

# Hints for Exercises 2.1

#1 Use Theorem 2.2

#2 Use theorem 2.2 and the Principle of Mathematical Induction along with some algebraic manipulations.

#3 You could use tree diagrams or compute distributions using the reproduction function as follows:

possible matings	AA x AA	AA x Aa	Aa x Aa
frequency	$\frac{1}{4}$	?	?
distribution of offspring	$[1, 0, 0]$	$[\frac{1}{2}, \frac{1}{2}, 0]$	$[, , ]$

Apply vector operations to calculate distribution of offspring

$$\frac{1}{4}[1, 0, 0] + ?[\frac{1}{2}, \frac{1}{2}, 0] + ?[ , , ] = ?$$

Now calculate the genotypic distribution in the next generation similarly.

mating pairings	AA x AA	AA x Aa	Aa x Aa	Aa x aa	aa x aa	AA x aa
Frequency	?	?	$\frac{36}{256}$	?	$\frac{1}{256}$	?
Distribution	$[1, 0, 0]$	?	?	$[0, \frac{1}{2}, \frac{1}{2}]$	?	?

Apply vector arithmetic as above

#4 We generalize #3

#6a Use Theorem 2.2

#6b Use Exercise #4