 times. What is the probability of getting

a) a 5 on all three rolls?

b) at least one 5 on the three rolls?

c) at most one 5 on the three rolls?

Example 2: Randomly select one bill from Pot A and from Pot B.

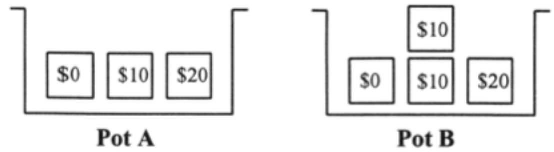


What is the probability of getting

a) a $10 bill on each draw?

b) a $10 bill on only one of the two draws?

Example 3: A pot is randomly selected, then a bill is randomly chosen from that pot.



What is the probability that

a) a $10 bill is chosen?

b) if a $10 bill is chosen, what is the probability that it came from Pot 1?

In Summary

Key Ideas

- If the probability of event *B* does not depend on the probability of event *A* occurring, then these events are called independent events. For example, tossing tails with a coin and drawing the ace of spades from a standard deck of 52 playing cards are independent events.
- The probability that two independent events, *A* and *B*, will both occur is the product of their individual probabilities:

$$P(A \cap B) = P(A) \cdot P(B)$$

Need to Know

- A tree diagram is often useful for modelling problems that involve independent events.
- Drawing an item and then drawing another item, after replacing the first item, results in a pair of independent events.

HW: 5.5 p. 350-353 #6, 8, 9, 13 & 18; 5.6 p. 360-363 #5, 7, 8 & 12