

Solutions

1. $BB = 0.35$

$$p^2 = 0.35$$

$$p = 0.59$$

$$Q = 1 - 0.59$$

$$Q = 0.41$$

$$\text{Heterozygotes} = 2pq$$

$$2 \times 0.41 \times 0.59 = 0.48$$

$$\text{B allele} = p = 0.59$$

$$\text{b allele} = q = 0.41$$

2. $P^2 + 2pq = 0.64$

$$q^2 = 1 - 0.64$$

$$q^2 = 0.36$$

$$q = 0.6$$

$$p = 1 - 0.6$$

$$p = 0.4$$

$$\text{heterozygotes} = 2pq$$

$$2 \times 0.4 \times 0.6 = 0.48$$

3. Red = 0.49

$$C^R = q$$

$$q^2 = 0.49$$

$$q = 0.7$$

$$p = 0.3$$

$$\text{blue} = r^2$$

$$p^2 = 0.3^2$$

$$p^2 = 0.09$$

$$\text{blue} = 9\%$$

$$9\% \text{ of } 200 = 200 \times 0.09 = 18 \text{ blue fish}$$

$$\text{Purple} = 2pq$$

$$2 \times 0.3 \times 0.7 = 0.42$$

$$\text{Purple} = 42\%$$

$$42\% \text{ of } 200 = 200 \times 0.42 = 84 \text{ purple fish}$$

4. $P^2 + 2pq = 0.58$

$$q^2 = 1 - 0.58$$

$$q^2 = 0.42$$

$$q = 0.65$$

$$\text{frequency of recessive allele} = 0.65 \text{ or } 65\%$$

5. $q^2 = 0.26$

$$q = 0.51$$

$$p = 1 - 0.51$$

$$p = 0.49$$

$$2pq = 2 \times 0.49 \times 0.51 = 0.50$$

$$50\% \text{ of } 100 = 50 \text{ heterozygous rhinos}$$

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