

Algebra 2 Trig Honors
Probability Test Review

Name: _____

1. You buy a bag of gummy candy. There are 15 peach rings (PR), 12 gummy bears (GB), and 22 gummy worms (GW). Find the following probabilities. *total 49*

a. $P(\text{GB}) = \frac{12}{49}$

b. $P(\text{PR}) = \frac{15}{49}$

c. $P(\text{GW}) = \frac{22}{49}$

- d. $P(\text{GB, then PR})$ with replacement

$$\frac{12}{49} \cdot \frac{15}{49} = 0.075$$

- e. $P(\text{GW and PR})$ without replacement

$$\frac{22}{49} \cdot \frac{15}{48} + \frac{15}{49} \cdot \frac{22}{48} = 0.281$$

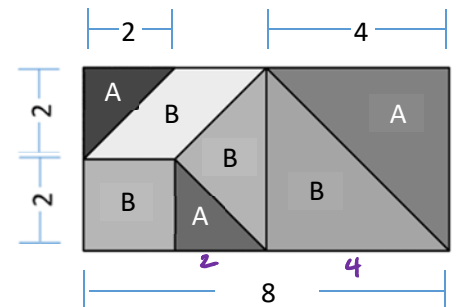
- f. $P(\text{GW then GB then PR})$ without replacement

$$\frac{22}{49} \cdot \frac{12}{48} \cdot \frac{15}{47} = 0.036$$

2. You are randomly shooting a paintball at the figure to the right. Assuming you hit the figure (and do not miss completely)...

- a. What is the probability the paintball will hit an area labeled "A"?

$$\frac{\frac{1}{2} \cdot 4 \cdot 4 + 2 \cdot \frac{1}{2} \cdot 2 \cdot 2}{32} = \frac{3}{8}$$



- b. What is the probability of hitting an area labeled "B"?

only 2 labels!

$$1 - \frac{3}{8} = \frac{5}{8}$$

3. You look in your fridge and find you have 3 boxes of leftovers to eat today, labeled B1, B2, and B3. You don't remember what is in each box, so you randomly choose one for breakfast, lunch, and dinner today.

- a. Define the sample space:

B_1, B_2, B_3 B_1, B_3, B_2 B_2, B_1, B_3 B_2, B_3, B_1
 B_3, B_1, B_2 B_3, B_2, B_1

- b. True or false: $P(B_1, B_2, B_3) = P(B_3, B_2, B_1)$ *True*

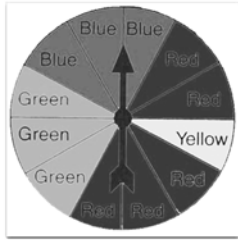
- c. What is the probability of choosing B2 for breakfast?

$$\frac{1}{3}$$

- d. What is the probability of choosing B3 before B1 for your meals today?

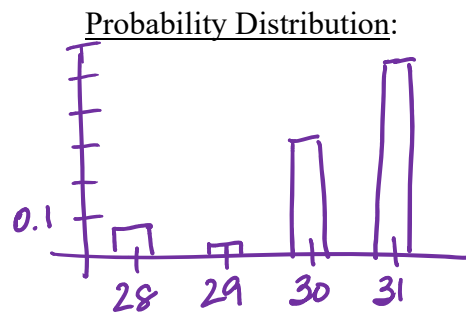
$$\frac{1}{2}$$

4. Consider the spinner below. Create a probability distribution for the outcomes {Red, Yellow, Blue, Green}.



5. Create a table and a probability distribution for the number of days {28, 29, 30, 31} in each of **48** consecutive months. Then answer the following questions.

# of days	Frequency	Probability
28	3	$\frac{3}{48} = 0.063$
29	1	$\frac{1}{48} = 0.021$
30	16	$\frac{16}{48} = 0.33$
31	28	$\frac{28}{48} = 0.58$



- a. P(less than 30 days)

$$\frac{4}{48} = \frac{1}{12}$$

- c. P(an odd number of days)

$$\frac{29}{48}$$

- e. P(not a prime number of days)

$$\frac{19}{48}$$

- b. P(28, 29, 30, or 31)

$$1$$

- d. P(not 29 days)

$$\frac{47}{48}$$

6. You are at a dog show and a total of 55 purebred dogs are competing. There are 23 Labradors, 11 Pugs, 3 Poodles, and 4 German Shepherds.

- a. Find the probability that a dog picked from the competition at random is either a Pug or a Poodle.

$$\frac{14}{55}$$

- b. Suppose 33 of the dogs are males, and 14 of them are male Labradors. Find the probability that a random dog picked from the show is either a male or a Labrador.

$$P(\text{male}) + P(\text{Labrador}) - P(\text{male Labrador}) = \frac{33}{55} + \frac{23}{55} - \frac{14}{55} = \frac{42}{55}$$

- c. Find the probability that the dog picked is neither a Pug nor a German Shepherd.

