

A mathematician's wife is having a baby.
When the baby is born, she asks him,
"Is it a boy or a girl?"
He replies, "Yes."

Warm-up

In a room full of 60 teachers, Mr. G notices:

- 45 teachers have brown hair
- the odds against a teacher having green eyes is 13:2
- in 5 teachers do not have green eyes or brown hair

If we choose a teacher at random, find:

- $P(\text{Brown hair})$ ← complement, opposite, NOT
- $P(\overline{\text{green eyes}})$
- $P(\text{Brown hair} \cup \text{Green eyes})$
(use a Venn Diagram)
- $P(\text{Brown hair} \cap \text{Green eyes})$
(use the formula)
- odds in favor of Brown hair \cup Green eyes
- Are brown hair and green eyes mutually exclusive?

$$a) P(\text{Brown hair}) = \frac{45}{60} = 0.75 = 75\%$$

① Prob

$$P(\text{Brown hair}) = \frac{1}{60} = 0.15 = 15\%$$

$$b) P(\overline{\text{Green eyes}}) = P(\text{Don't have green eyes}) = P(\text{Green eyes}')$$

$$= 100\% - P(\text{Green eyes})$$

$$P(\text{Green eyes}) \Rightarrow \text{odds against}$$

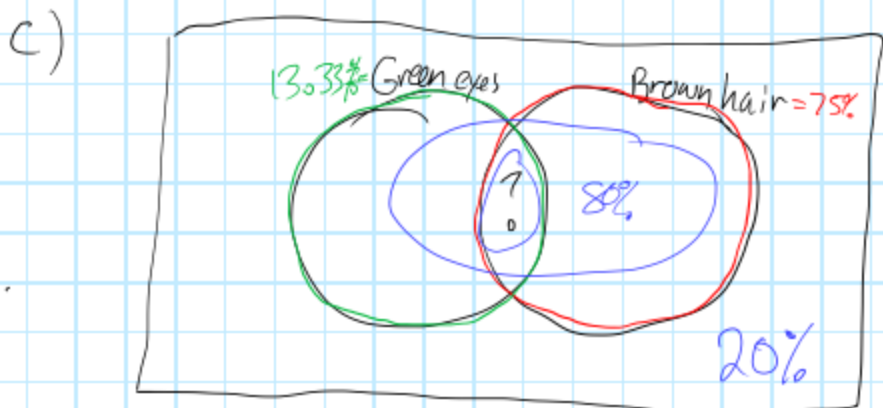
$$13:2 \Rightarrow \frac{52:8}{\text{total } 60}$$

$$= \frac{\# \text{ fav}}{\text{total}} = \frac{2}{13+2} = \frac{2}{15} = 0.1333...$$

$$= \frac{8}{60} = 13.33\%$$

$$P(\overline{\text{Green eyes}}) = 100\% - 13.33\%$$

$$= \underline{86.67\%}$$



$$\frac{1}{5} = \text{No green eyes} \\ = 20\% \text{ @ Brown hair}$$

(4) Venn

$$P(\text{Green eyes} \cup \text{Brown hair}) = 80\%$$

d) $P(\text{Brown hair} \cap \text{Green eyes})$

⑤ Form

Formula

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$\Rightarrow P(\text{BUG}) = P(B) + P(G) - P(B \cap G)$$

$$80\% = 75\% + 13.33\% - x$$

$$x + 80\% = 88.33\%$$

$$x = 88.33\% - 80\%$$

$$P(B \cap G) = 8.33\%$$

e) odds in favor of BUG

$$\Rightarrow P(\text{BUG}) = 80\% = \frac{\# \text{ favor}}{\text{total}} \Rightarrow \frac{80}{100}$$

Odds in favor \Rightarrow # favor : # unfav
80 : 20 $\div 10$

Odds
in
favor \Rightarrow # favor : # unfav

$$80 : 20 \quad \div 10$$

$$8 : 2 \quad \div 2$$

4 : 1 \leftarrow If I pick 5 teachers
4 will have Brown hair (or)
green eyes
1 won't have either

f) mutually exclusive! \Rightarrow NOT mutually exclusive