

## 5.1) What is Probability? pg. 173 3, 7, 9-11

Statistics - field of study that describes inferences are made on unknown populations

Probability - field of study that makes statements about what will occur in known populations

Example 1 #5, 6 pg. 174

⑤ Probability of wiggling ears

⑥ Probability of raising one eyebrow

Probability - Given all outcomes are equally likely

$$P(A) = \frac{\text{number of outcomes favorable to A}}{\text{Total number of outcomes}}$$

$$\text{Relative Frequency} = \frac{\text{frequency of an event}}{\text{Sample size}}$$

Example 2 Use a punnett square to determine the probability of having brown, blue, or green eyes.

	B	b
G	GB	Gb
b	bB	bb

$$P(\text{Brown}) = \frac{2}{4} = .5$$

$$P(\text{Green}) = \frac{1}{4} = .25$$

$$P(\text{blue}) = \frac{1}{4} = .25$$

\* Sum of all probabilities of assigned to outcomes in a sample space will equal 1

$$P(\text{Blue}) + P(\text{Brown}) + P(\text{Green}) = 1$$
$$.25 + .5 + .25 = 1$$

Complement of an event - Probability of an event not occurring

$$P(\text{not } A) = 1 - P(A)$$

Find the probability of not having blue eyes in the above.

$$P(\text{not blue}) = 1 - .25$$
$$= .75$$

Law of large numbers - As the sample size increases, the relative frequency of the outcomes gets closer to the actual probability

\* The larger the sample, the more reliable the data

Bonus: Odds vs Probability

$$\text{Probability} = \frac{\text{favorable}}{\text{total}}$$

$$\text{Odds} = \frac{\text{favorable}}{\text{not favorable}}$$