June 04, 2018

2A-2D Summative Review:

2A: Relative Frequencey

2B: Theoretical and Experimental Probability

2C: Random Outcomes

2D: The Counting Principle, Permutations, and Combinations

1. Rewrite each decimal or fraction as a percent:

a) 0.42 → 42%

b) 0.004 → 0.4%

c) $\frac{65}{300} = .2166\overline{6}$ = 21.66% = 22%

d) $\frac{12}{30} = .40 = 40\%$

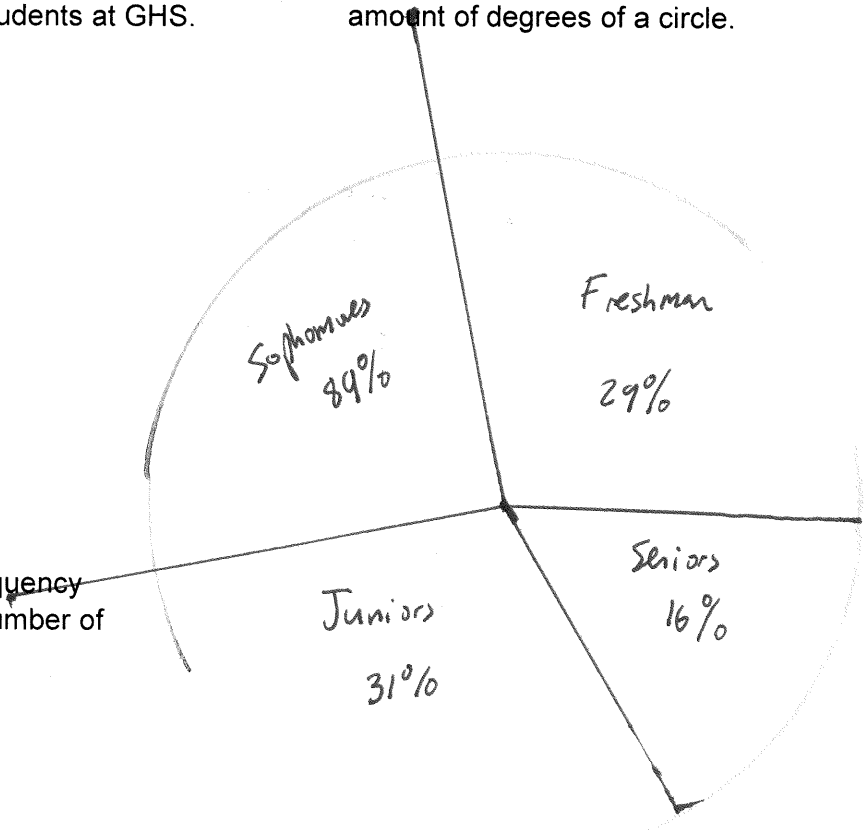
2. The chart below shows the number of students in each grade at GHS.

Freshman	Sophomores	Juniors	Seniors
150	130	160	85
29%	25%	31%	16%
103°	89°	110°	58°

Write each grade total as a percent of the total number of students at GHS.

Write each grade's percent as an amount of degrees of a circle.

Create a relative frequency circle graph of the number of students at GHS.



Follow-up questions to # 2:

What is the probability that if you walked past a random student in the hallway that it would be a senior?

16%

Based on your circle graph, if you were to make a new friend today, what grade would that person most-likely be in and why?

Juniors → 31%

3. Suppose you have a fair, six sided die. Find the reduced fraction and probability of the following happening:

a) P(3) $\frac{1}{6} = .16^{-} = 17\%$

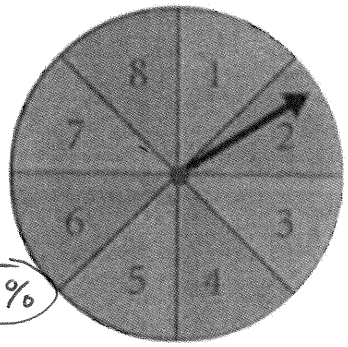
b) P[(2) or (5)] $\frac{2}{5} = .40 = 40\%$

c) P(not 4) $\frac{5}{6} = .83^{-} = 83\%$

d) P(odd) $\frac{3}{6} = .50 = \frac{1}{2}$

4.

