

Day 15 - Counting

- Multiply all options for each spot

Example: in a drawer are 3 shirts, 4 pants, and 2 hats. How many combinations are possible?

Probability

- Success over Total
- Answer can be fraction, decimal, or %

Example: in a bag are 3 red, 5 blue, and 4 white balls. What is the probability that:

A red is selected:

P(red or white):

P(Not White):

OGT Preparation #15
DA03 – Counting & DA06 – Probability

Name _____

1. Alfredo has forgotten the three-digit code to the lock on his suitcase. Alfredo remembered that the first digit is 3 and the last digit is either 2 or 4. The middle digit could be any number from 0 through 9 inclusive. What is the greatest number of three-digit codes Alfredo might have to try in order to be sure to open his suitcase?

- A. 10 B. 12 C. 20 D. 60

2. Rene is selecting a menu for a party. He plans to select a meal that includes one main dish, one vegetable and one dessert from the following list of choices.

Party Menu

Main Dish	Vegetables	Desserts
stuffed chicken breast	Italian green beans	peach cobbler
grilled salmon	corn on the cob	German chocolate cake
beef tips	glazed carrots	banana pudding
	baked potato	ice cream with cookies
		strawberry shortcake

How many different meals can Rene select?

- A. 12 B. 32 C. 35 D. 60

3. Mara packed a blue denim shirt , a red striped shirt , a red plaid shirt, and a black tank top to take on vacation. She also packed one pair of denim shorts, one pair of white shorts and one pair of beige shorts. Mara took two different pairs of shoes with her. How many different combinations of outfits with one shirt, one pair of shoes and one pair of shorts could Mara use on her vacation?

- A. 12 B. 24 C. 84 D. 504

4. Marty bought 4 new books today. He plans to read 2 of these while on vacation. How many combinations of 2 books from the group of 4 books could he choose to read?

- A. 2 B. 4 C. 6 D. 12

5. A large corporation uses a telephone chain to notify employees of company closings due to bad weather. The plant manager calls 5 people in the first round of the telephone chain. Each of those people calls 5 other people in the second round of the telephone chain. If the pattern continues, how many employees are called in the 4th round of the telephone chain?

- A. 125 B. 126 C. 625 D. 626

6. Casey has one afternoon to run errands involving buying a sweater, mailing a package and buying groceries. There are 3 clothing stores, 2 post offices and 4 grocery stores within a 10-mile radius. How many combinations of 1 clothing store, 1 post office and 1 grocery store are available within a 10-mile radius?

A. 3

B. 9

C. 19

D. 24

7. One style of jacket comes in three sizes: small, medium or large. These jackets have either buttons or a zipper. The jackets are available in five different colors. How many different combinations of this jacket are available?

A. 10

B. 15

C. 25

D. 30

PART 2

8. Carlos and Tiesha empty a bag of 100 colored candies and count the number of each color, as shown in the following chart.

Number of Candies of Each Color

Color	Number
Red	10
Brown	30
Orange	20
Yellow	15
Green	10
Blue	15

They return all the candies to the bag and shake the bag. Carlos removes 5 candies, 2 of which are blue. Tiesha then pulls out one candy. What is the probability that Tiesha pulls out a blue candy?

A. 6.67%

B. 13.68%

C. 15.00%

D. 15.79%

9. [SA] To demonstrate probabilities, a mathematics teacher had students draw marbles from a bag which contained 6 yellow marbles and 14 blue marbles. During class, the bag was dropped, and 2 yellow marbles and 2 blue marbles were lost.

In your Answer Document, tell whether the loss of marbles changes the probability of drawing a blue marble from the bag. If so, was the probability increased or decreased? Support your answer by calculating the probability for each situation.

10. The table below shows the number of fish caught each day last week.

Number of Fish Caught Each Day

Day	Number of Fish Caught
Monday	4
Tuesday	0
Wednesday	3
Thursday	2
Friday	0
Saturday	0
Sunday	5

If one day of that week is chosen at random, what is the probability that a minimum of one fish was caught that day?

A. $\frac{3}{7}$

B. $\frac{1}{2}$

C. $\frac{4}{7}$

D. $\frac{2}{1}$

12. Jack has a box with 10 unlabeled computer CD-ROMs. He knows that 2 are music CDs, 3 are game CDs, and 5 are picture CDs. Jack randomly selects a CD from the box. Which value represents the probability that the selected CD is a music or picture CD?

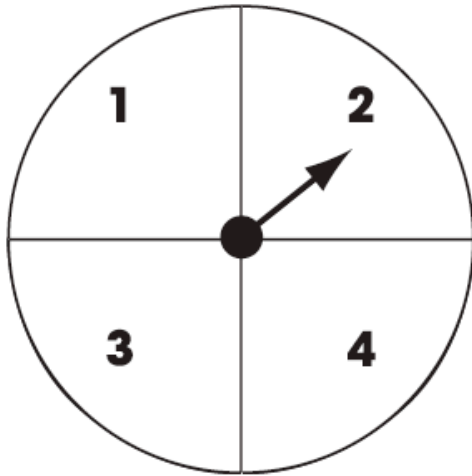
A. $\frac{1}{10}$

B. $\frac{3}{10}$

C. $\frac{7}{10}$

D. $\frac{4}{5}$

11. Teresa is playing a new board game. She must spin the spinner twice and get the same number both times in order to place her piece on the board. The diagram below shows the result of her first spin. Each number on the spinner has an equal chance of occurring.



