**13.1 Notes Sheet 2 – Probability and Punnet Squares – Odds Against v. Odds For**

1. In a punnet square, a dominant trait is represented by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ letter, while a recessive trait is represented by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ letter.
2. Example: A plant that has one dominant yellow gene (Y) and one recessive green gene (g) produces yellow seeds. This plant is paired with a plant that has the same genetic make-up. What is the probability they will produce a plant with green seeds? (YY = yellow, Yg = yellow, gg = green)
	1. Draw a punnet square to model the situation:

|  |  |  |
| --- | --- | --- |
| *Makin plant babies…* | Momma plant:Y | g |
| Poppa plant:Y |  |  |
| g |  |  |

1. Example: Red and white genes are both recessive in roses. For example, two red genes (rr) produces a red rose, two white genes (ww) produces a white rose, and a rose with one red gene and one white gene (rw) is a pink rose. Is it possible to get a white rose when you cross a red rose with a pink rose?
	1. Draw a punnet square to model the situation:

|  |  |  |
| --- | --- | --- |
| *Makin rose babies…* | Momma rose: |  |
| Poppa rose: |  |  |
|  |  |  |

1. The **complement** of an event is the probability that the event will NOT happen!
	1. P(E) = probability that an event will occur
	2. P(E’) = probability that an event will not occur (complement)
	3. \*They add up to 1 (or 100%) – for example …
		1. if P(rain) is 30% - there is a 30% chance of rain… ***event***
		2. then P(not rain) is 70% - there is a 70% chance that it won’t rain… ***complement***
2. Example: given the probability of the following events, find the complement of each event.

|  |  |
| --- | --- |
| P(E) | P(E’) \**complement* |
| 0.25 |  |
| 0.40 |  |
| 2/5 |  |
| 45% |  |

1. You will calculate the odds FOR something happening and odds AGAINST something happening. This is **very** different than probability!!!
	1. ODDS are written as ratios.
	2. The formula to calculate the **odds FOR** something = $\frac{P(E)}{P(E^{'})}$
	3. The formula to calculate the **odds AGAINST** something = $\frac{P(E')}{P(E)}$
2. Example: The PROBABILITY of the Lions winning the next SuperBowl is 0.35. What are the odds for them winning? What are the odds against them winning?
	1. P(E) = probability of lions winning superbowl = 0.35
	2. P(E’) = probability of lions NOT winning superbowl = 0.65
	3. ODDS FOR = $\frac{0.35}{0.65}$ = \*\*\*change to fraction = $\frac{7}{13}$ ….. so the odds for the lions winning are 7:13
	4. ODDS AGAINST = $\frac{0.65}{0.35}$ = \*\*\*change to fraction = $\frac{13}{7}$ ….. so the odds against the lions winning are 13:7
3. Example: P(E) = 2/7. Find odds against.
4. If the odds against an event are 5:4, what was the probability that the event would occur? *Tricky….*

Book Assignment p. 734-736: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_