

- 1 (a) $95/200 \times 100 = 47.5\%$ have the recessive phenotype.
(b) The two equations needed to find the percentage of the population that are recessive are:

$$p + q = 1$$

$$p^2 + 2pq + q^2 = 1$$

The frequency of the homozygous recessive trait is 0.48. So, $q^2 = 0.48$, therefore $q = \sqrt{0.48} = 0.69$.

Now we can find p as, $p + q = 1$ so, $p = 1 - 0.69 = 0.31$

Frequency of heterozygote = $2pq = 2 (0.31 \times 0.69) = 0.43$

So, percentage of heterozygotes = 43%

(c) Frequency of homozygotes with dominant phenotype = $0.31^2 = 0.1$

- 2 126/150 have brown fur so, 150 – 126 (or 24) have grey fur (recessive phenotype).
24/150 × 100 = percentage homozygous recessive = 16%
Frequency = 0.16

$$q^2 = 0.16 \text{ so, } q = \sqrt{0.16} = 0.4$$

Now we can find p as, $p + q = 1$ so, $p = 1 - 0.4 = 0.6$

Frequency of heterozygotes = $2pq = 2 (0.6 \times 0.4) = 0.48$

Frequency of homozygous dominant = $p^2 = 0.6$ so, $p^2 = 0.36$