

Genetics & Probability Quiz

Name

Key

1. In rabbits black (B) fur color is dominant over white (b) fur color. If a heterozygous black rabbit breeds with a homozygous white rabbit, what are the chances of the offspring being black? White?

	B	b
b	Bb	bb
b	Bb	bb

$$P(\text{Black}) = \frac{2}{4} = \frac{1}{2} = .5 = 50\%$$

$$P(\text{White}) = \frac{2}{4} = \frac{1}{2} = .5 = 50\%$$

2. In corn having pigment (red or purple) is dominant to have non-pigment (white or yellow). If a heterozygous pigmented corn is crossed with a homozygous non-pigmented corn, what is the probability of having white or yellow (non-pigmented) corn? What is the probability of having red or purple (pigmented) corn?

	P	p
p	Pp	pp
p	Pp	pp

$$P(\text{pigmented}) = \frac{2}{4} = \frac{1}{2} = .5 = 50\%$$

$$P(\text{non-pigmented}) = \frac{2}{4} = \frac{1}{2} = .5 = 50\%$$

3. A black colored mare with a trotting gait (BbTt) is bred by a chestnut colored stallion with a trotting gait (bbTt). How many possible outcomes are there? What are the chances that the foal is chestnut colored with a trotting gait?

4 · 4 = 16 possible outcomes

	BT	Bt	bT	bt
bT	BbTT	BbTt	bbTT	bbTt
bT	BbTt	Bbtt	bbTt	bbtt
bT	BbTT	BbTt	bbTT	bbTt
bT	BbTt	Bbtt	bbTt	bbtt

	Bb
b	Bb
b	Bb

P(chestnut)
 $\frac{2}{4}$

	Tt
T	TT
t	Tt

P(trotting)
 $\frac{3}{4}$

$$\frac{3}{8} = .375 = 37.5\%$$

$$\frac{6}{16} = \frac{3}{8} = .375 = 37.5\%$$

4. In cattle black colored fur is dominant to red colored fur and polled (no horns) is dominant to having horns. If a black, polled (BbHH) bull mates with a red, polled (bbHh) cow, how many possible outcomes are there? What are the chances that the offspring are black and polled? What are the chances that the offspring are red and polled?

4 · 4 = 16 possible outcomes

	BH	BH	bH	bH
bH	BbHH	BbHH	bbHH	bbHH
bh	BbHh	BbHh	bbHh	bbhH
bH	BbHH	BbHH	bbHH	bbHH
bh	BbHh	BbHh	bbHh	bbhH

	B	b
b	Bb	bb
b	Bb	bb

	H	H
H	HH	HH
h	Hh	Hh

$$P(\text{Black}) = \frac{1}{2}$$

$$P(\text{Red}) = \frac{1}{2}$$

$$P(\text{polled}) = \frac{4}{4} = 1$$

$$P(\text{horn}) = 0$$

$$P(\text{black \& polled}) = \frac{1}{2} \cdot 1 = \frac{1}{2} = 50\%$$

$$P(\text{red \& polled}) = \frac{1}{2} \cdot 1 = \frac{1}{2} = 50\%$$

5. What is the probability of drawing a red Ace in a standard 52-card deck?

$$\frac{2}{52} = \frac{1}{26} = .038 = 3.8\%$$

6. The cattle on a farm have coloring of black, black & white, red, red & white. They are also horned or polled. How many different combinations of offspring could the farm raise?

$$\begin{array}{ccc} 4 & \cdot & 2 \\ \text{color} & & \text{horn} \end{array} = 8 \text{ different combinations of offspring}$$

7. A die is rolled and a card is drawn from a 52-card deck. Find the probability of getting a number greater than 3 and a number card.

4-6 2-9 w/ 4 suits

$$\frac{3}{6} \cdot \frac{32}{52} = \frac{4}{13} = .308 = 30.8\%$$