13.4 Compound Probability and Probability of Multiple Events

Learning Targets for today

- To be able to identify independent and dependent events.
- To be able to find compound probabilities.

Vocabulary!

Dependent Events – When the occurrence of one event affects the outcome of the second event.

Ex: *Pick a card from a standard deck, then picking another.*

Independent Events – When the outcome of an event does NOT affect the outcome of the second event.

Ex: *Pick a card from a standard deck, then spinning a spinner.*

Probability of A and B!

If A and B are independent events, then P(A and B) = P(A) ∘ P(B).

Finding the Probability of Independent Events

Example for you…	**Your turn to try…**
1. For a fundraiser, a class sells 200 raffle tickets for a best buy gift card and 350 raffle tickets to win Pistons tickets. You buy 12 raffle tickets towards the gift card and 20 for the Pistons tickets. What is the probability you win BOTH prizes. P(BB and Pistons) P(BB) ∘ P(Pistons) $\left(\frac{12}{200}\right)\cdot\left(\frac{20}{350}\right) = .004 = .4\%$	1. At the class party there are 7 cheese and 10 pepperoni pizzas, and 3 bags of Doritos and 5 ~~bags~~ Sems of Pringles. If you grab a pizza and bag of chips at random, what is you probability of getting a cheese pizza and a bag of Doritos? P(CHEESE AND DORITOS) P(CHEESE) ∘ P(DORITOS) $\left(\frac{7}{17}\right)\cdot\left(\frac{3}{8}\right) = .154 = 15.4\%$

Vocabulary!

Mutually Exclusive Events - Events that CAN NOT happen at the same time.

If A and B are mutually exclusive events, **then P(A and B) = 0.**

Ex: Rolling a 3 and a 5. (Can't happen at the same time!)

Probability of A or B! (mutually exclusive)

If A and B are mutually exclusive events, **then P(A or B) = P(A) + P(B).**

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Finding the Probability of Mutually Exclusive Events

Example for you…	**Your turn to try…**
1. 25% of the students in 2nd hour earned a A on the midterm exam, and 33% earned a B. What is the probability that a student chosen at random from the class earned an A or B on the midterm? P(A or B) = P(A) + P(B) = .25 + .33 = .58 = 58%	1. You have 30 shirts currently hanging in your closet. More specifically there are 6 green and 3 blue shirts. If you were to select a shirt with your eyes closed, what is the probability that you will select a green OR a blue shirt? P(green or blue) = P(green) + P(blue) $\frac{6}{30} + \frac{3}{30}$ $\frac{9}{30} = .30 = 30\%$

Probability of A or B! (not mutually exclusive) AKA → OVERLAPPING EVENTS!

If A and B are NOT mutually exclusive events,

then P(A or B) = P(A) + P(B) – P (A and B).

Finding the Probability of Dependent Events

Example for US…

1. Find the probability of your chances of drawing a 10 or a diamond when asked to select one card from the deck.

$$P(10 \text{ OR } \diamondsuit) = P(10) + P(\diamondsuit) - P(10 \text{ of } \diamondsuit)$$

$$\frac{4}{52} + \frac{13}{52} - \frac{1}{52}$$

$$\frac{17}{52} - \frac{1}{52} = \frac{16}{52} = .307 = 31\%$$