What is the probability that Teresa's next spin will allow her to move her piece onto the board?

- A. $\frac{1}{16}$
- B. $\frac{1}{4}$
- C. $\frac{1}{2}$
- D. $\frac{3}{4}$
13. Rob has 3 red, 4 white, 2 blue, and 5 green T-shirts in his drawer. He picks a red shirt on Monday without looking. He notices a stain and puts the shirt in the wash. Without looking, Rob then picks another shirt from his drawer.

What is the probability he will pick a red shirt on his second try?

- A. $\frac{2}{13}$
- B. $\frac{2}{14}$
- C. $\frac{3}{14} \cdot \frac{2}{14}$
- D. $\frac{3}{14} \cdot \frac{3}{14}$

14. [SA] The following numbers are written on individual pieces of paper and placed in a bag. Four numbers are randomly drawn from the bag and are placed in the order in which they were drawn to form a four-digit number.



In your **Answer Document**, determine the probability that a number created in this way has a value greater than 6,000. Show your work or provide an explanation to support your answer.

15. [ER] Anne, Brett, Carl, and Danielle each rolled an identical small wooden cube. Each face of the cube is painted red, yellow or blue. The color of the top face is recorded each time the cube is rolled. The table below shows the results for three of the students after each had rolled the cube varying numbers of times.

Name	Number of rolls	Number of times red face up	Number of times yellow face up	Number of times blue face up
Anne	10	3	4	3
Brett	30	4	14	12
Carl	60	12	27	21

In your Answer Document, predict the number of the faces on the cube that are red, the number that are yellow, and the number that are blue. Show your work or provide an explanation for how you predicted the number of faces that are each color.

Danielle will roll the cube 75 times. Predict the number of times the cube will land with red as the top face, yellow as the top face, and blue as the top face. Show your work or provide an explanation for your predictions.

16. Luca randomly chose a marble from a bag, recorded the color and replaced the marble before choosing again. The table shows the number of times each color of marbles was chosen.

Color of Marble	Number of Times Chosen
Red	42
Green	17
Blue	27
Yellow	14

According to the data in the table, what is the experimental probability of picking a green marble?

A. 17/100

B. 1/4

C. 17/83

D. 17/25

17. Each week, Ms. Haroma has each of the 25 students in her class write his or her own name on a piece of paper. All the pieces of paper are put in a jar and 1 student's name is drawn from the jar. If Jamie's name was drawn last week, what is the probability that it will be drawn again this week?

A. $\frac{1}{2}$

B. $\frac{1}{25}$

C. $\frac{1}{50}$

D. $\frac{1}{625}$

18. Mirachelle picked a colored cube from a bag of cubes, recorded the color and returned the cube to the bag. She did this 10 times. The table below shows the color of each cube as it was selected.

Color of Cube

Pick	Color
1	yellow
2	brown
3	green
4	yellow
5	orange
6	yellow
7	green
8	brown
9	yellow
10	green

Using the information from the table, how many times would a yellow cube be expected in 30 picks?

A. 4

B. 10

C. 12

D. 30

19. Drake's school awarded 450 raffle tickets as incentives. The principal will draw one winning ticket. The winner will receive a CD player. Drake received 3 tickets for good attendance, 5 for making the honor roll, and 2 for tutoring other students.

What is the probability that one of Drake's tickets will be selected by the principal?

A. $\frac{1}{15}$

B. $\frac{1}{45}$

C. $\frac{1}{441}$

D. $\frac{1}{450}$

20. Joel plays tic-tac-toe on his computer. The computer plays first and randomly places an "X" in one of the grid squares as labeled in the diagram.

A	B	C
D	E	F
G	H	I

The frequency table shows the computer's first move for 50 games.

Computer's First Move (50 Games)

Location on Grid	A	B	C	D	E	F	G	H	I
Number of Games	5	3	8	2	8	3	6	8	7

Based on these results, what is the experimental probability that the computer will place an "X" in a corner square on the first move of its next game?

- A. $\frac{4}{9}$
- B. $\frac{19}{59}$
- C. $\frac{9}{25}$
- D. $\frac{13}{25}$

1. Alfredo has forgotten the three-digit code to the lock on his suitcase. Alfredo remembered that the first digit is 3 and the last digit is either 2 or 4. The middle digit could be any number from 0 through 9 inclusive. What is the greatest number of three-digit codes Alfredo might have to try in order to be sure to open his suitcase?

- A. 10 B. 12 **C. 20** D. 60 1 10 2 = 20

2. Rene is selecting a menu for a party. He plans to select a meal that includes one main dish, one vegetable and one dessert from the following list of choices.

