ALGEBRA II **REVIEW Chapter 10** Name Key

USE YOUR 10.1-10.3 QUIZ FOR REVIEW AS WELL!!

Hour _____

FROM SECTION 10.1

MAJOR POINTS:

- Tree Diagrams
- Fundamental Counting Principle
- Permutations
- Factorial
- Permutations with Repetition

Each event can occur in the given number of ways. Find the number of ways all of the events can occur.

Event 1: 6 ways Event 2: 7 ways Event 3: 4 ways $6 \cdot 7 \cdot 4 = 168$

For the given configuration, determine how many different computer passwords are possible if (a) digits and letters can be repeated, and (b) digits and letters cannot be repeated.

3 digits followed by 4 letters

(a) $10 \cdot 10 \cdot 10 \cdot 26 \cdot 26 \cdot 26 \cdot 26$ = 456,976,000

(b) $10 \cdot 9 \cdot 8 \cdot 26 \cdot 25 \cdot 24 \cdot 23$ = 258,336,000

If the last letter of the password has to be a Y or Z, and no repeats are allowed, how many passwords are available?

digits * letters

$10 \cdot 9 \cdot 8 \cdot 2 \cdot 25 \cdot 24 \cdot 23$

2 ← Y or Z

25 ← because we have already used Y or Z

* since it's multiply we can write it in any order

= 19,872,000

Evaluate.

14! = 87,178,291,200

${}_9P_6$ = 60,480

Find the number of distinguishable permutations of the letters in the word.

MISSISSIPPI $\frac{11!}{4!4!2!} = 34,650$

A baseball manager is determining the batting order for the team. The team has 9 members, but the manager definitely wants the pitcher to bat last. How many batting orders are possible?

$8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 \cdot 1 = 40,320$

start 8 ← can't use pitcher

1 ← pitcher

A men's department store sells 3 different suit jackets, 6 different shirts, 8 different ties, and 4 different pairs of pants. How many different suits consisting of a jacket, shirt, tie, and pants are possible?

$3 \cdot 6 \cdot 8 \cdot 4$

$({}_3C_1 \cdot {}_6C_1 \cdot {}_8C_1 \cdot {}_4C_1)$

576 suits

FROM SECTION 10.2

MAJOR POINTS:

- Combinations
- Deciding to multiply or add combinations
  When finding the number of ways both an event A and an event B occur you need to multiply
  When finding the number of ways both an event A or an event B occur you need to add

Find the number of combinations. do you know how to do this on the calculator?

${}_6C_4 = 15$

Find the number of possible 5 - card hands that contain the cards specified. The cards are taken from a standard 52 - card deck.

5 red cards

${}_{26}C_5 = 65780$

4 spades and 1 card that is not a spade

${}_{13}C_4 \cdot {}_{39}C_1 = 27{,}885$

3 face cards (K, Q, or J) and 2 cards that are not face cards

${}_{12}C_3 \cdot {}_{40}C_2 = 171{,}600$

At least one king

${}_4C_1 \cdot {}_{48}C_4 + {}_4C_2 \cdot {}_{48}C_3 + {}_4C_3 \cdot {}_{48}C_2 + {}_4C_4 \cdot {}_{48}C_1 = 886{,}656$

Expand $(x - 5y)^5$

1	5	10	10	5	1
x^5	x^4	x^3	x^2	x^1	
	$(5y)^1$	$(5y)^2$	$(5y)^3$	$(5y)^4$	$(5y)^5$

$x^5 - 25x^4y + 250x^3y^2 - 1250x^2y^3 + 3125xy^4 - 3125y^5$

Find the coefficient of x^6 in the expansion of $(2x + 3)^{10}$

1	10	45	120	210
$(2x)^{10}$	$(2x)^9$	$(2x)^8$	$(2x)^7$	$(2x)^6$
				3^4

1088640

A teacher is holding tryouts for the school play. There are 15 students trying out for 7 parts in the play. Each student can play each part. In how many ways can the teacher select the students?

$_{15}C_7$ **6435**

FROM SECTION 10.3

MAJOR POINTS:

- Finding Probability of Events/ Theoretical Probability
- Experimental Probability
- Odds against
- Odds in favor
- Geometric Probability

with replacement - fraction answers

Drawing a 6 from a deck of cards? $\frac{1}{13}$

Drawing all 4 queens from a deck of cards? $\frac{4}{52}\cdot\frac{4}{52}\cdot\frac{4}{52}\cdot\frac{4}{52}$ $(\frac{1}{13})^4$ $\frac{256}{7311616} = \frac{1}{28561}$

Drawing a factor of 10 (any suit) factors: 1, 2, 5, 10 so $4\times 4 = 16$ $\frac{16}{52} = \frac{4}{13}$

Drawing a black card from a deck of cards? $\frac{1}{2}$

Rolling an odd number on a die? $\frac{1}{2}$

Drawing a 3 from a deck of cards? $\frac{1}{13}$

Drawing a club from a deck of cards? $\frac{1}{4}$

Drawing a red factor of 9 factors 1, 3, 9 $3\times 2 = 6$ $\frac{6}{52} = \frac{3}{26}$

Drawing a heart from a deck of cards? $\frac{1}{4}$

Drawing a 7 from a deck of cards? $\frac{1}{13}$

Rolling an even number on a die? $\frac{1}{2}$

Drawing 3 cards that are all 9 from a deck of cards? $\frac{4}{52}\cdot\frac{4}{52}\cdot\frac{4}{52}$ $\frac{64}{140608} = \frac{1}{2197}$

Drawing a red card from a deck of cards? $\frac{1}{2}$

Rolling a 6 on a die? $\frac{1}{6}$

Drawing a 5 from a deck of cards? $\frac{1}{13}$

In favor of rolling a 6? $\frac{1}{5}$

Against rolling a 1, 3, or 5? $\frac{3}{3} = \frac{1}{1}$

In favor of picking all the 4's from a deck of cards? $\frac{1}{12}$

Against picking all the Jacks? $\frac{12}{1}$

Revisit geometric probability!! Check your notes or HW

ALSO:
If you toss a coin 100 times to determine the probability of getting tails are you using experimental or theoretical probability? Why?

