0-11a & b Notes -- Simple Probability & Odds

Name _____

Unit 12

Sample Space - the list of all possible outcomes
Probability - the ratio (fraction) of the # of outcomes wanted to the total # of outcomes

$$P(\text{event}) = \frac{\#\text{ wanted}}{\text{total }\#}$$

ex1 Rolling a die
A) P(2) B) P(even #) C) P(3 or 4) D) P(even or odd)

ex2 Bag of marbles: 10-green, 5-red, 7-blue, 6-yellow
A) P(blue) B) P(red or green) C) P(not green)

ex3 Jar of coins: 70-nickels, 100-dimes, 80-qtrs, 50-$1 coins
A) P(qtr) B) P(dime) C) P(qtr or nickel)

D) P(value greater than $0.10) E) P(value less than $1)

Tree diagram - used to draw a picture of all possible outcomes

ex4 Make a tree diagram to find the # of outcomes.
Ice cream: sugar cone or waffle cone
vanilla, chocolate, rocky road
nuts or gummy bears

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(ex 5) Draw a tree diagram to find the # of outcomes when you toss 3 coins.

(ex 6) P(2-H & 1-T) (ex 7) P(THT) (ex 8) P(at least 2-T)

Fundamental Counting Principle - a short-cut to finding the # of outcomes. Multiply the choices together.

(ex 4) Ice cream: sugar cone or waffle cone
vanilla, chocolate, rocky road
nuts or gummy bears

(ex9) Tossing 3 coins

(ex10) John needs a 6-digit password for his phone. He can choose from digits 0-9. How many possible passwords are there?

(ex11) Ashley needs a 6-digit password for her phone. She can choose from digits 0-9. She decides to use each # only one time. How many possible passwords are there?

Odds - the ratio that compares the # of successes (wanted) to the # of failures (left-over)
* written with a colon

$$\text{Odds (event)} = \frac{\text{successes}}{\text{failures}}$$

(ex 12) Rolling a dice
A) odds (2) B) odds (3 or 4)

(ex 13) Bag of marbles: 10-green, 5-red, 7-blue, 6-yellow

A) odds (blue)

B) odds (red or green)

C) odds (not green)

D) odds (not green or yellow)

(ex 14) Jar of coins: 70-nickels, 100-dimes, 80-qtrs, 50-$1 coins

A) odds (qtr)

B) odds (dime)

C) odds (not a nickel)

(ex 15) If the odds that Denise wins the race are 1:8, what is the probability that she will win the race?

(ex 16) The probability that it will snow in Auburn is $\frac{2}{15}$. What are the odds against snow in Auburn?

12.7a Notes -- Probability of Independent Events

Thursday, May 18, 2017 7:32 AM

Compound Event - is made up of 2 or more simple events.

Independent Events - the outcomes of one event does not affect the outcome of the other event.

(ex) rolling a die, then flipping a coin.

$$P(\text{event A and event B}) = P(A) \times P(B)$$

(ex1) Bag of marbles: 6-black, 9-blue, 4-yellow, 2-green
A marble is selected & replaced, then a 2nd marble is selected.

A) P(black, then yellow)

B) P(blue, then green)

C) P(not black, then blue)

D) P(black, then black)

Standard deck of playing cards: 52 cards

need to know:
- 4 suits: ♡, ◇, ♧, ♤
- 13 cards in each suit: A, 2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K
  * Ace = A = 1
- Hearts & Diamonds (Red) / Clubs & Spades (Black)

(ex 2) Use a standard deck of playing cards. A card is selected & replaced, then a 2nd card is selected.

A) P(red, then 5)

B) P(4, then black J)

C) P(7 or 8, then black even)

D) P(4, 7, A)

12-7b Notes -- Probability of Dependent Events

Friday, May 19, 2017 7:57 AM

Dependent Events - the outcome of one event affects the outcome of another event.

(ex) Drawing a card & laying it on the table, then drawing a 2nd card.

(ex 1) Bag of marbles: 6-black, 9-blue, 4-yellow, 2-green
A marble is selected, not replaced, then a 2nd marble is selected. Find each probability.

A) P(black, then yellow)

B) P(blue, then green)

C) P(not black, then blue)

D) P(black, then black)

ex 2) Standard deck of playing cards. A card is chosen, not replaced, then the next card is chosen.

A) P(red, then 5)

B) P(4, then black J)

C) P(7 or 9, then red even)

D) P(4, 7, A)

12-7c Notes -- Prob. of Not Mutually Exclusive Events

Friday, May 19, 2017 8:10 AM

Mutually Exclusive - events that cannot occur at the same time.

ex decks of cards → you cannot draw a card that is a heart & a diamond

(we have been finding these probabilities)

Not Mutually Exclusive - events that occur at the same time.

ex deck of cards → drawing a red B (* overlap)

$$P(A \text{ or } B) = P(A) + P(B) - P(A \& B)$$

ex1 deck of playing cards

A) P(red or 3)

B) P(black or even #)

C) P(black even or multiple of 3)

(ex 2) Bag of marbles: 6-red, 9-green, 4-white, 2-purple
* do not replace

A) P(red, then not white)

B) P(not green, then purple)

C) P(not red, then not green)

12.5 Notes

Tuesday, May 23, 2017 8:30 AM

Unit 12

Theoretical Probability – the ratio of favorable outcomes (wanted) to the total outcomes, written as a percent.

ex1 Coin
P(H)

ex2 die
P(3)

ex3 deck of cards
P(4)

ex4 deck of cards (no replacement)
P(6, then Q)

ex5 Julie examines jeans at a company plant. She expects to find defects in 1 out of every 20.

A) P(defect)

B) Theoretical prob. of defeat

C) How many defects are expected in a batch of 3200 jeans?

ex6 After receiving complaints, a skateboard manufacturer inspected 1000 skateboards at random. No defects were found in 992 skateboards.

A) Find the theoretical prob. of a skateboard not having a defeat.

B) The manufacturer has 8976 skateboards in its warehouse. How many skateboards are likely to be defective?

(ex 7) Quality control inspected 500 belts at random. They found 15 to be defective.

A) Find the theoretical prob. that a belt passes inspection.

B) In a production run of 6258 belts, how many should pass inspection.