14 unknown

$$\frac{23}{55} + \frac{3}{55} + \frac{14}{55} = \frac{40}{55} = \frac{8}{11}$$

7. Bobby Brains is a natural genius. He considers his probability of getting accepted at College A is 0.98, at College B is 0.71, and at College C is 0.26. What is his probability of getting accepted at...

a. All 3 colleges?

$$0.98 \cdot 0.71 \cdot 0.26 = 0.181$$

b. Not College A?

$$0.02$$

c. Not College B?

$$0.29$$

d. None of the colleges?

$$0.02 \cdot 0.29 \cdot 0.74 = 0.004$$

e. At least one college?

$$1 - 0.004 = 0.996$$

f. Exactly one?

$$0.98 \cdot 0.29 \cdot 0.74 + 0.02 \cdot 0.71 \cdot 0.74 + 0.02 \cdot 0.29 \cdot 0.26 = 0.222$$

g. Exactly two?

$$0.98 \cdot 0.71 \cdot 0.74 + 0.98 \cdot 0.29 \cdot 0.26 + 0.02 \cdot 0.71 \cdot 0.26 = 0.592$$

h. Colleges A and C, but not B?

$$0.98 \cdot 0.29 \cdot 0.26 = 0.074$$

8. A disease or disorder is defined as rare in the US when it affects fewer than 200,000 Americans at any given time. There is a disease that approximately 0.03% of the US population has at any given time.

a. Given the population of the US is currently about 319 million, is this considered a "rare" disease?

95,700 people have this. That's still A LOT!

b. What is the probability that any random person in the US will not have this disease?

$$0.9997$$

c. If 350 people are chosen at random, what is the probability that

i. None will have the disease?

$$(0.9997)^{350} = 0.900$$

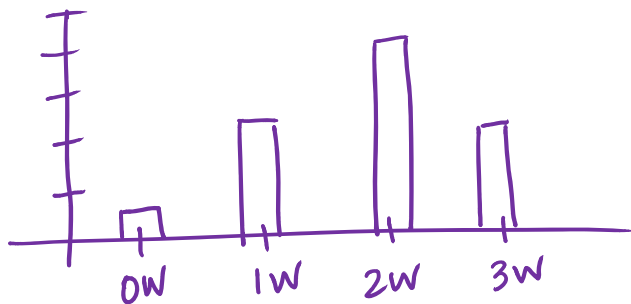
ii. At least one will have the disease?

$$1 - 0.900 = 0.0997$$

9. The Chicago Cubs and the St. Louis Cardinals are playing a series of 3 baseball games. The probability of the Cubs winning any single game against the Cardinals is 0.62. Assuming each game is independent of the next, complete the table below, graph the probability distribution, and answer the following questions.

# of Cubs wins	Outcomes	Mathematical calculations of probability
0 wins	SSS	$(0.38)^3 = 0.055$
1 wins	CSS SCS SSC	$3(0.62)^1(0.38)^2 = 0.269$
2 wins	CCS CSC SCC	$3(0.62)^2(0.38)^1 = 0.438$
3 wins	CCC	$(0.62)^3 = 0.238$

- a. Graph the probability distribution:



- b. P(Cardinals win exactly 2 of 3 games)

$$0.269$$

- c. P(Cubs win the series (2 games))

$$P(2) + P(3) = 0.676$$

- d. P(Cardinals lose at least 1 game)

$$1 - (\text{Cardinals lose } 0) = 1 - 0.055 = 0.945$$

- e. P(Cubs get swept (lose all 3 games))

$$0.055$$

10. Use the table below to answer the following questions.

Movie type:	Class 1	Class 2
Rom Com	24	11
Horror	19	30
Action	7	52

50

93

35

49

59

143

- a. What is the probability that a person who prefers action movies is in Class 2? $52/93$

- b. What is the probability that someone in Class 1 prefers horror movies? $19/50$

- c. What is the probability that a person prefers Rom Coms? $35/143$

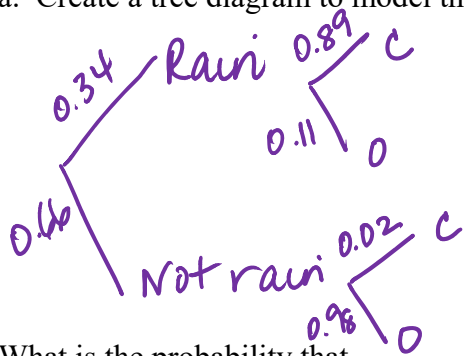
- d. What is the probability that a person prefers Rom Coms, given they are from class 1? $\frac{24}{50} = \frac{12}{25}$

11. The probability that a student arrives to class on time is eighty-five percent. The probability a student did not complete their homework and arrives late to class is nine percent, and the probability a student completes their homework is 88%. What is the probability that a student who is late to class did not do their homework?

$$P(\text{No HW} | \text{Late}) = \frac{P(\text{Late and No HW})}{P(\text{Late})} = \frac{0.09}{0.15} = 0.6$$

12. You are a member at the local community pool in Oakbrook, IL. The probability of rain during pool season in Oakbrook on any given day is 34%. If it is raining outside, the pool will be open 11% of the time. If it is not raining, the pool only closes approximately 2% of the time.

a. Create a tree diagram to model the situation described above.



What is the probability that...

b. It is raining and the pool is closed?

$$0.34 \cdot 0.11 = 0.374$$

c. The pool is closed, given it isn't raining?

$$0.02$$

d. The pool is closed?

$$0.34 \cdot 0.11 + 0.66 \cdot 0.02 = 0.394$$

e. The pool is open?

$$1 - P(\text{closed}) = 0.606$$

f. It is not raining, given the pool is open?

$$\frac{0.66 \cdot 0.98}{0.606} = 0.997$$

g. P(not open | raining)

$$0.11$$

h. P(not raining and open)

$$0.66 \cdot 0.98 = 0.647$$