? experimental – conducting an experiment to determine prob.

If you answer a test question about the chance of drawing a heart out of a deck of cards as 1/13 are you using experimental or theoretical probability? Why?

? theoretical – using prior knowledge not conducting an experiment

FROM SECTION 10.4

MAJOR POINTS: You need to know: P(A or B) = P(A) + P(B) – P(A and B)

- Probability of Disjoint Events
- Probability of Overlapping Events
- Applying Formula of P(A or B)
- Finding probability of complements and applying formula

Events A and B are disjoint. Find P(A or B).

P(A) = 0.1 P(B) = 0.45 P(A or B) = .55

Find the indicated probability.

P(A) = 0.23 P(B) = 0.36 P(A or B) = 0.25 P(A and B) = .34

$.25 = .23 + .36 - x$

P(A) = 0.25 $P(\overline{A})$ = .75

$1 - .25$

P(A) = $\frac{2}{13}$ P(B) = $\frac{10}{13}$ P(A or B) = $\frac{8}{13}$ P(A and B) = $\frac{4}{13}$

$\frac{8}{13} = \frac{2}{13} + x - \frac{4}{13}$

Two six - sided dice are rolled. Find the probability of the given event (use pg. 709).

The sum is greater than 4

can't have
1-1
1-2
2-1
1-3
3-1
2-2

$1 - \left(\frac{6}{36}\right) = \frac{30}{36} = \frac{5}{6}$

or $\frac{36}{36} - \frac{6}{36} = \frac{30}{36} = \frac{5}{6}$

The sum is 6 or 11 ← add

$\frac{5}{36} + \frac{2}{36} = \frac{7}{36}$

The sum is neither 5 nor 9

$\frac{36}{36} - \left(\frac{4}{36} + \frac{4}{36}\right)$

$\frac{28}{36} = \frac{7}{9}$

The sum is greater than 7 and less than 11

$\frac{12}{36} = \frac{1}{3}$

FROM SECTION 10.5

MAJOR POINTS:

- Independent Events and applying formula
- Dependent Events and applying formula

Events A and B are independent. Find the indicated probability.

P(A) = $\frac{5}{8}$ $\frac{5}{8} \cdot \frac{4}{5} = \frac{20}{40}$

P(B) = $\frac{4}{5}$

P(A and B) = $\frac{1}{2}$

P(A) = 1

P(B) = 0.3

P(A and B) = 0.3

Events A and B are dependent. Find the indicated probability.

P(A) = 0.4
P(B|A) = 0.4
P(A and B) = .16

.4 · .4

P(A) = 0.3
P(B|A) = ? .9
P(A and B) = 0.27

.27 ÷ .3

The students at DHS were asked to name their favorite lunch entrée. The results are shown in the table below:

	Freshman	Sophomore	Juniors	Seniors	TOTAL
Pizza	105	105	110	130	450
Hamburger	75	65	65	80	285
Burritos	100	125	115	85	425
TOTAL	280	295	290	295	1160

Find the following probabilities as fractions

P (senior | student who prefers hamburgers) $\frac{80}{285}$ $\boxed{\frac{16}{57}}$

P (student who prefers burritos | junior) $\frac{15}{290} = \boxed{\frac{23}{58}}$

P (senior | junior) $\emptyset$

What is the school's favorite entrée? pizza ☺

TWO cards are drawn from a well – shuffled deck of playing cards
Find the probability of:

a) Two aces if the first card is replaced $\frac{4}{52} \cdot \frac{4}{52} = \frac{16}{2704} = \boxed{\frac{1}{169}}$

b) Two aces if the first card is not replaced $\frac{4}{52} \cdot \frac{3}{51} = \boxed{\frac{1}{221}}$

c) Which pair of events is independent? A

FROM SECTION 10.6

MAJOR POINTS:

- Constructing and interpreting a probability distribution
- Constructing and interpreting Binomial distributions
- Classifying distribution - symmetric or skewed

Calculate the probability of tossing a coin 25 times and getting the given number of heads.

18 $(.5)^{18}(.5)^{7}\ {}_{25}C_{18} = \boxed{.0143}$

Calculate the probability of k successes for a binomial experiment consisting of n trials with probability p of successes on each trial.

$k \geq 3$, $n = 5$, $p = 0.34$

$(.34)^3(.66)^2 \cdot {}_5C_3 = .1712$

$(.34)^4(.66)^1 \; {}_5C_4 = .0441$

$(.34)^5(.66)^0 \; {}_5C_5 = .0045$

$\approx .2198$

A survey states that <u>35%</u> of people in the US visited an art museum in a certain year. You randomly select 10 U.S. citizens. What is the probability that at most 4 people visited an art museum?

$(.35)^4(.65)^6 \; {}_{10}C_4 = .2377$

$(.35)^3(.65)^7 \; {}_{10}C_3 = .2522$

$(.35)^2(.65)^8 \; {}_{10}C_2 = .1757$

$(.35)^1(.65)^9 \; {}_{10}C_1 = .0725$

$(.35)^0(.65)^{10} \; {}_{10}C_0 = .0135$

$.7516$

You should be well prepared!!!

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