Party Menu

Main Dish	Vegetables	Desserts
stuffed chicken breast	Italian green beans	peach cobbler
grilled salmon	corn on the cob	German chocolate cake
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	baked potato	ice cream with cookies
		strawberry shortcake

How many different meals can Rene select? $3 \times 4 \times 5 =$

- A. 12 B. 32 C. 35 **D. 60**

3. Mara packed a blue denim shirt, a red striped shirt, a red plaid shirt, and a black tank top to take on vacation. She also packed one pair of denim shorts, one pair of white shorts and one pair of beige shorts. Mara took two different pairs of shoes with her. How many different combinations of outfits with one shirt, one pair of shoes and one pair of shorts could Mara use on her vacation?

- A. 12 **B. 24** C. 84 D. 504 $4 \cdot 3 \cdot 2 = 24$

4. Marty bought 4 new books today. He plans to read 2 of these while on vacation. How many combinations of 2 books from the group of 4 books could he choose to read?

- A. 2 B. 4 **C. 6** D. 12 $\begin{matrix} AB & BC \\ AC & BD \\ AD & CD \end{matrix}$

5. A large corporation uses a telephone chain to notify employees of company closings due to bad weather. The plant manager calls 5 people in the first round of the telephone chain. Each of those people calls 5 other people in the second round of the telephone chain. If the pattern continues, how many employees are called in the 4th round of the telephone chain?

- A. 125 B. 126 **C. 625** D. 626

Round	People	Total
0	1	1
1	5	6
2	25	31
3	125	256
4	625	

6. Casey has one afternoon to run errands involving buying a sweater, mailing a package and buying groceries. There are 3 clothing stores, 2 post offices and 4 grocery stores within a 10-mile radius. How many combinations of 1 clothing store, 1 post office and 1 grocery store are available within a 10-mile radius?

A B C a b 1 2 3 4

- A. 3 B. 9 C. 19 D. 24

~~3-2-4~~
3-2-4

A a 1 A b 1
A a 2 A b 2 x 3
A a 3 A b 3
A a 4 A b 4

7. One style of jacket comes in three sizes: small, medium or large. These jackets have either buttons or a zipper. The jackets are available in five different colors. How many different combinations of this jacket are available?

- A. 10 B. 15 C. 25 D. 30

3-2-5

PART 2

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Number of Candies of Each Color

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Green	10
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13/95

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- A. 6.67% B. 13.68% C. 15.00% D. 15.79%

9. [SA] To demonstrate probabilities, a mathematics teacher had students draw marbles from a bag which contained 6 yellow marbles and 14 blue marbles. During class, the bag was dropped, and 2 yellow marbles and 2 blue marbles were lost.

In your Answer Document, tell whether the loss of marbles changes the probability of drawing a blue marble from the bag. If so, was the probability increased or decreased? Support your answer by calculating the probability for each situation.

	Before	After
Blue	$14/20 = .7$	$12/18 = .67$ - went up 5%
Yellow	$6/20 = .3$	$4/16 = .25$

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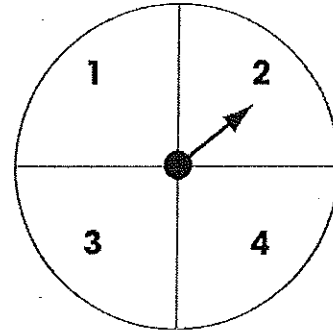
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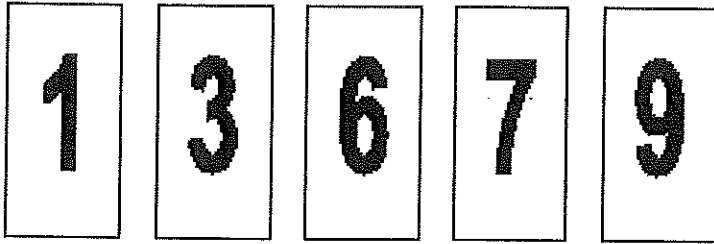
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B. $\frac{2}{14}$

C. $\frac{3 \cdot 2}{14 \cdot 14}$

D. $\frac{3 \cdot 3}{14 \cdot 14}$

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1 Red 3 Yellow 2 Blue

Danielle will roll the cube 75 times. Predict the number of times the cube will land with red as the top face, yellow as the top face, and blue as the top face. Show your work or provide an explanation for your predictions.

R $75 (\frac{1}{6}) = 12.5$
 Y $75 (\frac{3}{6}) = 37.5$
 B $75 (\frac{2}{6}) = 25$

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C. $\frac{1}{50}$

D. $\frac{1}{625}$

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3	green 1
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5	orange 1
6	yellow 3
7	green 2
8	brown 2
9	yellow 4
10	green 3

Yel 4 Br 2 Gr 3 Or 1

Using the information from the table, how many times would a yellow cube be expected in 30 picks?

A. 4

B. 10

C. 12

D. 30

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C. $\frac{1}{441}$

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$\frac{10}{450}$

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C. $\frac{9}{25}$

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$\frac{26}{50}$