Find the odds in favor of the spinner landing on the following:



a) What is the probability of spinning an even number:

$\frac{4}{8} = .50 = 50\%$

b) What is the probability of spinning a divisor of 12

1, 2, 3, 4, 6 $\frac{5}{8} = .625 = 62.5 = 63\%$

c) What is the probability of spinning a multiple of 3

3, 6 $\frac{2}{8} = \frac{1}{4} = 0.25 = 25\%$

d) What is the probability of spinning a divisor of 4

4, 2, 1 $\frac{3}{8} = .375 = 37.5 = 38\%$

e) What is the probability of spinning a prime number

1, 2, 3, 5, 7 $5/8 = .625 = 62.5 = 63\%$

f) What is the probability of spinning a factor of 10

0 1, 2, 5

$\frac{3}{8} = 37.5 = 38\%$

g) What is the probability of spinning a 9

$\frac{0}{8} = 0\%$

h) P(number greater than 3)

4, 5, 6, 7, 8

$\frac{5}{8} = .625 = 62.5 = 63\%$

5. Find the reduced fraction and probability of each.

A card is drawn from a shuffled deck of 52 cards:

a) P(green card) 0%

b) P(diamonds) $\frac{13}{52} = \frac{1}{4} = 25\%$

c) P(face card) 3 Face cards per suit
12 Face cards total
$\frac{12}{52} = \frac{3}{13} = .23 = 23\%$

d) P(ace)
4 aces
$\frac{4}{52} = \frac{1}{13} = .08 = 8\%$

e) P(not a club)
52 - 13 clubs = 39
$\frac{39}{52} = \frac{3}{4} = .75 = 75\%$

f) P(not a 10 of diamond) $\frac{51}{52} = 98\%$

g) P(club or spade)
13 + 13 = 26
$\frac{26}{52} = .50 = 50\%$

h) P(red or black card)
$\frac{52}{52} = 1 = 100\%$

i) P(5 of hearts) $\frac{1}{52} = .02 = 2\%$

j) P(numbered card or club)
- 2-10 = 9 cards
- 9 x 4 = 36 # cards
- 13 clubs, but need to take away the 9 numbered clubs so 13 - 9 = 4
- 4 additional clubs

36 + 4 = 40
$\frac{40}{52} = \frac{10}{13}$
$= .77$
$= 77\%$

6. Give an example of a situation where it is very difficult to make predictions of what may happen next.

- Where the batter will hit the ball during a baseball game.

7. Suppose that you observed that an ice cream shop has the following flavors:

Chocolate, vanilla, strawberry, chocolate-chip cookie dough, cookies and cream, and cookie monster.

a) Based on the number of flavors that the shop has, what would you assume the probability would be that when a random person walks into the ice cream shop, he or she will purchase vanilla? 6 flavors, so $\frac{1}{6} = .166 = 17\%$

b) Do you think that this probability you found in part *a* is reflective of what percentage of people actually buy vanilla? Why or why not?

Probably not. Cookie dough and cookies + cream are usually more popular.

8. How many three person committees can be chosen from a group of six people?

$$_6C_3 = \frac{_6P_3}{_3P_3} = \frac{120}{6} = 20 \text{ ways}$$

9. Dylan, Andrew, Hailey, and Jordan ran in a race. In how many different orders can they finish the race?

$$_4P_4 = 4 \cdot 3 \cdot 2 \cdot 1 = 24 \text{ orders}$$

10. There are 6 things in a hat. How many ways can you pick 2 things from the hat at once?

$$_6C_2 = \frac{_6P_2}{_2P_2} = \frac{6 \cdot 5}{2 \cdot 1} = \frac{30}{2} = 15 \text{ ways}$$

11. In how many ways can Dylan, Taylor, Sydney, Alyssa, Natalie, and Madison stand in line?

$$_6P_6 = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 720 \text{ ways}$$

12. How many four digit numbers can you make by arranging the numbers 7, 6, 3, and 5?

$$_4P_4 = 4 \cdot 3 \cdot 2 \cdot 1 = 24 \text{ numbers}$$

13. There are twelve players on the basketball team. How many ways can a starting lineup of five players be chosen?

$$_{12}C_5 = \frac{_{12}P_5}{_5P_5} = \frac{12 \cdot 11 \cdot 10 \cdot 9 \cdot 8}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = \frac{95,040}{120} = 792 \text{ lineups}$$

14. How many permutations can you make from the letters K, C, M, I, and O?

$$_5P_5 = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$$

15. A PIN for your ATM card consists of 4 numbers. You can repeat any of those 4 numbers. How many possible PINs can you come up with?

$10 \cdot 10 \cdot 10 \cdot 10 = 10{,}000$ PINs

16. Your password for your school computer has to be 3 consonants (non-vowels) followed by 4 digits (0-9) and then finally one special character (!,@,#,$,%,&,*). How many passwords are possible if no consonants may be repeated but any digit can be?

# of consonants = 26 − 5 vowels = 21

$21 \cdot 20 \cdot 19 \cdot 10 \cdot 10 \cdot 10 \cdot 7$

(21 · 20 · 19: consonants; 10 · 10 · 10 · 7: digits)

55,860,000 pws